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**System for Environmental and Agricultural Modelling;
Linking European Science and Society**

**Application of the Procedure for Institutional Compatibility
Assessment (PICA) to the implementation of the EU Nitrate
Directive in Midi-Pyrenees. Evaluation and suggestions for
further improvement and integration into the final version
of SEAMLESS-IF**

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General Information

Task(s) and Activity code(s): Task 6.6, Activity 6.6.6
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Executive summary

This Project Deliverable (PD) encompasses work done within the Activity 6.6.6 (Integration, evaluation and improvement of the Procedure for Institutional Compatibility Assessment (PICA) in SEAMLESS-IF) from April 2008 until November 2008. PICA has been developed in WP2 as a formalised methodology to assess ex-ante the compatibility between policy options and different institutional contexts. This PD is a joint production of the members of the PICA Tool Task Force working at Cemagref in Clermont-Ferrand (Cemagref) and Humboldt-University of Berlin (UBER).

In Activity 6.6.6 (former Activity 6.4.5), a second empirical application of PICA was conducted, the perception of the tool by policy experts and their preferred modes of interaction were assessed and the tool was further integrated into SEAMLESS-IF, focussing on conceptual, technological, and empirical aspects.

The main objective of this second testing was to analyse if a PICA application could be carried out by an external expert who was not involved in the tool development process. In order to achieve a full application of SEAMLESS-IF, PICA was applied to the implementation of the policy option 'EU Nitrate Directive' in Midi-Pyrenees. An integrative modeller (IM) with a background in institutional economics was hired to carry out the testing. This was done in close cooperation with INRA in Toulouse, which provided expert supervision as well as the necessary infrastructure (working space, computer, data access etc.) to support the PICA run. The time frame for the testing was defined as two months, from July to August 2008. The IM has run PICA on her own, on the basis of the initial information provided by the SEAMLESS-PICA team and the information she collected. Therefore, as part of the testing, the IM has chosen a methodological design consisting of quantitative and qualitative approaches to collect available (regional) information to come up with qualitative statements about the Nitrate Directive's institutional compatibility with the context of Midi-Pyrenees. At all time of the PICA run, the possibility to contact the PICA team was guaranteed to clarify questions and to provide practical assistance. These requests have been documented in detail to use them for further improvements of the presentation of PICA in the GUI and preliminary training materials as well as for qualitative improvements of the tool.

The application of PICA to the implementation of the Nitrate Directive in Midi-Pyrenees further validates the filter function of the policy matrix in PICA Step 1. With regard to the methodology used for the application of the subsequent steps, this testing highlights the interest of including several experts' opinions in order to reduce the subjectivity induced by the choices of the PICA Integrative Modeller alone or by the integration of stakeholders' point of view.

The testing also shows the capability of the tool to be run by an expert who was not part of the SEAMLESS PICA development team. The conditions needed for future successful PICA applications were further defined. In terms of competencies, a background in institutional economics proved to allow the external expert for a quick adaptation to the tool. The existence of local contacts was of great help for an application in an unknown regional (institutional) context. As a timeframe for application, with the two previous conditions fulfilled, two and a half months seem to be sufficient to obtain relevant results. With regard to the improvements to bring to the presentation of PICA in the GUI and the training materials for future 'PICA-Integrative Modellers', precise methodological guidance at each step of the procedure are needed for an easier uptake of the tool. With these improvements, PICA should be ready for end-users applications.

Finally, the combination of the PICA results with the results of the CropSyst-FSSIM model chain application (Louhichi et al., 2008) shows the added value of taking into account an institutional perspective in SEAMLESS-IF ex-ante policy assessment. The PICA results can contribute to the interpretation and validation of the model results, often dependent on strong assumptions with regard to institutional aspects which, in reality, influence policy implementation and outcomes.

In addition to the testing of PICA by an Integrative Modeller in Midi-Pyrenees, policy experts as potential end users of the procedure have been included in testing activities. Therefore, four meetings between representatives of the Cemagref and policy experts from the regional services of French Ministries of Agriculture and Environment (potential secondary users) have been used as interacting platforms, where specific PICA workshops have been carried out to explore the perception of the tool by policy experts and their preferred interaction modes with future PICA Integrative Modellers. The interactions have shown the great interest of these potential secondary users towards the application of PICA. Improvements in the communication about the procedure for this specific audience were identified. Regarding the future interactions with 'PICA-Integrative Modellers', policy experts seem willing to be actively involved in the applications of the tool.

Finally, two versions of the PICA GUI (not delivered to the European Commission) are presented: an August 2008 version integrated in the SEAMLESS-IF GUI and a March 2009 version, linked to the S-IF database. These versions are based on a) suggestions made in appendix 3 in D2.4.2, and b) common work with WP5 during the project on PICA-elements, as documented in appendix 11 of the PD 6.5.5.2. Major improvements and adjustments have been made since then. Besides visual improvements, this also includes the creation of a PICA ontology and linking PICA with the database. Screenshots of each version as well as suggestions for further improvements are included in this PD.

1 Introduction

The Procedure for Institutional Compatibility Assessment (PICA) has been developed as a formalised methodology to assess ex-ante the compatibility between policy options and different institutional contexts. The PICA procedure consists of four working steps. Step 1: Classification of the policy option; Step 2: Identification of crucial institutional aspects; Step 3: Definition of institutional indicators characterising crucial institutional aspects; Step 4: Assessment of the institutional compatibility between the policy option and the institutional context.

Within a first testing (02.2007 - 02.2008), PICA was applied to the implementation of the policy option 'EU Nitrate Directive' in the sample region Auvergne, France, in two test cases at NUTS 3 level: the départements Allier and Puy-de-Dôme. Three different empirical analyses were conducted: In *Allier*, *first*, a 'simulation' of running PICA before the actual implementation of the Nitrate Directive was carried out as well as, *second*, 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 allowed for validating the PICA results. In Puy-de-Dôme, *third*, the procedure was applied to the hypothetical implementation of the Nitrate Directive in the département, i.e., in a 'real' ex-ante situation. The comparison of both 'ex-ante' assessments has shed light on the ability of PICA to account for (crucial) similarities and differences in the institutional contexts of both study areas (Schleyer *et al.*, 2007b).

While in Auvergne PICA was carried out primarily to empirically test the procedure for methodological practicability and quality of results, two further tests of PICA have been organised to focus on the use of the tool and its integration within Seamless-IF: 1) The test of the use of PICA by an external expert in Midi- Pyrenees; 2) The evaluation of the perception of PICA by policy experts. The objective of this PD is to highlight the findings of these two distinct tests and the insights they provide for the application of PICA. Additionally, the progresses achieved for PICA integration into Seamless-IF and the SeamGUI are illustrated in the last section of this document.

2 Application of PICA to the implementation of the EU Nitrate Directive in Midi-Pyrenees

For this second testing of the tool, PICA was applied to the implementation of the EU Nitrate Directive in Midi-Pyrenees. The main objective was to test the practicability of using PICA by Integrative Modellers (IM). Additionally, this testing was used to further validate PICA ex-ante policy evaluation qualities. In consistence with the third year SEAMLESS-IF objective, i.e. to concentrate on a few appealing applications, the choice to study the implementation of the Nitrate Directive in the sample region Midi-Pyrenees allowed for the achievement of a full application of SEAMLESS-IF.

For the testing, an integrative modeller with a background in institutional economics and based in the Midi-Pyrenees region was chosen. Contacts were formed through SEAMLESS researchers, providing networks to find a suitable candidate (Cemagref Clermont-Ferrand) as well as infrastructure (INRA Toulouse) to support the PICA run. At the beginning of the test, the PICA team explained the IM the tool's functionalities and the distinct assessment steps. This introduction to institutional compatibility analysis was somewhat similar to explanations used when interacting with policy experts (IM-PE interaction).

The IM then ran PICA on the basis of the initial information provided by the SEAMLESS PICA team and the information collected by the IM. Therefore, as part of the testing, the IM chose a methodological design and collected available quantitative and qualitative (regional) information to come up with qualitative statements about the EU Nitrate Directive's institutional compatibility in the context of Midi-Pyrenees. At all time of the PICA run, the possibility to contact the SEAMLESS PICA team was guaranteed to clarify questions and to provide practical assistance. These requests have been documented in detail and are used for improvement of the presentation of PICA in the GUI and in the preliminary training materials. Additionally, this second testing provided new insights with regard to the methodology of application of the tool. The time span to carry out the testing was limited to two month (July and August 2008). This allowed for testing the practicability of the tool in respect to user preferences and quality of results in a comparatively short time compared to the first PICA testing in Auvergne.

In this section, the results of the PICA application in Midi-Pyrenees are presented, followed by a discussion on the methodological insights gained. Implications of the testing for the future use of PICA by Integrative Modellers and the contribution of an institutional perspective to ex-ante policy assessment within SEAMLESS-IF are then presented. The result and methodological parts are largely based on the report prepared by the external PICA expert in charge of the application.

2.1 Testing PICA: results

PICA was applied to the implementation of the EU Nitrate Directive in Midi-Pyrenees in France. As this policy is implemented in this region since 1994, i.e., part of the area is already classified as vulnerable zone, the hypothetical policy scenario designed for the application was "The extension of the vulnerable zones to the whole region", that is, the whole (agricultural) surface in the region is to be designated as a vulnerable zone. This policy scenario also fits to the application of other Seamless-IF models to the implementation of the Nitrate Directive in the entire Midi-Pyrenees region.

For the institutional compatibility assessment, three representative “departments” (NUTS 3) in Midi-Pyrenees were chosen as study areas: Tarn, Gers and Haute-Garonne. They are described in the following section. Concerning population and employment, the data used comes from the population census conducted by INSEE (2006) (National Institute for Statistics and Economic Studies). Data concerning agriculture originates from the farm structure survey elaborated by the French Ministry of Agriculture (2005).

2.1.1 The Midi-Pyrenees region as a study area

2.1.1.1 *General Background information*

The Midi-Pyrenees region, located in the southwest of France, is the largest region of the country and one of the main areas for agriculture. It is divided into eight “departments” (Ariège, Aveyron, Gers, Haute-Garonne, Hautes-Pyrenees, Lot, Tarn and Tarn et Garonne). The agricultural surface represents 2 340 250 ha, managed by 50 900 farms (5.7% of the working population in the region).

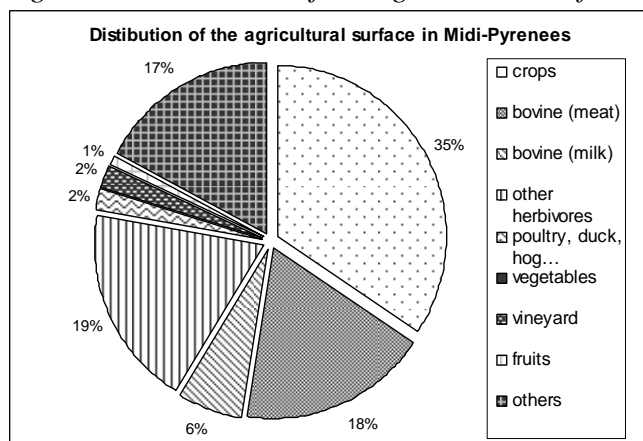
The region presents a high diversity of relief, with plains, hills and mountains. The Pyrenees Mountains in the south are shaping the biophysical conditions of the départements Ariège and Hautes-Pyrenees as well as the southern parts of the “department” Haute-Garonne. The département Aveyron, the western part of Lot and the north-eastern part of Tarn are characterised by mountains of the Massif Central and the Quercy plateaux. Plain areas are found in the central part of the region on both sides of the Garonne Valley in the “departments” Gers, Tarn et Garonne, Haute-Garonne, Lot and Tarn. The rivers flowing from the mountains constitute a large network in the plain. This water resource constitutes a worrying problem in this region which is characterized by hot and dry summers. Yet, frequent periods of drought are leading to dwindling water resources and thus high nitrate rates issues.

This territory presents also disparities concerning the population density. The only major city, Toulouse, gathers around 30% of the population with about 440 000 inhabitants. The majority of the region is characterised by vast rural areas that are sparsely inhabited. As a result, the population density of the region (56 inhabitants/km²) is considerably lower than the national average. The employment situation of the region is comparable to the national average, except for a comparatively larger agricultural sector, which is a distinct feature.

2.1.1.2 *Agriculture in Midi-Pyrenees*

The region of Midi-Pyrenees is characterised by a diversity of agricultural production (Figure 1). While the foothills and mountain areas are mainly used for extensive breeding (e.g. bovine, ovine, etc), the plain areas are utilised mainly for crop production like for soft wheat or corn. Furthermore, one can find in these flat areas fruit production (apple, plums and peaches), vegetables and vine, as well as a few intensive breeding activities (e.g. poultry, duck, hog, etc.). The numerous farms (50 900) tend, since the last decade, to become more specialized and to grow in size. The contribution of the agricultural sector to the region’s added value accounted for 3.9%.

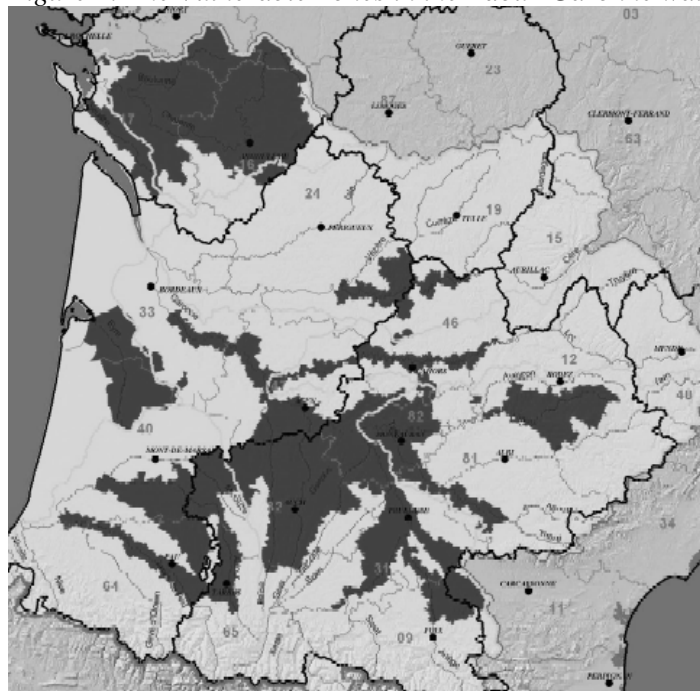
Figure 1: Distribution of the agricultural surface in Midi-Pyrenees



2.1.1.3 The implementation of the EU Nitrate Directive in Midi-Pyrenees

The EU Nitrate Directive (ND) is implemented in the Midi-Pyrenees region since 1994. Since then, nitrate rates are regularly monitored, vulnerable zones (VZ) have been designated and corresponding action programmes implemented. As a national rule, the revision of the delimitation of vulnerable zones is conducted every four years, leading to an adjustment of their delineation if necessary. The Midi-Pyrenees region is part of the Adour-Garonne watershed. Because nitrate pollution in this watershed is mainly linked to crop production, major vulnerable zones can be found in the “departments” Tarn, Tarn et Garonne, Gers and Haute-Garonne, where crop production is dominant. The vulnerable zones represent about 30% of the total agricultural surface of the Midi-Pyrenees region (DIREN, 2004). Their share in the total agricultural surface has decreased compared to the last delimitation campaign in 2002, although the nitrate rates did not show a significant decreasing trend in the concerned areas. Figure 2 shows the location and extent of the vulnerable zones in the Adour-Garonne watershed and in the Midi-Pyrenees region in 2004.

Figure 2: The Vulnerable Zones in the Adour-Garonne watershed



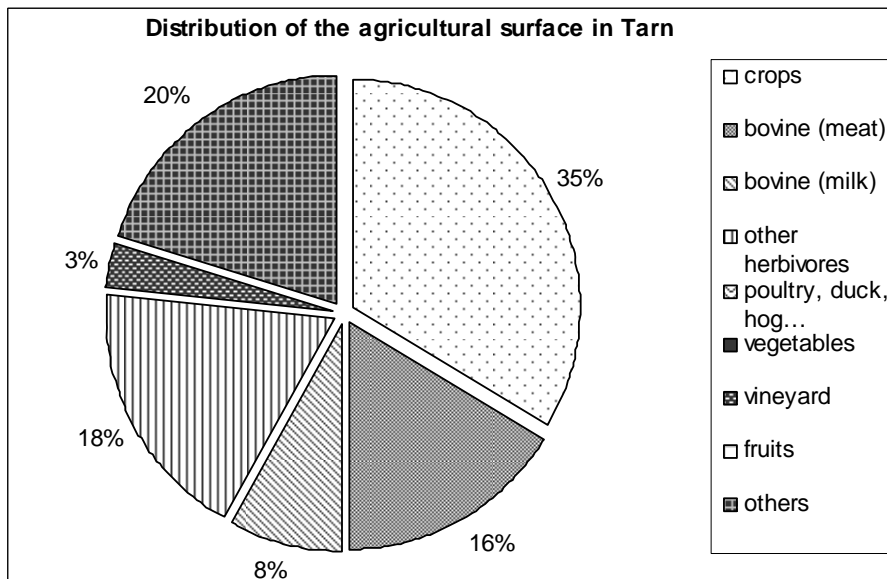
2.1.2 The three “départements” for PICA testing in Midi-Pyrenees

Three representative study areas were chosen to apply PICA in Midi-Pyrenees: (1) the département Tarn, (2) the département Gers and (3) the département Haute-Garonne. The choice of these areas reflects the diversity of biophysical conditions and agricultural activities in the region. This diversity of conditions leads also to different issues in terms of nitrate pollution, reflected by a different importance of the vulnerable zones and different conflict situations. In the following, the three départements are briefly described.

2.1.2.1 The département Tarn

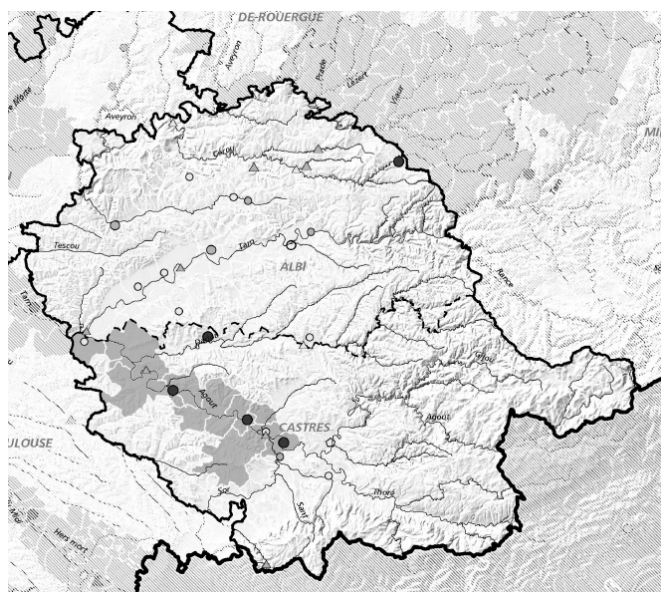
The département Tarn (4 513 km² and 304 196 ha of agricultural surface) is an area of mountains and valleys. It is a rural area which accounts for ~365 000 inhabitants (63.4 inhabitants/km²). The préfecture is Albi with 48 000 inhabitants and a growing urban population, mainly thanks to the development of a new activity centre. The farming population represents 6.5% of the working population, managing 6 472 farms. The average farm size is 47 ha. The mountain part is characterized by livestock farms. Therefore, 42% of the agricultural surface of the département is used as grassland. The valley, representing around 33% of the agricultural surface, is characterized by crop farming. It is the most representative département of the region in terms of agricultural productions diversity (Figure 3).

Figure 3: Distribution of the agricultural surface in Tarn



In the plain area where ground waters are superficial and vulnerable, the nitrate rate can reach 90 mg/l. The vulnerable zone encompasses 20 municipalities in the valley of the Agout River and represents 7.4% of the département’s agricultural surface (Figure 4). The size of the vulnerable zone did not change after its initial delimitation.

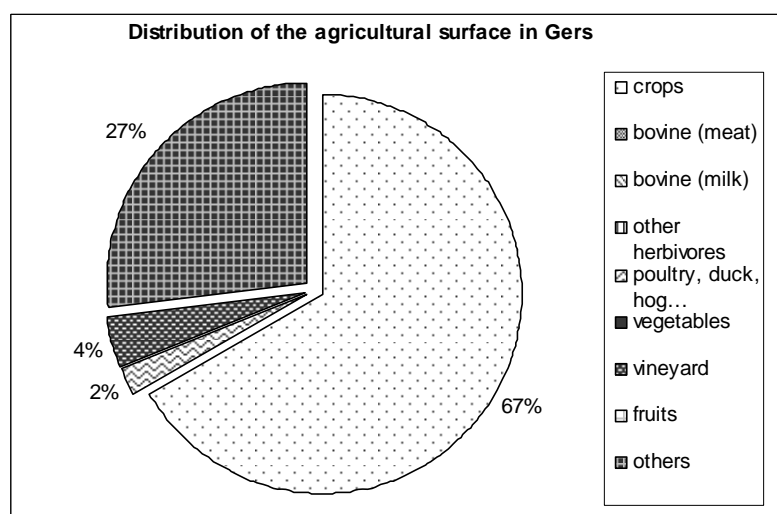
Figure 4: The vulnerable zone in Tarn



2.1.2.2 The département Gers

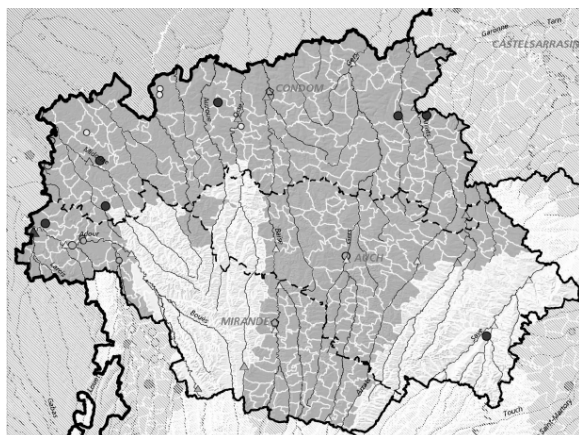
The département Gers (6 282 km² and 457 733 ha of agricultural surface) is mainly a plain rural area, with about 180 000 inhabitants (28.8 inhabitants/km²). The main town is Auch with 21 700 inhabitants, characterised by a decreasing population rate. The farming population represents 16% of the working population, managing 8 195 farms. The average farm size is 56 ha. Agriculture is dominated by crop production, representing 62% of the agricultural surface (Figure 5). The département is also characterized by the presence of large farmers' cooperatives (Cooperative Terre de Gascogne, Valandour) which are in charge of input supply, crops procurement and production selling.

Figure 5: Distribution of the agricultural surface in Gers



The crop production in this department is demanding due to the biophysical conditions. Up to 90% of deducted water is used for irrigation in the summer months. The département is one of the most intensively irrigated areas in France. Because the département is covered by numerous artificial small rivers which are supplied by a dam in the Pyrenees, Gers bears a high natural vulnerability for water pollution. In consequence, the vulnerable zone is comparatively large, encompassing 318 municipalities in the valley of the *Adour*, *Gers*, and *Arrat* Rivers and representing 72% of the département's agricultural surface (Figure 6).

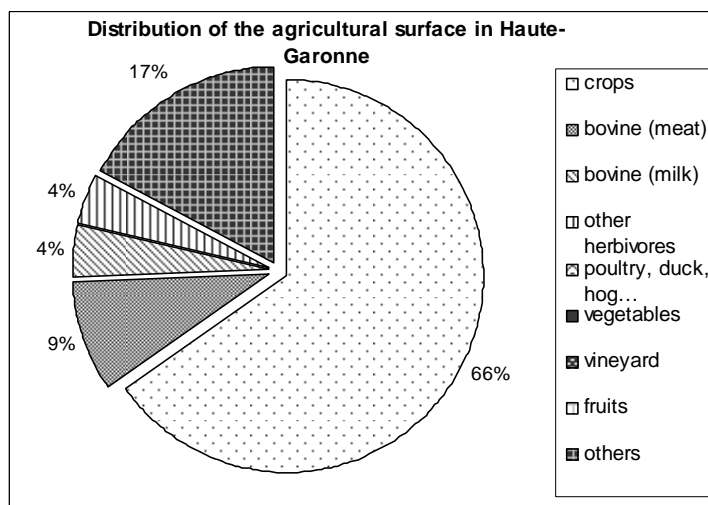
Figure 6: The vulnerable zone in Gers



2.1.2.3 The département Haute-Garonne

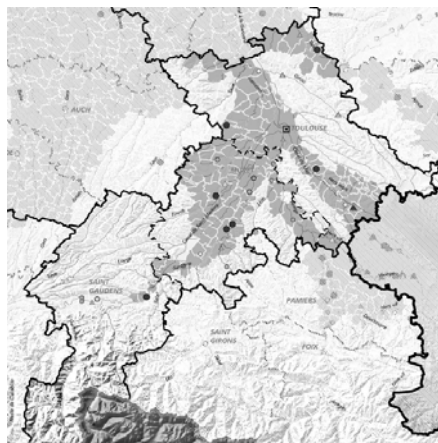
The département Haute-Garonne (6 346 km² and 329 237 ha of agricultural surface) encompasses a mixture of mountains and valleys. In contrast to the other two départements, it is an urbanised area with 1 169 500 inhabitants (185.4 inhabitants/km²). The main town is Toulouse with 437 100 inhabitants, characterised by a rapidly growing urban population. The farming population represents only 1.8% of the working population with 6 761 farms. The average farm size is 47 ha. In the mountain part, livestock farms are dominant and 17% of the agricultural surface is occupied by grassland. In the valley part, crop farming predominates and represents 64% of the agricultural surface of the département (Figure 7).

Figure 7: Distribution of the agricultural surface in Haute-Garonne



The département shows a similar agricultural irrigation intensity to the department Gers. However, this département benefits from the large *Garonne* River and presents thus fewer problems with nitrate water pollution. The vulnerable zone encompasses 180 municipalities in the valley of Garonne, Hers mort and Ariège, and represents 34% of the agricultural surface (Figure 8).

Figure 8: The vulnerable zone in Haute-Garonne



2.1.3 Methodology applied

For the application of PICA in Midi-Pyrenees, various empirical methodological approaches have been applied within the distinct assessment steps. Besides a focused literature review to gain a deeper understanding of the policy option 'EU Nitrate Directive' in general and its implementation in the region, methods utilised for this testing include the analysis of quantitative data as well as qualitative data collected through problem-centred interviews with stakeholders¹ and a focus group with stakeholders and external experts. Table 1 gives an overview of the methods applied in the respective PICA steps. They are described in detail in the following sub-sections.

Table 1: The empirical methods used for the application of PICA in Midi-Pyrenees

PICA Steps	Empirical Methods	Material/data used
Step 1: Classification of the policy option	Review of policy documents	Definition of the policy type 'EU Nitrate Directive' on the basis of original policy documents
Step 2: Identification of Crucial Institutional Aspects	Literature review	Documents about the EU Nitrate Directive (scientific and evaluation reports)
	Interviews	Face-to-face interviews with stakeholders involved
Step 3: Definition of Institutional Indicators	Statistical data analysis	Data bases 1998-2008
	Interviews	Telephone interviews with stakeholders with an expertise on the EU Nitrate Directive
Step 4: Assessment of Institutional Compatibility	Focus group	Structured focus group with external experts and stakeholders involved

¹ As stakeholders, we understand in this context, people being actively involved in the implementation process of the EU Nitrate Directive, while experts are characterised by having a detailed scientific knowledge on the EU Nitrate Directive and other environmental policies.

2.1.4 The institutional compatibility assessment of the vulnerable zones (VZ) extension scenario

2.1.4.1 PICA Step 1: Classification of the policy option 'EU Nitrate Directive'

The first step of PICA corresponds to the classification of the policy option under scrutiny as a policy type, according to the policy matrix introduced in Schleyer et al. (2007, p. 31). The implementation of action programmes aiming at limiting nitrate use in vulnerable zones may affect farmers' production systems and thus their production function. This does not necessarily mean that yields will decrease due to restrictions in fertiliser use, since the objective of the EU Nitrate Directive is to build standards for an optimum nitrate input. However, the farm production costs may increase (e.g., for building manure storages) potentially leading to a reduction in profit. The EU Nitrate Directive can be thus defined as a policy that intervenes at markets. This policy implies regulatory (command and control) instruments (the mandatory rules included in action programmes to be implemented in vulnerable zones). As a conclusion, the EU Nitrate Directive is categorised as a "regulatory type of policy having affects on markets".

2.1.4.2 PICA Step 2: Identification of Crucial Institutional Aspects (CIA)

The identification of Crucial Institutional Aspects which may foster or hamper the extension of the Nitrate Directive vulnerable zones in Midi-Pyrenees was realised in several steps. For a first orientation of the range of possible CIA, the initial list of CIA linked to the policy type 'regulatory on markets' as identified in Table 3.2 in Schleyer et al. (2007) served as a basis. Additionally, the final lists of CIA identified in the former PICA applications to the implementation of the Nitrate Directive in Auvergne (Amblard et al., 2008) were considered as potentially relevant also in Midi-Pyrenees. The CIA included in the initial list linked to the policy type and in the final lists of the Auvergne test case were revised for identification of those which potentially play a role for the vulnerable zones extension scenario in Midi-Pyrenees on the basis of regional specific information. This led also to the identification of new, region specific CIA.

The adjustment of the CIA list to the regional context of Midi-Pyrenees was done on the basis of: (1) a literature review and (2) interviews with regional stakeholders involved in the implementation of the EU Nitrate Directive.

(1) First, a focused literature review on the implementation of the EU Nitrate Directive in Midi-Pyrenees has been carried out. For this, documents on previous zoning, action programmes, etc. have been consulted. Using the two initial lists of CIA as a starting point, together with insights gained from the literature review, a first – literature based - revised list of CIA which potentially play a role for the implementation of the vulnerable zones extension in Midi-Pyrenees was compiled (Table 2).

From the initial list of CIA linked to the policy type 'Regulatory on market', the CIA *Information asymmetry state versus farms*, *Transaction costs for administrations* and *Transaction costs for farmers* were selected as being potentially relevant for the Midi-Pyrenees test case. The initial CIA *Level of opportunism* was considered as being too broad to reflect the precise institutional constraints found in the Midi-Pyrenees context. The level of opportunism was considered as depending on the level of information asymmetry (already selected as a relevant CIA), on the opportunity costs to cheat for farmers and on psychological factors (e.g. to protest against an "unfair" regulation). As a result, these three underlying factors were included as separate CIA, with a distinction between the *Information asymmetry state versus farms*, *Opportunity costs for farmers* and the *Psychological factors affecting farmers' level of opportunism*. From the final lists of CIA identified in the Auvergne applications, the CIA *Interplay between administrations*, *Lack of information*, *Attitude of*

farmers towards ecological considerations, Bargaining power of farmers' organisations, Bargaining power of environmental associations and Public concern about water pollution from agriculture were kept as potentially affecting the extension of the vulnerable zones extension to the whole Midi-Pyrenees region.

Table 2: The revised list of CIA used for the interviews with stakeholders

<ol style="list-style-type: none"> 1. Information asymmetry state versus farm 2. Opportunity costs for farmers 3. Psychological factors affecting farmers' level of opportunism 4. Transaction costs for administrations 5. Interplay between administrations 6. Degree of contradiction/consistency with other policy instruments 7. Lack of information on policy 8. Transaction costs for farmers 9. Lack of trust with ND solution to decrease nitrate pollution 10. Attitude of farmers towards ecological considerations 11. Bargaining power of farmers' organisations 12. Bargaining power of environmental associations 13. Public concern about water pollution from agriculture

(2) This first revised list was then used as a basis for empirical validation. This was realised by a qualitative approach. 14 semi-structured problem-centred interviews with stakeholders were carried out to further define the revised lists of CIA. These stakeholders were from private and public agricultural and environmental organisations involved in the implementation of the EU Nitrate Directive in the Midi-Pyrenees region (Table 3).

Table 3: List of the organisation representatives interviewed

Regional Level/watershed level
Regional Agricultural Administration (DRAF Midi-Pyrenees) Regional Council (Conseil Régional Midi-Pyrenees) Water Agency (Agence de l'eau Adour Garonne) Regional Environmental Administration (DIREN)
Département Tarn
Departmental Agricultural Administration (DDAF Tarn) Agricultural Chamber (Chambre d'agriculture Tarn) Departmental Council (Conseil Général Tarn) <i>Regional social services administration (DDASS), Farmers' cooperatives, and environmental associations are not involved in the implementation of the EU Nitrate Directive in this département</i>
Département Gers
Departmental Agricultural Administration (DDAF Gers) Agricultural Chamber (Chambre d'agriculture Gers) Departmental Council (Conseil Général Gers) Farmers' cooperative <i>Regional social services administration (DDASS) is not involved in this department</i>
Département Haute-Garonne
Departmental Agricultural Administration (DDAF Haute Garonne) Agricultural Chamber (Chambre d'agriculture Haute-Garonne) Regional social services administration (DDASS) <i>Departmental Council (Conseil Général), cooperatives and environmental associations were not available for interviews</i>

In the first part of the interviews (Appendix 1), the "Vulnerable zone extension" scenario was presented to the interviewees in order to initiate a narrative process of possible crucial institutional aspects from diverse stakeholder perspectives. The second part of the interviews

was based on a systematic check of the revised list of CIA, in order to get an impression on the relevance of each CIA not mentioned by the interviewees in the first part. This second part was needed to ensure that the results of the different interviews were comparable for the analysis. Finally, the last part of the interviews was devoted to the ranking of mentioned CIA by order of importance. However, stakeholders experienced difficulties in assigning distinctive ranks to each CIA. As a result, this part was progressively dropped from the interview process. The time for an interview ranged between one and two hours.

Based on the focused literature review and the interviews with stakeholders, a final list of CIA was compiled for the vulnerable zone extension scenario in Midi-Pyrenees. It reflects the institutional characteristics of the Midi-Pyrenees region which may foster or hamper the implementation of vulnerable zone extension to the whole region (Table 4). The compilation of the final list demanded decisions on which particular CIA mentioned by the stakeholders was to be kept or skipped. For this particular application, it was decided to keep all CIA mentioned by stakeholders. Further, decisions were taken with regard to which CIA should be additionally included apart from those indicated by the stakeholders. Most CIA identified through the literature review, but not mentioned by the interviewed stakeholders, were skipped from the final list of CIA: Transaction costs for administrations, Transaction costs for farmers and Lack of trust with ND solution to decrease nitrate pollution. Two CIA, however, were still considered as being important for the implementation process: Bargaining power of environmental associations and Public concern about water pollution from agriculture. The reason for this choice was that, from the interviews, it seemed that both CIA were not mentioned by stakeholders not because they had no influence on the implementation of the policy option but because the bargaining power of environmental groups as the public concern about water pollution from agriculture were considered as low (or null) in Midi-Pyrenees. It was thus decided to keep these two CIA, also identified as relevant in the Auvergne applications.

Table 4: Final list of Crucial Institutional Aspects (CIA) potentially affecting the VZ extension in Midi-Pyrenees

1. Interplay between administrations (8)
2. Resources of state administrations for the water issue (7)
3. Resources of local government for the water issue (3)
- 4. Information asymmetry state versus farms (2)**
- 5. Degree of contradiction/consistency with other policy instruments (2)**
6. Interplay between stakeholders (1)
- 7. Level of information/training on policy (3)**
- 8. Opportunity costs for farmers (2)**
9. Psychological factors affecting farmers' level of opportunism (7)
- 10. Bargaining power of farmers' organisations (5)**
- 11. Attitude of farmers towards ecological considerations (1)**
- 12. Bargaining power of environmental associations (0)**
- 13. Public concern about water pollution from agriculture (0)**

Those CIA that are covered by previous lists (i.e., that were compiled before the application in Midi-Pyrenees) are marked in bold. The figures in brackets indicate how many interviewed stakeholder mentioned the respective CIA during the first open part of the interviews. This final list of CIA is the basis for the subsequent PICA Steps. In Appendix 2, each CIA is described in the specific context of the implementation of the EU Nitrate Directive in Midi-Pyrenees. PICA Step 3: Definition of Institutional Indicators to characterise CIA

In PICA Step 3, institutional indicators need to be defined to empirically assess the extent of the identified CIA in PICA Step 2. Therefore, the initial library of institutional indicators compiled by the SEAMLESS PICA team has been used as a starting point (Table 3.5. in Schleyer *et al.* (2007)). Additionally, institutional indicators which were developed for the PICA applications in Auvergne were considered (Amblard *et al.*, 2008). Both lists of institutional indicators had to be adjusted to the specific institutional context, and to the availability of relevant data. Moreover, those CIA that have been identified when testing PICA Step 2 and that are not included in the PICA libraries of CIA, e.g., *Psychological factors affecting farmers' level of opportunism*, needed to be characterized by (new) institutional indicators.

For the definition of institutional indicators three sub-steps have been carried out:

- First, for each CIA identified in PICA Step 2, institutional indicators considered to be relevant for the institutional context of Midi-Pyrenees were selected from the previous libraries of institutional indicators. Therefore, existing databases that are provided and maintained at the international level (e.g., by the World Bank, OECD, and EUROSTAT) as well as national and regional statistical databases (agricultural census, Agreste, INSEE, etc.) were considered for data extraction. Because the previous PICA application in Auvergne already contained some relevant data and/or indications of available data sources, data extraction for institutional indicators was eased.
- Second, in case that for a relevant CIA no appropriate institutional indicators were available from these libraries, new institutional indicators were developed. New data was generated by qualitative methods, namely problem-centred interviews with stakeholders. Here, appropriate qualitative procedures for data generation were defined. That includes selection of a suitable interview process (because of the time constraint, telephone interviews were carried out (each around 0.25 hour), the identification of interview partners according of the data needed and the design of interview guidelines (Appendix 3).
- Third, the *degree of relevance* of each initial and new indicator was assessed with regard to the case of the extension of the VZ in the Midi-Pyrenees context. The degree of relevance, evaluated by the IM running PICA, ranges from + for «minor relevance» to +++ for «high relevance». The rating refers to the explanatory power of the indicator with regard to the corresponding CIA in the particular context. For the assessment, all indicators were considered but a coefficient was assigned to each indicator according to its degree of relevance. Indicators of high relevance were weighted with a coefficient of 0.5 while coefficients of 0.25 and 0.1 were assigned to indicators of medium and low relevance, respectively.

Indicator values were calculated at different geographic levels, wherever it was necessary and/or possible: the international or another national level (Germany), the national level (France), the regional level (Midi-Pyrenees). Besides the indicator values, the final list of institutional indicators contains also information about the indicators (*Description*) and the assumed linkages (*Specific linkage*) with the corresponding CIA. The *Degree of relevance* of each indicator is given in the last column (Appendix 4).

2.1.4.3 PICA Step 4: Assessment of the Institutional Compatibility of the vulnerable zones extension scenario in Midi-Pyrenees

In PICA Step 4, first, the information provided by the institutional indicators was aggregated in order to assess empirically the extent of every single CIA.

Second, the CIA and the related assessments were grouped in thematic categories of institutional compatibility. The relative importance of each CIA within a thematic category, its way of influencing (fostering/hindering) the policy implementation, as well as the relative

importance of each category with regard to the process of extension of VZ in Midi-Pyrenees was assessed together with regional stakeholders and other external experts through a focus group. Finally, qualitative statements about the institutional compatibility between the EU Nitrate Directive Vulnerable Zone extension scenario and the institutional context of the Midi-Pyrenees region were derived.

a) The empirical assessment of the extent of CIA

As a first step for the assessment of each CIA extent, the value of each respective institutional indicator was qualitatively assessed. The indicator value at the national (international) level was taken as main reference point and classified as «medium». Then, the indicator value at the regional (national) level was classified as "high", "low", or "medium" by comparing it with the (national or European country) reference value.

Second, the extent of each CIA was evaluated as “high”, “medium/high”, “medium”, “medium/low” or “low” on the basis of the classified values of the institutional indicators related to the respective CIA. The indication given by the classified value of an indicator for the extent of the corresponding CIA depends on the classification of the indicator value ("high", "low", or "medium") and the degree of relevance, thus the corresponding coefficient:

$$CIA \text{ extent} = \sum_{i=1}^n ((medium = 0; high = +1; low = -1)_i * coefficient_i)$$

The rules to classify the corresponding CIA are indicated in the following Table 5.

Table 5: The rules of aggregation of the classified values of institutional indicators

CIA extent sum	CIA extent classification
Less than - 0.5	Low
Between - 0.25 and - 0.5	Medium/low
Between - 0.25 and 0.25	Medium
Between 0.25 and 0.5	Medium/high
More than 0.5	High

Based on the comparative assessment of indicator values, the following aggregation results have been achieved to classify the CIA extent (Table 6).

Table 6: The empirical extent of CIA identified in Midi-Pyrenees

Crucial Institutional Aspect	Extent Classification
Interplay between administrations	Low
Resources from state administrations for the water issue	Medium
Resources from local government for the water issue	High
Information asymmetry state versus farms	Medium/high
Degree of consistency with other policy instruments	Medium/high
Interplay between stakeholders	Medium
Level of information/training on policy	Medium
Opportunity costs for farmers	Medium
Psychological factors affecting farmers' level of opportunism	Medium/high
Attitude of farmers towards ecological considerations	Medium/high
Bargaining power of farmers' organisations	Medium/high
Bargaining power of environmental associations	Low
Public concern about water pollution from agriculture	Low

b) The institutional compatibility assessment

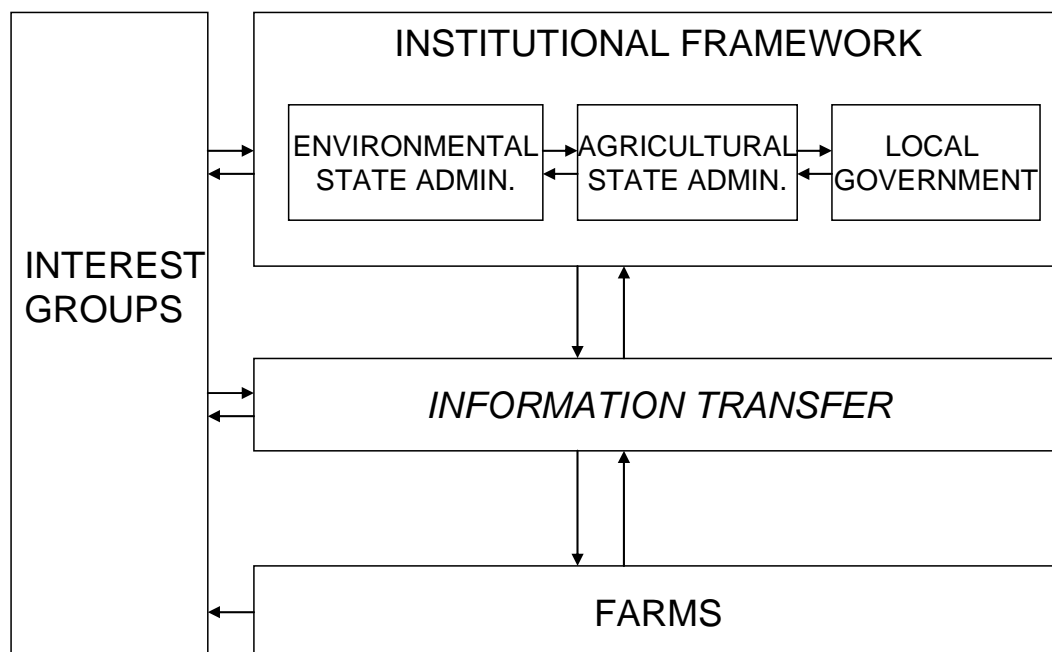
Defining thematic categories of institutional compatibility

The identified and evaluated CIA were then grouped into thematic categories of institutional compatibility. As a result, four thematic categories have been defined (see Table 7): 'Institutional framework' refers to i) the governance structures which are in charge to implement the new “institution”, that is the law extending the VZ to the whole region) and ii) the institutions already in place (rules, laws, etc.) which may interact with the new extension policy. Further, 'Information transfer' group those CIA related to the communication between the stakeholders. The category 'Farms' reflects the characterising aspects of farmers' behaviour, and 'Interest groups' covers the extent of influence of the different involved actor groups. The way the defined categories are related to each other is shown in

Table 7: Grouping CIA within thematic categories of institutional compatibility

Institutional framework
Interplay between administrations
Resources from state administrations for the water issue
Resources from local government for the water issue
Information asymmetry state versus farms
Degree of consistency with other policy instruments
Information transfer
Interplay between stakeholders
Level of information/training on policy
Farms
Opportunity costs for farmers
Psychological factors affecting farmers' level of opportunism
Attitude of farmers towards ecological considerations
Interest groups
Bargaining power of farmers' organisations
Bargaining power of environmental associations
Public concern about water pollution from agriculture

Figure 9: Diagram of thematic categories of institutional compatibility



Assessing institutional compatibility

Every CIA within each thematic category was i) ranked according to its importance and ii) its influence characterised as «fostering» or «hampering» with regard to the process of policy implementation. Additionally, each thematic category was ranked by order of importance for the vulnerable zones extension scenario in Midi-Pyrenees.

The ranking exercise was realised by a focus group with stakeholders who were involved in the implementation of the EU Nitrate Directive in Midi-Pyrenees. Included were stakeholders from the regional level as well as from the three studied departments: Tarn, Gers and Haute-Garonne. The same stakeholders as the ones interviewed for the identification of CIA in PICA Step 2 were considered as potential participants. Besides their relevant knowledge, it is of advantage to invite people already known and that are familiar with both the implementation of the EU Nitrate Directive in Midi-Pyrenees as well as with the PICA procedure. It was attempted to ensure a balanced distribution of represented organisations in order to discuss results in-depth following the objective to gain a 'close-to-reality' picture of the represented opinions in this institutional implementation context. Eight people participated in the session (Table 8). The focus group session lasted for two hours and a half.

Table 8: Participants of the focus group meeting

Administrations
Water Agency for Adour Garonne Watershed (Agence de l'eau) Regional Environmental administration (DIREN) Departemental Agricultural Administration (DDAF) Haute-Garonne Departemental Agricultural Administration (DDAF) Tarn Departemental Water Inter-administration (MISE) Haute-Garonne
Interest groups
Agricultural Chamber Gers Agricultural Chamber Haute-Garonne
External expert
National Research Institute for Agriculture (INRA)

The focus group session was organised in three distinct parts:

At the beginning, a short presentation of the SEAMLESS project and the PICA method was made to the stakeholders. This was followed by the presentation of the intermediate PICA assessment results in Midi-Pyrenees (PICA Steps 2 and 3). The first half of the workshop was devoted to the presentation and explanation of the 13 CIA identified in the assessments conducted in Midi-Pyrenees. For this, the names of CIA were «translated» in less academic and more self-explaining words, in order to avoid potential misunderstanding. Afterwards, the focus group's objectives were presented and the suggested thematic categories of institutional compatibility introduced.

Following as the main task for the stakeholders, they were asked to rank the importance of each crucial institutional aspect and thematic category for the implementation of the vulnerable zones extension in Midi-Pyrenees. For this purpose, ranking sheets were distributed to the participants (see Appendix 4). In these sheets, stakeholders had to rank the importance of each CIA within one category by assigning numbers (1 = most important, 2 = less important, ... , n = least important). These ranks were later reversed and aggregated for the analysis, the highest values indicating therefore the factors considered as the most important ones within this category.

Also, stakeholders were asked to indicate the nature of the impact of each CIA on the vulnerable zones extension ("+" = positive influence, i.e., fostering the implementation, "-" = negative influence, i.e., hindering the implementation of the policy).

Finally, they were requested to rank each category according to the importance of the grouped CIA with regard to the implementation process. This was realised by asking participants to assign numbers to each category (1 = most important, 2 = less important, ... , n = least important). For the analysis of results, values were reversed and aggregated, so that an increasing importance is reflected by higher values.

After each participant had filled out the ranking sheets, the third part of the session corresponded to a group discussion and further comments based on a) the displayed results and b) the presentation of the PICA method. In the following, the results are presented.

With regard to the institutional compatibility of the vulnerable zones extension implementation, following thematic categories and respective CIA extents formed the basis for the focus group ranking session (Table 9).

Table 9: The CIA and thematic categories to be ranked

Institutional framework
<i>Low</i> interplay between administrations
<i>Medium</i> level of resources from State administrations for the water issue
<i>High</i> level of resources from local government for the water issue
<i>Medium/High</i> information asymmetry state versus farms
<i>Medium/High</i> degree of consistency with other policy instruments
Information transfer
<i>Medium</i> level of interplay between stakeholders
<i>Medium</i> level of information/training on policy
Farms
<i>Medium</i> level of opportunity costs for farmers
<i>Medium/High</i> level of psychological factors affecting farmers' level of opportunism
<i>Medium/High</i> level of farmers consideration towards ecological considerations
Interest groups
<i>Medium/High</i> bargaining power of farmers' organisations
<i>Low</i> bargaining power of environmental associations
<i>Low</i> public concern about water pollution from agriculture

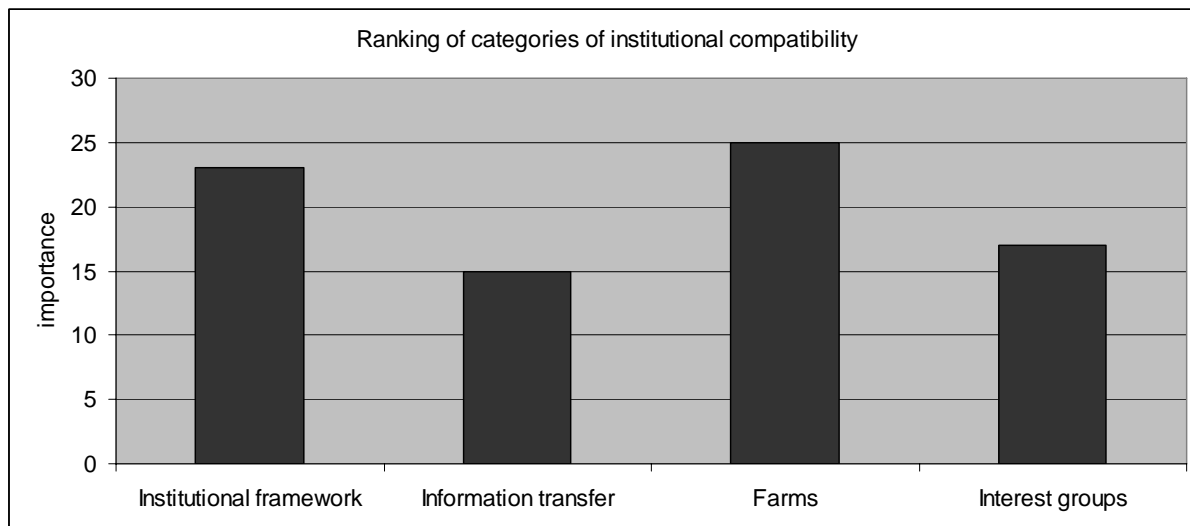
The eight participants ranked the CIA within each category as well as the four categories in the course of the focus group. Because one person of the Agriculture Chamber had to leave earlier the session, only seven answers for the indication of (positive/negative) influence of CIA have been collected. The aggregated results of the focus group are presented in Table 10.

Table 10: Aggregated results of the focus group

Thematic categories	aggregated importance of category	Crucial Institutional Aspects	aggregated importance of CIA	positive impact (no stakeholders)	negative impact (no stakeholders)
Institutional framework	23	Low Interplay between administrations	24	0	7
		<i>Medium</i> level of resources from State administrations for water issue	24	0	7
		<i>High</i> level of resources from territorial administrations for water issue	11	7	0
		<i>Medium/ High</i> Information asymmetry state versus farms	28	1	6
		<i>Medium/High</i> Degree of consistence with other policy instruments	33	7	0
Information transfer	15	<i>Medium</i> level of interplay between stakeholders	11	1	6
		<i>Medium</i> level of information/formation on policy requirements	13	3	4
Farms	25	<i>Medium</i> level of opportunity costs for farmers	18	2	5
		<i>Medium /High</i> level of psychological factors leading to farmers opportunism	17	0	7
		<i>Medium /High</i> level of farmers consideration towards ecological issue	13	7	0
Interest groups	17	<i>Medium /High</i> bargaining power of farmers' organizations	22	1	6
		<i>Low</i> bargaining power of environmental groups	11	1	6
		<i>Low</i> public concern about water pollution from agriculture	15	0	7

The ranking results of the four thematic categories of institutional compatibility are shown in Figure 10.

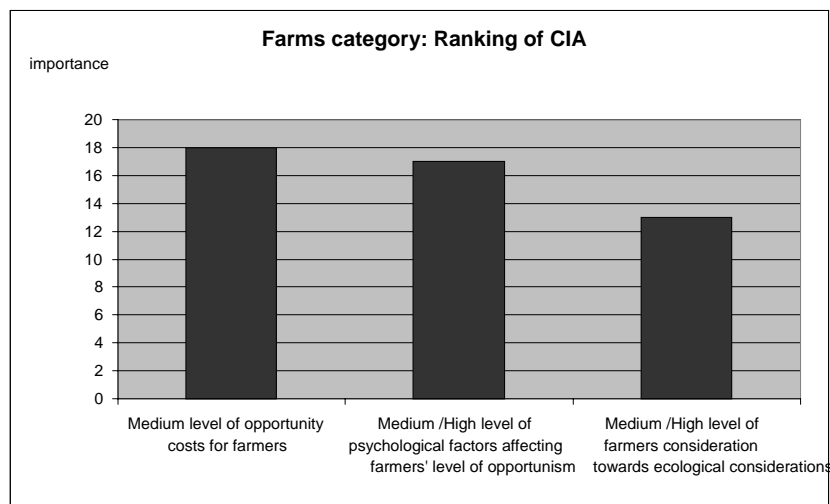
Figure 10: Ranking results for the thematic categories of institutional compatibility



The results show that the most important category with regard to the implementation of the policy option of the vulnerable zones extension in Midi-Pyrenees is the group of CIA reflecting the factors affecting the compliance of the farmers in the 'Farms' category. Of similarly high importance is the category 'Institutional framework', which groups institutions and governance structures involved in the implementation process, in the view of the participating stakeholders. Of comparatively lower importance were ranked the categories 'Interest groups' and 'Information transfer', whereas the latter received the lowest assigned priority from the panel.

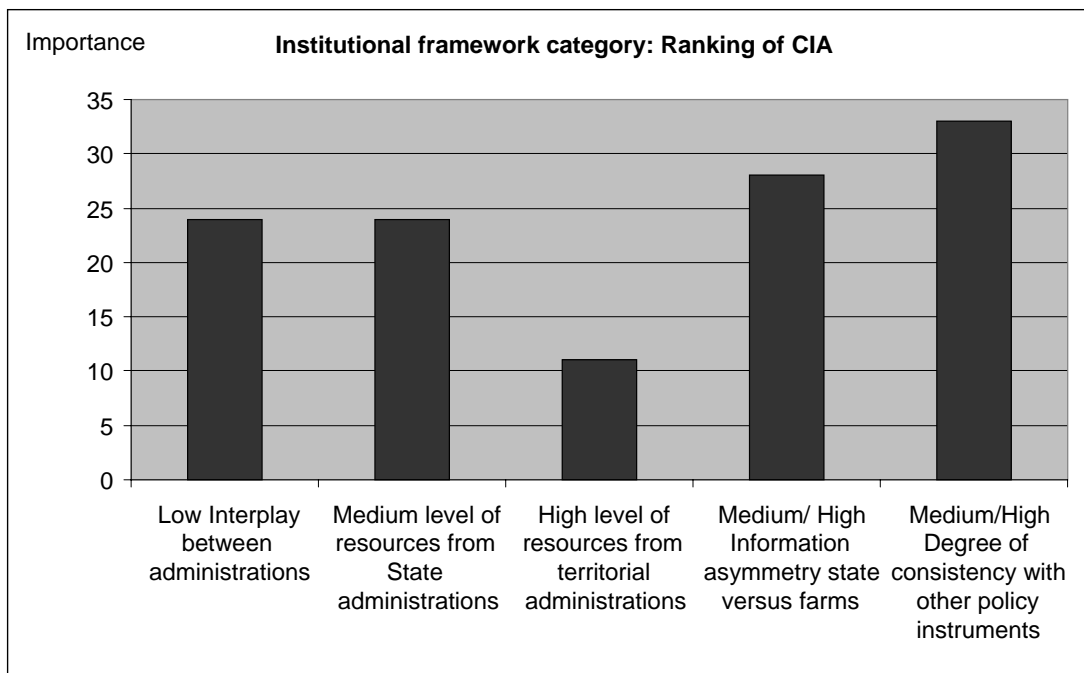
Zooming into the individually ranked CIA from the 'Farms' category, the results indicate that the 'Medium level of opportunity costs' as well as the 'Medium/high level of psychological factors affecting farmers' level of opportunism' were considered as important for the implementation scenario (Figure 11).

Figure 11: Ranking of the CIA within the « Farms » category



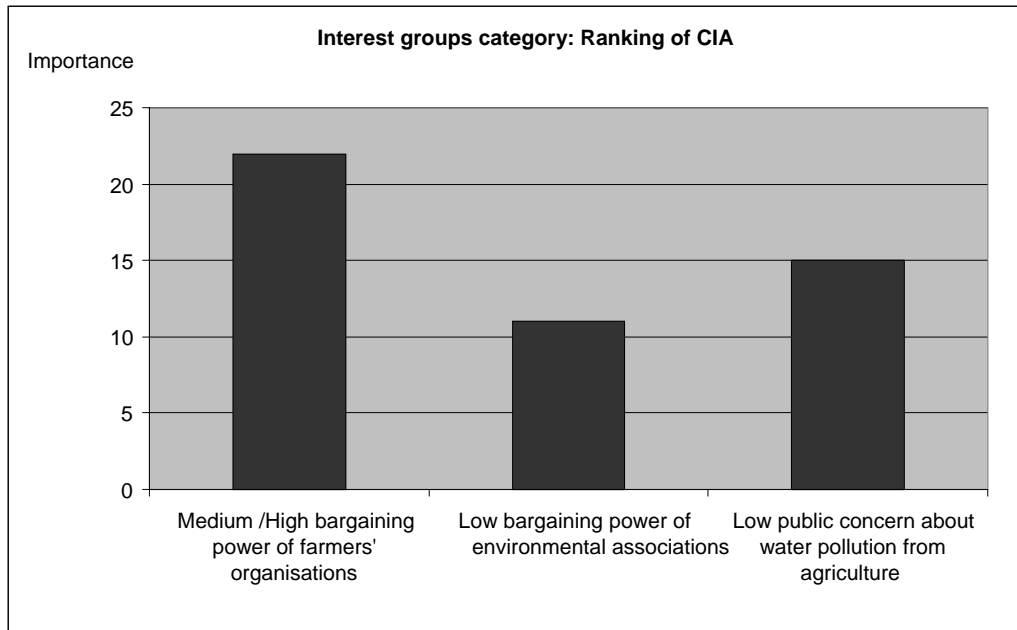
The ranking results for CIA in the 'Institutional framework' category are more diverse (Figure 12). For the participants, the CIA '*Medium/high degree of consistency with other policies*' is the most important one, and has a clear positive influence on the implementation of the policy. The '*Medium/high information asymmetry*' between the state and the farms is also of high relevance for the implementation and has a negative influence. The limited ability to control farmers' compliance with the regulations can hinder the vulnerable zone extension. This is supported by the importance of the CIA '*Medium level of resources from state administrations for the water issue*' to carry out these controls.

Figure 12: Ranking of the CIA within the « Institutional framework » category



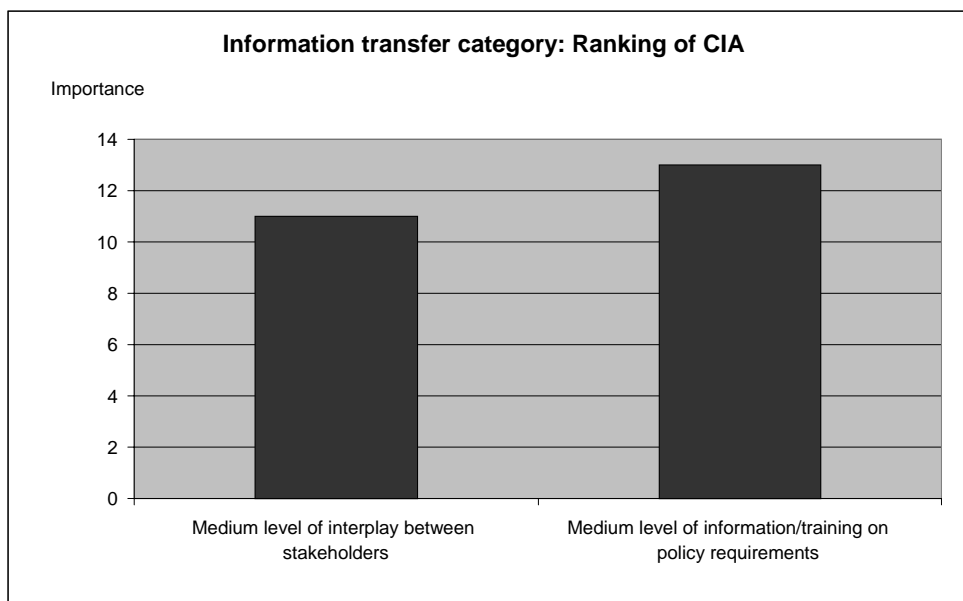
Among the '*Interest groups*' thematic category, the '*Medium/High bargaining power of farmers' organisations*' is considered as the most important institutional aspect likely to affect the implementation process. Almost all stakeholders agreed on its negative impact (Figure 13).

Figure 13: Ranking of the CIA within the « Interest groups » category



The influence of the most important CIA within the thematic category ‘Information transfer’, ‘Medium level of Information/Formation on policy requirement’ was differently interpreted among the stakeholders. While four participants considered that a “medium” level of information was not enough to implement the new policy, the three other participants considered that this level was sufficient to foster the policy implementation. Because the extent of this CIA is classified as “medium”, different views of stakeholders were likely (Figure 14).

Figure 14: Ranking of the CIA within the « Information transfer » category



2.1.4.4 *Final compatibility statements*

Using the results of the focus group as a basis, final statements can be drawn characterising the vulnerable zones extension compatibility with the institutional context of Midi-Pyrenees region. Besides the results of the focus group, additional qualitative information gathered during the testing was also considered. This includes the earlier interviews with stakeholders as well as discussions with the SEAMLESS PICA team.

The crucial institutional aspects related to the compliance on part of the farmers to the provisions of the EU Nitrate Directive appear as the most important ones with regard to the implementation of the policy in Midi-Pyrenees. Based on the indicators used, the opportunity costs borne by farmers to change their practices do not seem to be high, but, according to some stakeholders, still high enough to hinder the efficient implementation process. Moreover, a general feeling of farmers in Midi-Pyrenees to be disadvantaged by this policy and other agro-environmental policies which potentially restrict their activities, may lead to substantial protest behaviour. In contrast, many of them are sensitive to ecological issues, which could be a positive factor on the vulnerable zones extension.

Some institutional aspects related to the institutional framework in Midi-Pyrenees could hamper the implementation process. While the policy itself is consistent with other existing agri-environmental policies in Midi-Pyrenees, a lack of efficient controlling systems of the compliance of farmers with the EU Nitrate Directive, due to a) a too low level of available resources as well as b) a generally low interplay and communication level between the different administrations in charge, may seriously hinder the process of implementation on the regional as well as on the local level.

In terms of the present interest groups who would be involved in the implementation process, the high bargaining power of farmers' organisations was characterised as potentially influencing the vulnerable zone extension in a negative, thus hindering way. Additionally, due to a generally low public awareness for water pollution issues as well as weak environmental groups, a supporting help from the public and environmental side can not be expected.

Apart from this, some more information on EU Nitrate Directive policy requirements as well as an improved interaction between the involved stakeholders e.g. in form of better participation possibilities, would help to improve the implementation process of the vulnerable zones extension.

2.2 **Methodological insights gained**

The second application of PICA, conducted by an external integrative modeller (IM), has provided important insights towards methodological improvements of the procedure, which are discussed step by step in this section.

2.2.1 Reflections on the Policy Matrix: PICA Step 1

The classification of the policy option 'EU-Nitrate Directive' has led to the same classification within the policy matrix as in the first PICA test case. Therefore, the logic of classification along the two axes 'type' and 'area' of intervention was further validated on the case of the policy option 'EU-Nitrate Directive'.

However, in the process of classification, it was suggested to make a further distinction in the category 'regulatory policy having effects on markets' between regulatory policies with financial compensations (e.g., for the restrictions imposed in NATURA 2000 areas, farmers

can be financially compensated through agri-environmental schemes) and regulatory policies without financial compensations (e.g., The EU Nitrate Directive). However, this distinction can be rather seen as a matter of combination with other policy options, i.e., the policy option defining restrictions in NATURA 2000 does not include financial compensations. These are provided by the implementation of another policy option, the agri-environmental schemes, parallel to the policy option under scrutiny. The potential interdependency between the policy option under scrutiny and other policies implemented alongside with this policy will affect the CIA affecting the implementation process, their extent and their relative importance so it has to be taken into account in the assessment. But to make the distinction from the start would blur the boundaries between different policy options.

This highlights the importance of precisely defining the policy option to be assessed when starting a PICA application, that is, to disentangle the core policy option and the accompanying measures.

Another suggestion was to take into account in the classification of the policy option 'EU Nitrate Directive' the economic nature of the penalty imposed in case of non-compliance with the mandatory rules. Here, the sanctioning mechanism corresponds to an economic instrument working with negative financial incentives. However, this instrument becomes effective only in the case of the farmers' defection. While the nature of the sanction mechanism is important to take into account into the analysis, the classification in policy-type should focus on the primary policy instrument.

Concerning the filter ability of the policy matrix with regard to the list of 'pre-defined' CIA related to policy types, the list of CIA identified during the Midi-Pyrenees study was compared to the current list of CIA linked to the policy type 'regulatory on market', based on the initial list (Schleyer *et al.*, 2007a) and revised after the first empirical application in Auvergne (Schleyer *et al.*, 2007b).

Eight CIA linked to the policy type 'regulatory on market' in the current list proved to be relevant and constituted crucial institutional aspects for the vulnerable zones extension in the Midi-Pyrenees region. However, five CIA identified in Midi-Pyrenees were not part of the current list (Table 11). The CIA '*Interplay between administrations*' and '*Resources for state administrations for the water issue*' are new versions of the CIA '*Interplay between environmental and agricultural administrations*' and '*Resources for environmental administration*' identified during the test in Auvergne. '*Interplay between administrations*' is broader than '*Interplay between environmental and agricultural administrations*', as it includes also the potential interplay between different vertical levels of administrations and a larger range of administrations (Water Agency, Préfecture). '*Resources for state administrations for the water issue*' is also broader than '*Resources for environmental administration*', including the constraints on the agricultural administration in charge of the monitoring of farmers' compliance. One suggestion is to keep these broader versions instead of the more restrictive Auvergne ones in the revised version of the initial list of CIA linked to the policy-type 'Regulatory on market', knowing that they can be more precisely specified in future applications. The CIA '*Resources for local government for the water issue*', '*Interplay between stakeholders*', and '*Psychological factors affecting farmers' level of opportunism*' are new CIA which can be also included in the revised version of the policy matrix.

Table 11: Comparison of the current list of CIA for the policy type 'Regulatory on market' with the CIA identified for the vulnerable zones extension in Midi-Pyrenees

Current list of CIA for the policy type 'Regulatory on market'	CIA for the ex-ante assessment of vulnerable zones extension in Midi-Pyrenees
1. Ambiguous property rights 2. Information asymmetry versus 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 12. Bargaining power of farmers' organisations 13. Bargaining power of agro-industries 14. Bargaining power of environmental associations 15. Attitude of farmers towards ecological considerations 16. Public concern about water pollution from agriculture 17. Opportunity costs for farmers 18. Interplay between agricultural and environmental administrations 19. Resources for environmental administrations 20. Level of information on policy	1. Interplay between administrations 2. Resources for state administrations for the water issue 3. Resources for local government for the water issue 4. Information asymmetry state versus farms 5. Degree of contradiction/consistency with other policy instruments 6. Interplay between stakeholders 7. Level of information/training on policy 8. Opportunity costs for farmers 9. Psychological factors affecting farmers' level of opportunism 10. Bargaining power of farmers' organisations 11. Attitude of farmers towards ecological considerations 12. Bargaining power of environmental associations 13. Public concern about water pollution from agriculture

Further, a number of CIA from the current list proved not to be relevant for the implementation of the extension of the vulnerable zones in Midi-Pyrenees. As stated in Schleyer *et al.* (2007b), these CIA may be not crucial in this specific case, but that does not mean they could not be relevant for other 'regulatory on market' policy options and/or in other institutional contexts. Consequently, they are not to be dropped from the policy matrix. On the other hand, the two empirical applications realised in Auvergne and in Midi-Pyrenees allow for a first ranking of the CIA linked to the policy type 'regulatory on market' according to the number of times they were identified as relevant. Table 12 presents the first ranking of CIA. Of higher rank are the CIA mentioned in the initial list and in both test cases. Of lower ranks are the CIA identified during the initial literature review, but which were not identified during an empirical application of PICA so far.

Table 12: A first ranking of CIA for the policy type 'Regulatory on market'

	Revised version of the initial list of CIA for the policy type 'Regulatory on market'
CIA identified during the initial literature review (Schleyer <i>et al.</i> , 2007a) and the test cases in Auvergne (Schleyer <i>et al.</i> , 2007b) and Midi-Pyrenees	<ul style="list-style-type: none"> ▪ Information asymmetry versus farms ▪ Contradictory policy instruments and rules
Additional CIA identified during the initial literature review (Schleyer <i>et al.</i> , 2007a) and the test case in Auvergne (Schleyer <i>et al.</i> , 2007b), but not in Midi-Pyrenees	<ul style="list-style-type: none"> ▪ Level of opportunism
Additional CIA identified during the test cases in Auvergne (Schleyer <i>et al.</i> , 2007b) and Midi-Pyrenees, but not during the initial literature review (Schleyer <i>et al.</i> , 2007a)	<ul style="list-style-type: none"> ▪ Level of information on policy ▪ Opportunity costs for farmers ▪ Bargaining power of farmers' organisations ▪ Attitude of farmers towards ecological considerations ▪ Bargaining power of environmental associations ▪ Public concern about water pollution from agriculture ▪ Interplay between administrations ▪ Resources for administrations
Additional CIA identified 'only' during the test case in Midi-Pyrenees	<ul style="list-style-type: none"> ▪ Psychological factors/ opportunism ▪ Interplay between stakeholders ▪ Resources for local government
Additional CIA identified 'only' during the test case in Auvergne (Schleyer <i>et al.</i> , 2007b)	<ul style="list-style-type: none"> ▪ Bargaining power of agro-industries
Additional CIA identified 'only' during the initial literature review (Schleyer <i>et al.</i> , 2007a), but in none of the test cases	<ul style="list-style-type: none"> ▪ Ambiguous property rights ▪ Redundant policy instruments and rules ▪ Monopoly power ▪ Lack of trust between economic actors ▪ Administrative public and/or private transaction costs ▪ Weak consumer preferences ▪ Strong consumer preferences together with high level of social capital ▪ Level of corruption

The application realized in Midi-Pyrenees confirms the usefulness and validity of the filter function of the policy matrix in PICA Step 1 and shows the interest of keeping the library of respective CIA as a growing source, to be further validated by future applications.

2.2.2 Reflections on the methodology to identify CIA: PICA Step 2

In this testing, PICA was for the first time applied at the NUTS 2 level. Therefore, the choice of study design was of crucial importance in order to get representative results. Moreover, the external expert (IM) was facing a comparatively short application time of two month, compared to the first PICA testing. Three out of eight départements have been therefore chosen as representative study areas to identify the CIA potentially affecting the extension of the vulnerable zones in Midi-Pyrenees. Each of these three départements represents specific characteristics of the region, either bio-physical and/or socio-economic conditions.

Nevertheless, as Midi-Pyrenees is the largest region in France, a lack of representation of all existing conditions was unavoidable. This lack was balanced by also including representatives of the regional level in the assessment. Given the time limits, choosing representative and contrasting study sites, reflecting the diversity of a region, seemed to be a reliable solution for the identification of CIA at this level. This empirical application in Midi-Pyrenees shows then the ability of PICA to capture the main institutional features at the NUTS2 level within a comparatively short time span.

The final list of CIA has been compiled on the basis of the current list of CIA (the combination of the initial list (Schleyer *et al.*, 2007a) and the Auvergne list (Schleyer *et al.*, 2007b)) which was then adjusted with help of a focused literature review and semi-structured problem-centred interviews with stakeholders. The timeframe allowed only carrying out a limited literature research. Nevertheless, this was sufficient to gain a first insight into the institutional context of the implementation of the EU Nitrate Directive in Midi-Pyrenees.

Especially during the qualitative part of this step, difficulties have been encountered. Critical for the interview partner selection was the fact that the EU Nitrate Directive is (still) a «hot topic» under discussion. For example, a potential interview partner from local government could not be interviewed because of the ongoing political processes (and/or because he had no clear official position towards the EU Nitrate Directive). For the same reasons, no environmental associations could be interviewed. Because of this, the representativeness of interview partners suffered. This together with a limited number of interviewees may question the representativeness of results.

Regarding the range of stakeholders to consider for the identification of CIA, some interview partners mentioned that involving also organisations for professional training and/or technical high schools could provide further interesting input to the analysis. One suggestion to avoid ignoring important stakeholder groups in PICA Step 2 is to provide a list of relevant stakeholders to meet, that could be used in future PICA applications when a similar policy option and/or institutional context are to be analysed.

During the interview process, it was sometimes difficult to keep the interviewees' attention on the scenario of "vulnerable zone extension". This was due to two reasons: First, interviewees referred often to the past, mentioning factors explaining the designation of the current vulnerable zones. This may have led to a bias in the analysis, with the identification of *ex-post* rather than *ex-ante* factors. However, it is likely that most of the experienced constraints are the same at present. Further, *ex-ante* identification of CIA by stakeholders will always rely on their past experiences with the implementation of similar policies. These past experiences highlight also the value of stakeholders' opinion for an *ex-ante* assessment. Second, according to interviewees, the scenario was not enough "realistic" to talk longer about it. But especially interesting for the assessment was to know more about the reasons why stakeholders thought the extension of vulnerable zones to the whole region of Midi-Pyrenees would be unrealistic as these reasons could reveal the likely constraints on the implementation process.

Despite the difficulties encountered in the qualitative collection of information for the revision of CIA, a satisfactory number of interviews has been realised and a majority of the relevant stakeholders has been met. Moreover, the final list of CIA identified was validated later by the stakeholders participating in the focus group in PICA Step 4.

2.2.3 Reflections on the methodology to define institutional indicators: PICA Step 3

The identification of indicators meaningful for the empirical evaluation of CIA proved to be a difficult task. The need to pre-define several indicators in order to reduce the subjectivity of the PICA external expert's choice of indicators was underlined by this second empirical

application. In this matter, it could be recommended to use an expert workshop for the definition of indicators, as organised during the testing in Auvergne, to reduce subjectivity induced by the choices of a single PICA expert.

For indicator data collection, the use of qualitative procedures (like telephone expert interviews) appeared to be a valuable approach to assess a CIA extent. Additionally, this was a way to reduce the individual subjective influence of the external expert by including several experts' opinions. After all, the available time for a PICA run will closely determine the scope and intensity of indicator selection and data assessment.

2.2.4 Reflections on the assessment of institutional compatibility assessment: PICA Step 4

2.2.4.1 *Reflections on the empirical evaluation of the extent of CIA*

As a consequence of the definition of indicators by the external expert alone, the evaluation of the empirical extent of CIA may suffer also from a relative subjectivity, as this evaluation depends on the indicators and their degree of relevance, as chosen by the external expert.

The choice of a reference point for the relative assessment of the extent of CIA also caused problems. First, the inherent limits of a system of geographic reference points were underlined. The choice to classify one indicator value at one given geographical level taken as reference point as "medium" does not mean that this value is indeed "medium" with regard to the phenomenon represented by the indicator. To classify the value of every indicator in relation to what it represents would imply a deep knowledge of every phenomenon captured by the indicators. The PICA expert, or any other expert alone, is not likely to have such a comprehensive knowledge. This would be thus a very heavy task in terms of time and resources to call for several experts' opinion to classify all indicators values. Advantages of the comparative assessment of indicator values are that it is relatively less costly and that the choice of reference points is transparent, even if arbitrary.

Additionally, due to the fact that only a few indicators could be calculated at the EU level, only the national level served as a reference point to assess the extent of CIA at the regional level of this assessment. That could lead to get only "high" or "low" extents, insofar as the "exact" same value between national and regional level is seldom the case. Thus, the expert needed to decide if the difference between the two values seemed to be significant or not (not significant difference leads to the "medium" extent of the CIA). From the PICA testing in Auvergne, the choice to use two reference levels can be a solution to limit arbitrariness in the classification of indicator values and CIA extent. It is therefore recommended for applications at the regional (NUTS 2) level to choose, as much as possible, indicators whose values can be assessed at an international or EU level. This level can thus serve as a main reference point while the national level is used as second reference point.

2.2.4.2 *Reflections on the formulation of statements about the institutional compatibility of the vulnerable zones extension scenario*

For the focus group ranking session, it turned out that participants generally followed the logic of the procedure and understood the task they were in charge of. On the basis of the insights gained during the first PICA testing, all CIA had been translated from a theoretical language to a more accessible language beforehand. As a result, no understanding problems occurred and the questions asked were mainly related to methodological aspects, like the choice of indicators and the assessment of the CIA empirical extent.

The final list of CIA identified for the Midi-Pyrenees context was approved by all the participants of the focus group. However, one wish of the participants was to get more details about the indicators as a basis for the assessment of the CIA extent. While presenting in detail

the indicators used to characterise the empirical extent of the CIA 'Opportunity costs', some participants disagreed with the choice of indicators made. Like in the testing in Auvergne, this raises the issue of whether to open the process of the evaluation of the extent of CIA to stakeholders (see PD 6552 for a discussion of the advantages and limits of this alternative).

Some participants expressed the wish to rank CIA without knowing their extent. This does not seem to be a possible solution. While the importance of a CIA for the implementation of the policy option analysed and the empirical extent of this CIA in a given context are two distinct aspects, the importance of the CIA with regard to the implementation process depends of its empirical extent. That the '*Bargaining power of farmers' organisations*' is high or low in a given institutional context matters for its importance for the implementation process. Each stakeholder may have his own idea of the empirical extent of CIA and rank them accordingly. A stakeholder who thinks that the bargaining power of farmers' organisations is low may consider it of low importance for the implementation of the EU Nitrate Directive while another one, whose opinion is that this bargaining power is very high, will rank the CIA differently. That the extents of CIA are characterised and given to the participants before the ranking ensures that the ranking is done on a common basis to make outcomes comparable.

Another wish made by the participants was that they would prefer to get all other SEAMLESS model results on the three other dimensions of sustainability (economic, social and environmental) before they participate at the institutional compatibility assessment. More particularly, they said that if the "vulnerable zones extension" scenario would have turned out not to be relevant on the three other pillars, there is no sense to assess the institutional compatibility of an "incongruous policy". However, providing results from the other SEAMLESS models beforehand would bare the danger that they significantly influence people in their assessment. Nevertheless, the timing when to present PICA results to end-users, in relation to other results generated by the whole model chain of SEAMLESS-IF, is an open question.

To conclude, the structured focus group turned out to be a useful approach to incorporate stakeholder knowledge for the assessment of the relative importance of crucial institutional aspects and thematic categories with regard to the extension of vulnerable zones in Midi-Pyrenees. However, using the results of the focus group as a basis for final statements about the compatibility of the vulnerable zones extension scenario appeared difficult to make: mixed results of the focus group did not allow for making strong conclusions about the nature of their potential impact on the process of implementation. Therefore, it could be recommended to include external expert opinions as an important additional basis to draw final compatibility statements.

2.3 Reflections on the use of PICA by an external expert (IM)

The empirical application of PICA to the implementation of the EU Nitrate Directive in Midi-Pyrenees was conducted by an external expert (IM) in order to test if the method can be applied by an expert for whom the method is new. This represents a typical case for future SEAMLESS applications where PICA will be used by an external 'PICA-Integrative Modeller'. The objective of this section is to discuss more particularly the insights provided by the test realized in Midi-Pyrenees with regard to the use of PICA by an external expert. In a first sub-section, the methodology used to accompany and facilitate the work of the external expert and to identify the implications of this situation close to a 'real-world' application is presented. Then, the main insights resulting from the application are described. This test has shown that an application of PICA by an external expert produces relevant results for the ex-ante assessment of institutional compatibility between a policy option and a given

institutional context. It allows for, first, defining better what could be the conditions needed to apply successfully PICA in the future and, second, improving the presentation of PICA in the GUI and in training materials designed for future ‘PICA-Integrative Modelers’.

2.3.1 Methodology

The application of PICA to the test case “Implementation of the EU Nitrate Directive in Midi-Pyrenees” was realised in a timeframe of two months in July-August 2008. As an external expert, PICA-Integrative Modeler, for applying the tool, a researcher with a PhD in institutional economics was chosen. For the time of the application, the external expert was based in INRA Toulouse centre, thus close enough to the study area to easily conduct the empirical fieldwork needed. Moreover, this location allowed for an access to regional data as well as to the regional knowledge of INRA researchers. More particularly, the external expert benefited from the support of a SEAMLESS INRA researcher as a proximity contact.

Before the application started, the SEAMLESS PICA team provided the external expert with some documentation for her to become more familiar with the tool. The SEAMLESS report presenting the tool from a conceptual point of view (Schleyer *et al.*, 2007) as well as the two Seamless reports describing the first empirical application conducted in Auvergne (Schleyer *et al.*, 2007; Amblard *et al.*, 2008) were thus made available for a first overview of PICA and the potential methodology for application.

Two personal meetings with the SEAMLESS PICA team were organised during the time of the application. The first one took place in Toulouse on the 07/07/08, at the time when the external expert was starting the application. The first part of the meeting was devoted to an oral presentation of the four steps of the procedure by the SEAMLESS PICA team, illustrated by the results of the empirical application in Puy-de-Dôme (Auvergne). In the second part, the external expert could ask for the precisions needed. Finally, a schedule for the application in Midi-Pyrenees was set up. The second meeting took place in Clermont-Ferrand on the 31/07/08. The external expert presented the intermediate results obtained until then and her plans for the next steps of the application. Results and methodological issues were discussed together with the SEAMLESS PICA team.

At all time of the PICA application, the possibility to contact the SEAMLESS PICA team was guaranteed for clarification and assistance. These requests, as well as the experiences the external expert made, were documented as a basis for identifying the conditions for a successful application of the tool as well as potential improvements of the presentation of PICA in the GUI and in training materials.

2.3.2 Results

2.3.2.1 *Defining the conditions for successful future PICA applications*

On the whole, the clarifications asked by the external expert were rather addressing methodological issues for the application than the logic of the tool itself. This can be explained by the competencies of the external expert in institutional economics which allowed her to catch on quickly the main concepts behind the procedure as well as the sequence of steps. Therefore, a background in institutional economics appears as a crucial condition to economize on time for a PICA application and to ensure high quality results.

Additionally, being new in the Midi-Pyrenees region meant for the external expert that neither had she known the biophysical and socio-economic conditions of that region in detail, nor that she could rely on existing networks for the collection of information. Being based in INRA Toulouse, a research institute related to the subject matter, turned out to be of sufficient help in order to generate the needed information and contacts. The close

cooperation with a local partner seems to be a second necessary precondition to carry out a PICA assessment in an unfamiliar institutional context.

All steps of the procedure could be applied and relevant results with regard to the institutional compatibility between the EU Nitrate Directive and the context of Midi-Pyrenees have been produced within the imposed timeframe of two months. Only the detailed presentation of results and their discussion in a final report have suffered from a too short deadline. According to the external expert, two weeks more would have allowed her to write a more detailed and documented report. Two months and a half can be thus considered as an “ideal” time frame for such a PICA application, with the two conditions described before fulfilled. However, it may be the case that the time devoted to a PICA application is not a matter of choice but rather a requirement of the policy experts as end-users. What has to be stressed then is that the amount of invested time closely defines the quality of collected information and its documentation. This means the quality of assessment increases the more time is available and vice versa.

2.3.2.2 Potential improvements of communication with future ‘PICA-Integrative Modellers’

For the development of a methodological design, the PICA material already available was of great help. Here, the two PD on the first empirical application of PICA served as a basis and 'use manual'. Many of the principal empirical methods used for the application of PICA in Auvergne were also used in the Midi-Pyrenees context. Nevertheless, some modifications, sometimes based on the lessons learned from the previous testing, have been introduced.

As specified above, clarifications asked by the external expert to the SEAMLESS PICA team were mainly concerning the methodology of application. In terms of improvement of the GUI and training materials for future ‘PICA-Integrative Modellers’, this means that the development of precise methodological guidance for each step of the procedure could be of great help.

The majority of the requests of the external expert appeared to be ‘understanding’ questions on points already presented and discussed in the two reports documenting the empirical application of PICA in Auvergne. Thus, the methodological information contained in these documents could be used as a basis for guidance presented in the GUI and the training materials. However, some of these requests revealed lacks to be filled in for a better methodological guidance.

A first general point to stress is that the empirical methods used so far in the PICA applications do not constitute a fixed and fits-all recipe. They can be adapted or modified by the external expert, as far as his methodological choices are made clear and their implications on the results are discussed. At the same time, as stated by the external expert, a short application timeframe does not leave much room for methodological innovations. That is why methodological guidance should be as precise as possible, presenting the different empirical methods used so far as well as their advantages and limits so that the future 'PICA-Integrative Modeller' will be able to decide as quickly as possible for which method he opts.

Another indication that would be of help for future 'PICA-Integrative Modeller' is the "minimum requirements" at each step of the procedure in terms of collected information to ensure that relevant results are achieved. From the experiences gained from the Midi-Pyrenees testing, it seems that, in PICA Step 3, the definition/calculation of 2-3 institutional indicators per CIA allows for a relevant assessment of the extent of CIA. In PICA Step 4, the organisation of one focus-group with stakeholders is considered as being sufficient to classify the CIA by order of importance and indications of their influences for the policy implementation. In contrast, the impressive number of interviews undertaken in PICA Step 2

is higher than what could be the minimum requirement to identify CIA potentially affecting the policy implementation. However, without an additional application where the number of interviews is reduced, it is hard to come to a conclusion on the "minimum requirements" in this matter.

Finally, some requests of the external expert were related to the concrete implementation of qualitative empirical methods for the collection of information (face-to-face interviews, focus group). For example, the external expert was wondering how to help the stakeholders to think 'ex-ante' about the scenario proposed for a better identification of Crucial Institutional Aspects in PICA Step 2. Another concern was how to deal with disagreement about CIA extent among the panel of stakeholders participating to the focus-group in PICA Step 4. These difficulties, linked to the integration of the stakeholders' point of view into the PICA assessment, should also be mentioned in the methodological guidance with some suggestions to reduce them.

To conclude, PICA proved to be an applicable tool for both, its methodological approach and sequence of assessment steps, as well as its capability to be run by an expert who was not part of the SEAMLESS PICA development team. The test of the application of the tool by an external expert allowed us to define better the conditions needed for future successful PICA applications. In terms of competencies, a background in institutional economics proved to allow the external expert for a quick adaptation to the tool. The existence of local contacts was of great help for an application in an unknown regional (institutional) context. As a timeframe for application, with the two previous conditions fulfilled, two months and a half seem to be sufficient to obtain relevant results. With regard to the improvements to bring to the presentation of PICA in the GUI and the training materials for future 'PICA-Integrative Modellers', precise methodological guidance at each step of the procedure are needed for an easier uptake of the tool. With these improvements, PICA should be ready for end-users applications.

2.4 Contribution and complementation of PICA to the SEAMLESS-IF model-chain application results in Midi-Pyrenees

One important additional objective of the second empirical application of PICA was to evaluate to what extent the *ex-ante* institutional compatibility assessment is complementary with the *ex-ante* impact assessment results generated by the SEAMLESS-IF model chain. In order to allow for a complete application of SEAMLESS-IF, it was chosen to assess the institutional compatibility of the EU Nitrate Directive with the context of Midi-Pyrenees (Test Case 2).

In this section, the PICA results of the assessment of the institutional compatibility of the vulnerable zones extension in Midi-Pyrenees are related to the results of the CropSyst-FSSIM model chain application to assess the impacts of the EU Nitrate Directive in Midi-Pyrenees (Louhichi *et al.*, 2008).

The CropSyst-FSSIM model chain was applied to assess the economic and environmental impacts of the EU Nitrate Directive measures, providing for a better management of nitrogen mineral and organic fertilisation. Three farm types representative of the arable farming systems in Midi-Pyrenees were selected for the application². In the models, the costs for farmers to change from their current activities (over-fertilisation) to alternative activities (adoption of a better nitrogen fertilisation based on crop requirements and soil fertility)

² The three farm types are similar in size (large) and intensity (medium). The crop pattern of farm type 1 is dominated by cereals while farm type 3 is characterized by a relatively higher importance of oilseeds and a smaller irrigable area. Farm type 2, which represents twice less farms than each of the two other farm types, shows a relatively higher share of fallow in the crop pattern.

include explicitly private transaction costs. These costs are related to the collection of information on the policy. The conditionality of the provision of CAP payments for the selection of alternative activities (cross-compliance sanctioning mechanism) is modelled by a cut of 3% of the payments in the case one or more current activities are selected (Louhichi *et al.*, 2008).

The results at the farm level indicate that farm type 2 does not substitute the current activities with the alternative ones, even with the 3% cut in the CAP payments. It is estimated that only a 6% cut (or more) in the subsidies would lead to a complete switch to alternative activities, but accompanied by a loss of income for farmers. In contrast, farm types 1 and 3 fulfil the cross-compliance requirements by adopting alternative activities. Here, the loss of income is marginal while the nitrate leaching decreases significantly.

At an aggregated (NUTS 2) level, the impact of the EU Nitrate Directive measure is a slight decrease in farm income and CAP payments levels, and a reduction in nitrate leaching (-29% compared to the baseline scenario) (Louhichi *et al.*, 2008).

The aggregated result that the loss of income induced by the adoption of alternative activities is marginal is in line with the findings of the PICA assessment that the opportunity costs for crop farmers to change their practices are low in Midi-Pyrenees. However, the modelling of cross-compliance in FSSIM rests on the assumption of full monitoring such that any non-compliance is detected (Louhichi *et al.*, 2007). The PICA assessment reveals that the low resources devoted to the administrations in charge of monitoring as well as the high information asymmetry between the administrations and the farmers are two important factors which may prevent the detection of non-compliance. Moreover, beyond economic reasons and controlling issues, psychological factors were found to have a strong influence on farmers' behaviour in Midi-Pyrenees. Farmers' feeling to be considered guilty for water pollution as well as their rejection of State interference in their activities - which is perceived as being too strong - may also lead them not to comply with the EU Nitrate Directive.

Given these institutional features, the compliance of crop farmers with the EU Nitrate Directive measure and thus the decrease in nitrate leaching in Midi-Pyrenees may be not as significant as predicted by the model chain. Alternatively, addressing the lack of resources for administrations in charge of the monitoring and enhancing communication with farmers to reduce their protest behaviour, by e.g. better participation possibilities, could help for the predicted beneficial impacts of a better nitrogen management to become effective.

Relating PICA statements to the model chain results on the case of the EU Nitrate Directive implementation in Midi-Pyrenees illustrates the added value of taking into account an institutional perspective within SEAMLESS-IF *ex-ante* policy assessment. The PICA results can contribute to the interpretation and validation of the model results, often dependent on strong assumptions with regard to institutional aspects which, in reality, influence policy implementation and outcomes.

3 The evaluation of PICA from a policy experts' perspective

This additional testing activity had the objective to gain valuable insights about the expectations of policy experts as potential end-users with respect to an institutional compatibility assessment and their perception and evaluation of PICA. In particular, information about the preferred specific modes of interaction between policy experts and the expert team running PICA, as one component of the overall team running SEAMLESS-IF, has been collected.

3.1 Methodology

Between December 2007 and April 2008, four meetings between Cemagref researchers and policy experts from the regional services of the French Ministry of Agriculture were organized in different cities in France (Table 13). The purpose of these meetings was to exchange on the expectations of policy experts with regard to the applied research conducted in Cemagref and on what Cemagref researchers can offer to support public decision making and intervention.

We took the opportunity of these meetings to interact with policy experts on the PICA procedure. We organized specific one-hour workshops to present PICA and to get some feedback on the tool. Between 3 and 8 policy experts participated in each session. In total, 20 policy experts attended the four workshops (Table 13).

Table 13: PICA workshops with French policy experts

Date	Place	Policy Experts
11.12.07	Saint Malo	5
28.02.08	Paris	4
06.03.08	Périgueux	8
24.04.08	Montpellier	3

The policy experts who participated in the workshops are mainly working in the local services of the French Ministry of Agriculture, at the “département” (NUTS 3) level (Table 14) Most of them are in a head position, whether at the head of the administrative unit or at the head of a specific department. With regard to their activities, the heads of the administrative units are directly responsible for the definition or adaptation of policies at their respective administrative level. Others are rather in charge of the implementation of agricultural and environmental policies. At last, a good number of these experts have more a role of technical support to communities.

Table 14: The sample of policy experts

Level of intervention	Position	Field of activities
National	Head	Definition/ adaptation of policies
Regional (NUTS 2)	Manager of department	Implementation of policies
Local (NUTS 3)	Engineer	Technical support

The workshops were organized as follows. First, PICA was introduced to the policy experts on the basis of a general presentation of the procedure and of an illustration based on the concrete case of the implementation of the EU Nitrate Directive in Puy-de-Dôme and in Auvergne. All questions and comments from the policy experts were recorded. Second, a questionnaire was distributed to the participants to be filled out (Appendix 6). This questionnaire consisted of two main parts: (i) questions about the perception and evaluation of PICA by policy experts, (ii) questions regarding the preferred modes of interaction with the future PICA expert team.

3.2 Results

3.2.1 Perception and evaluation of PICA by policy experts

As a general feedback from policy experts after the presentation of PICA in the first part of the workshop, it seems that most of them understood the objective of the tool, the logic of steps and the type of results to be expected. Many indicated spontaneously their interest for the assessment of policy options' compatibility with a given institutional context.

However, the interactions with policy experts revealed also some clarification needs for a better communication on PICA. First, some policy experts were confused by the use of the terms "institutions", "institutional compatibility", etc. Actually, "institutions" is used in PICA with a specific meaning, grounded in institutional economics theory, which is different from the common understanding of the word. Whereas in PICA "institutions" refer to the "systems of informal and formal rules" which characterize a given context, it is rather commonly understood as corresponding to the organisations involved in the implementation of a policy such as state administrations, interest groups, etc. Also, some names of Crucial Institutional Aspects were found to be difficult to understand as too abstract or complex, more particularly when they were related to theoretical concepts, e.g., "information asymmetry" or "opportunity costs".

The reactions and questions of the policy experts underlined thus the need for a better "translation" of the vocabulary used for the presentation of PICA in more simple terms. The use of examples and illustrations should also help the communication on the main concepts behind the tool.

Maybe as a consequence of the confusion about the word "Institutions", another misunderstanding was concerning the main objective of PICA. Some participants understood that the tool's aim was to assess if a policy option is accepted by all the stakeholders involved, instead of assessing its institutional compatibility.

With regard to the methodology of application of the tool, a concern of those policy experts less familiar with social sciences approaches was the "subjectivity" of the generated results. Many results reflect stakeholders' opinions (i.e. the identification of some CIA in PICA Step 2 based on interviews with stakeholders; or the classification of CIA through a focus group in PICA Step 4) and experts' opinion (the aggregation of information from the institutional indicators in PICA Step 4). It seems thus necessary to give precisions on the way stakeholder or expert "subjectivity" is reduced through specific methodological designs at each step of the application.

With regard to their perception and evaluation of PICA, a large majority of the policy experts (18/20) stated that PICA can contribute to a better implementation of policies. For most of them, the tool allows for an anticipation of the problems which may occur and thus may help for easier/ adequate adaptations.

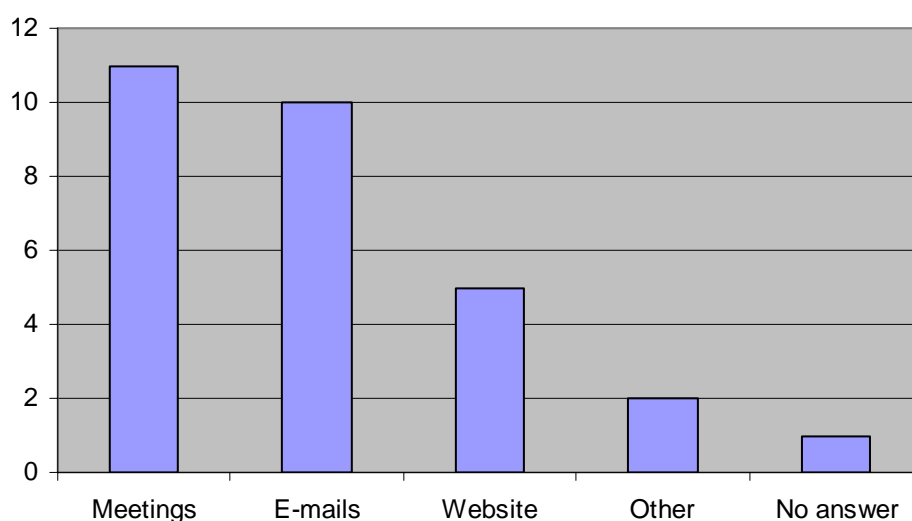
Also a majority (15/20) considered that the procedure can be useful for their own activities. They mainly see the tool as helpful to define and implement a new policy locally. Some policy experts also mentioned that the procedure can help to characterize a local context from an institutional perspective or to assess the stakeholders' positions with regard to the implementation of the specific policy. Some of the policy experts who stated that the tool could not be useful for their own activities (2/5) explained that they find PICA too complex to be applied in a 'real-world' situation. The remaining policy experts in this group (3/5) are involved in technical activities and as such they do not consider the tool as useful for them in practice.

Particularly interesting aspects of PICA highlighted by the policy experts were, first, the identification, evaluation and classification of the institutional factors which affect potentially the implementation of a policy option, second, the consideration of stakeholders' opinions in the assessment and third, the formalization of an analysis often made spontaneously by policy experts but without the necessary systematisation.

3.2.2 The preferred modes of interaction

With regard to the modes of interactions, the policy experts stated that they would prefer meetings and/or e-mails with the PICA expert team for information exchange (Figure 15) What is interesting is that, contrary to expectations, policy experts do not only favour the more distant and less costly interaction like e-mails and websites but seem largely ready to spend time in participating to meetings.

Figure 15: The preferred modes of interaction with PICA experts



Further, 15 policy experts would like to be informed of the intermediate results, while 13 of them would be willing to participate actively in the intermediate steps of the procedure. These results show the preference of policy experts for an active involvement in the application of the tool.

Finally, the policy experts prefer the results provided to them in form of a presentation by the PICA expert team and/or a written report and/or a website interface (Figure 16). The time frame under which the PICA study should be realized according to the policy experts ranges from one to six months (Figure 17).

Figure 16: The preferred forms for results of PICA

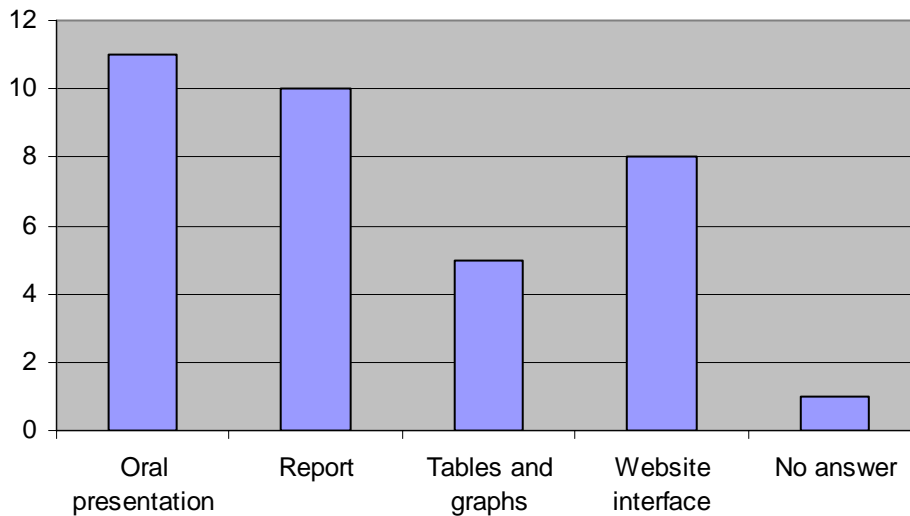
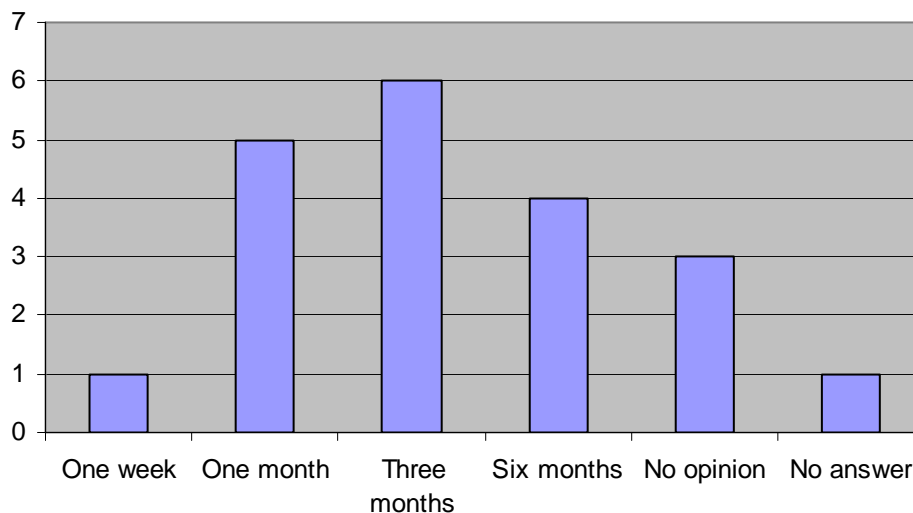


Figure 17: The preferred time span for a PICA application



The questions about the modes of interaction included in the questionnaire were based on the assumption that the future applications of PICA will be realized by a SEAMLESS PICA Integrative Modeller, external to the policy experts' organisations. However, some policy experts asked if it was possible and/or feasible that they make the applications themselves with some methodological guidance, thus if it was planned to develop PICA as a procedure to be applied by the policy experts alone. They were arguing that it would be much more practical for them to benefit directly from the insights of PICA when they feel the need of assessing institutional compatibility. Some other policy experts were more in favour of support provided by a PICA expert, who can bring, according to them, an external and neutral point of view.

Still in relation with the future modes of interaction for the use of PICA, many policy experts spontaneously asked about the organisation of future applications. What kind of organisation will be in charge? Under which conditions they, as users, will have access to the applications? At the time of the workshops, the SEAMLESS PICA team had hardly any precise answers to these questions. With regard to the expectations of policy experts, this issue should be

addressed in the general frame of the SEAMLESS Association for PICA to be ready for 'real-world' applications.

To conclude, the interactions with French policy experts from the local agricultural and environmental administrations showed the great interest of these potential end-users towards the application of PICA. Improvements in the communication about the procedure for this specific audience were identified. Regarding the future interactions with 'PICA-Integrative Modellers', policy experts seem willing to be actively involved in the applications of the tool. It would be interesting to undertake a similar evaluation with policy experts acting at the national and EU levels in order to check for adaptations in the PICA communication and modes of interaction with these potential end-users.

4 Integration of PICA into the final version of Seamless-IF

Integrating the procedure for institutional compatibility assessment into the SEAMLESS-Integrated Framework generally includes three interrelated aspects: a) The procedural integration, i.e. the entrance point when to launch the institutional compatibility assessment within the SEAMLESS-IF workflow; b) the visual integration of the procedure into the Graphical User Interface, including the linkages with the SEAMLESS-Database and the ontology; and c) the contextual integration of how to relate the PICA results to the results of the other models, thus to the model chain output. In this section, all three aspects are addressed.

4.1 The procedural integration of PICA

For the procedural integration, the initial idea was that PICA is running in parallel to the model chain ('linear Seam-PICA-GUI'). Therefore, the respective parts of the institutional compatibility assessment are present in all three phases of SEAMLESS-IF: Pre-modelling, modelling, and post-modelling. In the course of the project, PICA is placed in the Post-modelling phase and the analysis is launched from here. This bears the advantage that, in case several policy options are analysed by the SEAMLESS models, the most likely option(s) can be identified after the modelling phase has done its calculation. For this policy option(s), PICA can then shed light on its implementation compatibility with the institutional context. This saves time and costs by limiting the number of PICA runs.

The overall PICA assessment within SEAMLESS-IF consists of three basic parts: a) an initial interaction with the policy experts (i.e. prime-users, secondary users) to gain necessary information on the intended policy option to start the analysis, b) carrying out the PICA assessment steps, and c) the presentation of the results to the policy experts. While interaction with policy experts is crucial in the first and last phases, the whole assessment is conceived as an interactive process between the PICA expert team ('PICA-Integrative Modellers') and the policy experts that spans over all three phases.

Launching the institutional compatibility analysis requires that PICA experts gain information about the objectives and characteristics of the policy option under scrutiny. This is realised by an initial meeting with policy experts. Here, policy experts will be introduced to the concept of assessing ex-ante the institutional compatibility of policy options; and the usefulness of such an assessment will be explained in an illustrative way. Appropriate information on PICA in the GUI may be used like e.g., a short presentation of the results of former applications of PICA. If decided that an institutional compatibility assessment of a policy option(s) should be carried out, the PICA expert team defines the essential structure (definition) of the policy option that is to be implemented. This step can be described as '*Policy option description from an institutional perspective*' and is facilitated by a series of guiding questions the policy experts may want to answer. For example:

- Who are the actors you address with the policy option(s)?
- Would your policy option include new payments (money or kind) to the targeted actors, or the termination/ stop of payments already existing?
- Does your policy option target the protection of one or more concrete natural resource(s)?
- Who (which administrative units) would implement, monitor, and sanction the policy?

- Do you know of any similar policies that have been implemented (in this region) before?
- What factors may hinder/ foster the implementation of the policy option(s)?

Additionally, the geographical assessment scope needs to be decided at this starting point. This includes decisions if the compatibility assessment shall focus on one particular region or country, or if several regions or Member States shall be covered. Based on this information the PICA expert team initiates the assessment, where all PICA steps need to be carried out.

The institutional compatibility assessment itself can be also conceived of as an interactive process of varying intensity with the policy experts according to their preferences (Part 3). In the polar case '*no interaction*', PICA will solely run on the basis of the information provided beforehand. *No intermediate* results will be presented and discussed with policy experts. All decisions necessary during the assessment are taken by the PICA expert team based on the results of the respective steps of the assessment. This may include collecting further information with help of other scientists, stakeholders, or experts. However, regular interactions between the PICA expert team and the policy experts are recommended to increase the relevance of the PICA results for them. It would be useful to get back to the policy experts at various points of the assessment in order to present and discuss with them, for example, suggestions for appropriate crucial institutional aspects, selected institutional indicators, databanks, scale of outputs, and thematic categories of institutional compatibility. Such an interactive approach would allow on the one hand the policy experts to provide insights based on their experiences which can be included in the assessment and on the other hand to comment insights that are revealed during the assessment. When the PICA assessment is completed, PICA outputs are presented to the policy experts. Here, the GUI is used as a way to visualise the PICA results.

4.2 PICA integration into the Graphical User Interface (GUI)

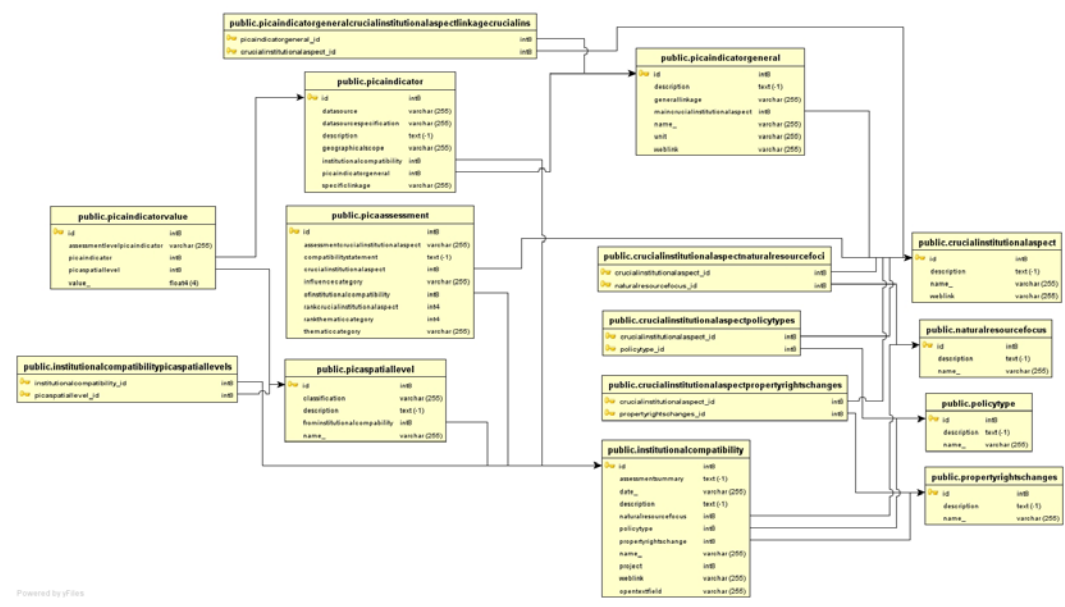
PICA is integrated in the SEAMLESS-IF GUI (available on the SEAMLESS test server and not delivered to EU). This integrated version represents a model to carry out the distinct PICA assessment steps. The model is based on a) suggestions made in appendix 3 in D2.4.2, and b) common work with WP5 during the project on PICA-elements, as documented in appendix 11 of the PD 6.5.5.2.

In the preparation phase with WP5, it was clarified which content, forms of visualisation (tables), and functionalities (buttons) need to be in the GUI for the computer-based operationalisation of PICA, which functionalities are static (metadata) and which ones are dynamic (application depending). This covers which content and forms of visualisation are permanent, which ones are likely to vary with the policy option under scrutiny, and which will be newly generated while running PICA. The latter is the case for crucial institutional aspects, institutional indicators and values, as well as for the thematic categories of institutional compatibility. For this, processes and interfaces have been thought that allow the input of these varying information and data via the GUI. For quality insurance of PICA and future PICA runs, options have to be developed accordingly to assign different use rights to allow for modifying dynamic and static information or only dynamic information. This is not done yet.

Major improvements and adjustments have been made on the PICA GUI after the April Evora P4M1 release (see PD 6552). Besides visual improvements, this includes the creation of a PICA ontology and, moreover, linking PICA with the SEAMLESS-IF database. Because PICA and thus the PICA GUI follows a different logic and has – to some extent - a different

design as the overall SEAMLESS GUI, most work in the last year has been done on this technical integration of PICA (Figure 18)

Figure 18: The integrated PICA database



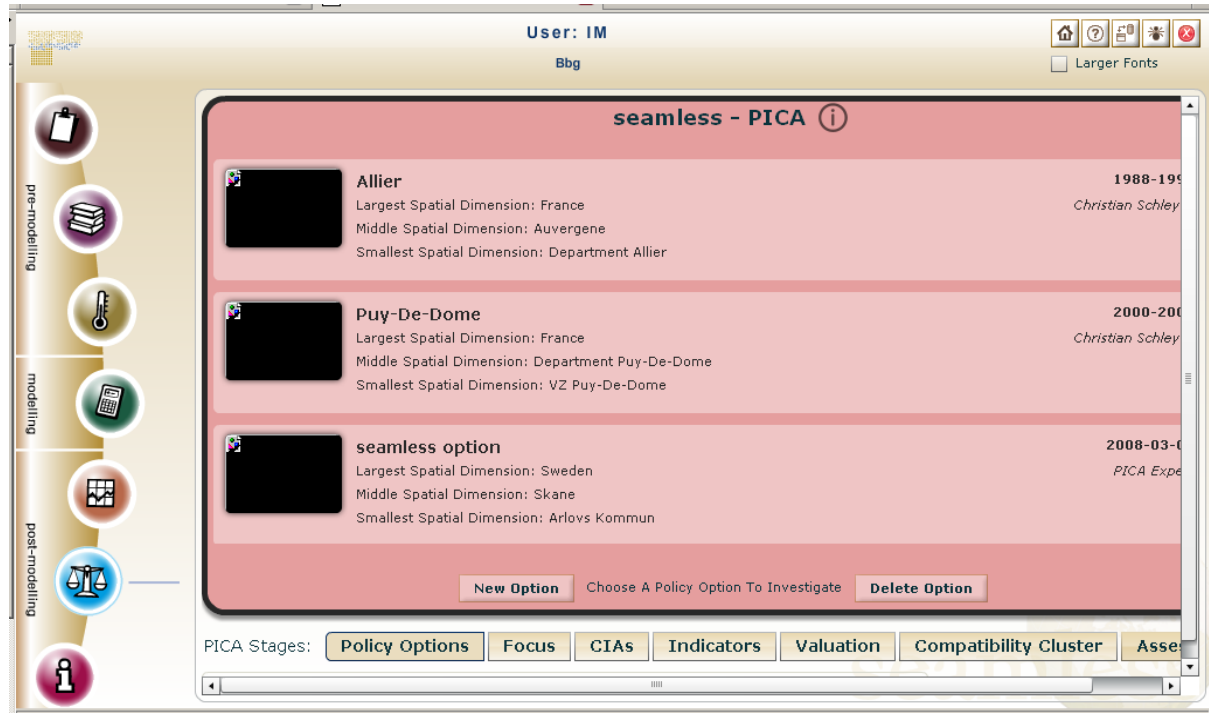
Until the end of the project, metadata and application data for the PICA GUI have been generated and delivered. Still, parts of the PICA GUI functionalities, mainly the ones allowing to insert and adjust dynamic information, remain to be further developed. Following, the work done is described in detail and an outlook of the work which remains to be done is given. Two versions are presented for illustration purposes. First, the P4M2 August version, including a combination of metadata (static information) and application data from the Auvergne testing, and second the March 09 version, containing only metadata (i.e. the PICA model to be further developed and used for future applications).

The **August version of the PICA GUI** is integrated in the SEAMLESS-IF GUI but is NOT linked to the SEAMLESS-IF database. This prototype includes static and dynamic information. The dynamic information builds on data from two empirical test cases: assessing the EU Nitrate Directive in the departments Puy-de-Dôme and Allier in Auvergne (NUTS 3-level). Data for the region Midi-Pyrenees (NUTS 2-level) was additionally generated, prepared for integration and transferred to WP5. Static content (metadata) include information on CIA and institutional indicators as well as introductions to PICA and its methodological ideas and approaches. In the following, screenshots from the August version of the PICA GUI are presented, their functions explained and adjustment needs illustrated.

The Procedure for Institutional Compatibility Assessment is entered from the first level in the Post-modelling phase, characterised by the symbol of a balance.

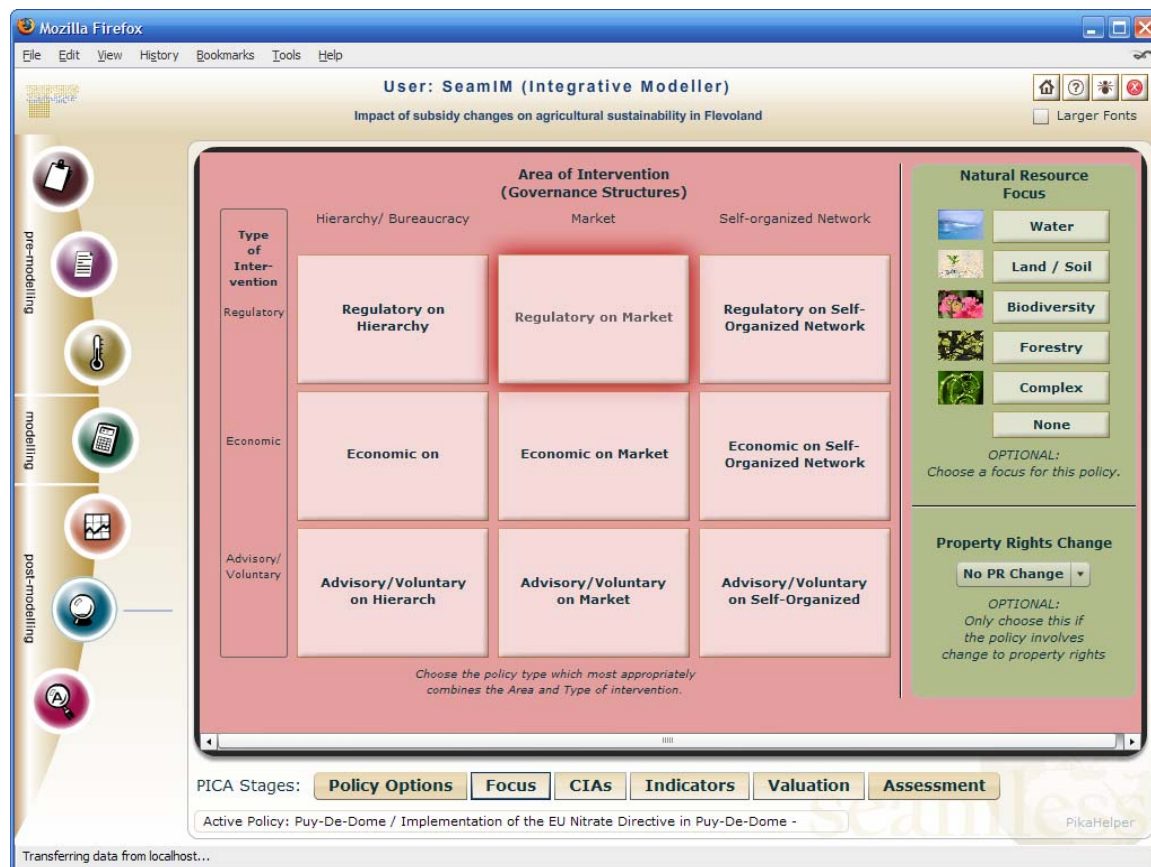
The **entrance screen** shows three projects (= Policy options) where PICA assessments have been carried out as example projects: Allier, Puy-de-Dôme and a Seamless option. The button 'New Option' allows the IM to create a new policy option for a new institutional compatibility assessment. In the P4M2 version, the creation and saving of a new policy option as dynamic information is not functional and remains to be developed after the end of the project. The tool bar beneath represents different 'PICA Stages' and functions as navigation through the analysis (Figure 19).

Figure 19: The entrance screen 'Policy Option'



Focus: The identification of the generic structure and the classification of the policy option are done at the Focus stage (PICA Step 1). It comprises the matrix of policy types (D2.4.2), with two axes: the type of intervention (e.g., regulatory policy, economic instrument, or advisory policy), and the area of intervention, i.e., the targeted governance structures (hierarchy, market, or hybrid). Two (non-compulsory) further specification options can be made here: the natural resource focus, where the targeted resource for the policy options can be defined as well as an optional 'Property rights change' indication. The characteristics of the policy option are marked as click-on (Figure 20). Behind each policy cluster are then the according CIA situated.

Figure 20: Defining the focus of the policy option



CIA: With respect to the identification of crucial institutional aspects (PICA Step 2), the respective interface presents a static list of CIA including a short description which belong to the previously selected policy type (Figure 21). From this list, theoretically, CIA can be selected for further analysis, and/or new ones added and/or created. For reviewing all available CIA, a static CIA browser opens (Figure 22). The browser covers the current library of so far existing CIA (as static information), which can be marked and added to the final list of CIA for further analysis. As an additional function, the browser offers a filter function to in- or exclude CIA for specific policy types, resources affected or property rights changes (see functions of the policy matrix). Besides the list of CIA, the browser includes static CIA descriptions and their general linkage to the policy option. It is important to note, that the content is only static in the sense that these are first orientation tables to start the empirical analysis. There is also a dynamic dimension planned in the GUI. This includes the possibility to develop and add new CIA, if considered helpful as well as their explanatory texts. This function is not available by the end of the project and needs to be developed afterwards. The same applies for the 'save' option for CIA selection.

Figure 21: List of CIA belonging to the selected policy type

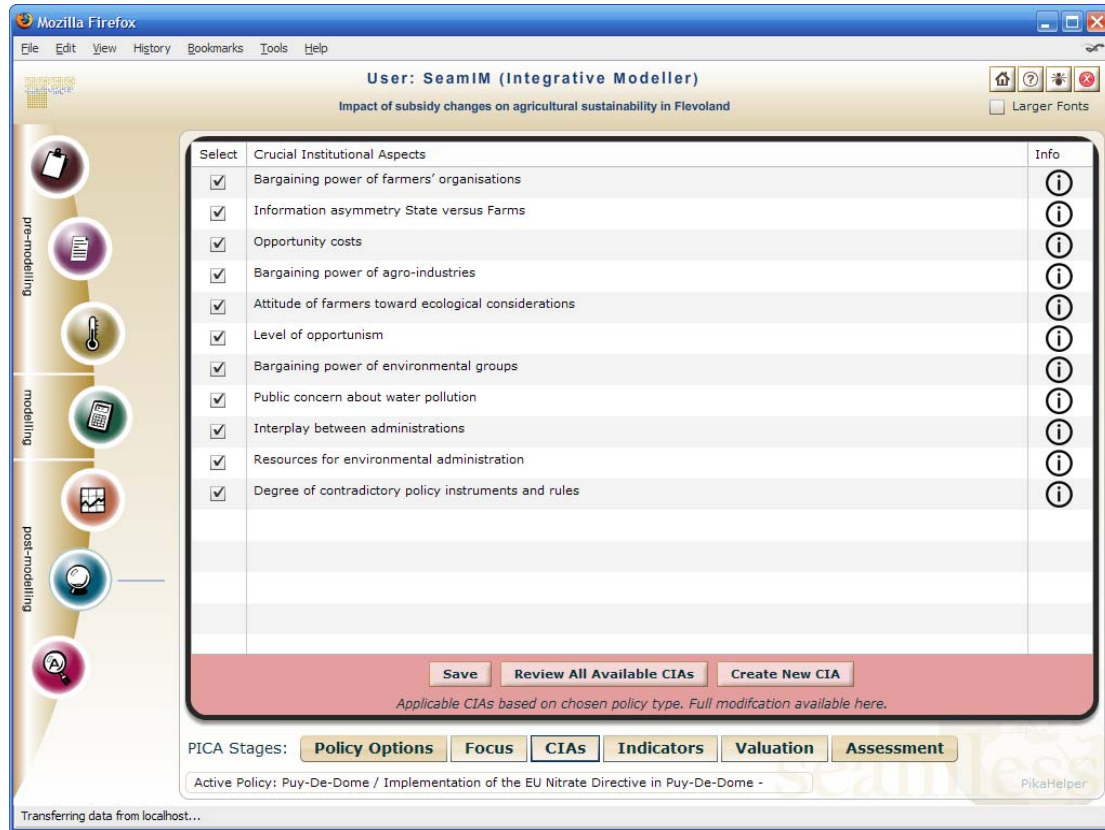
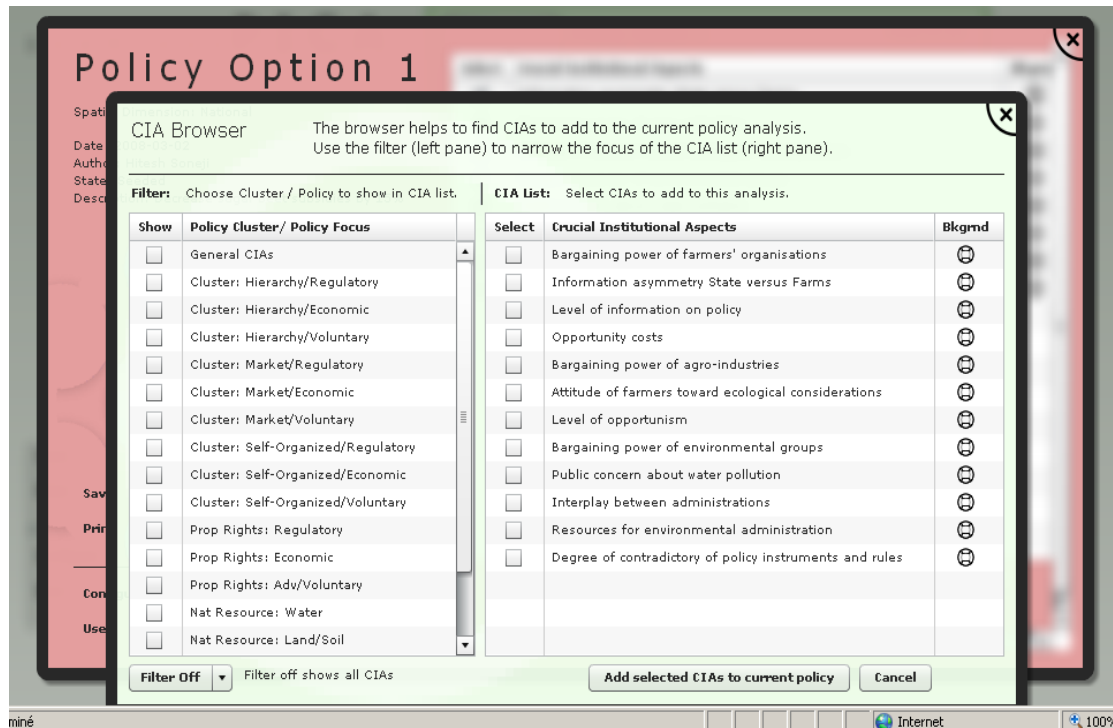


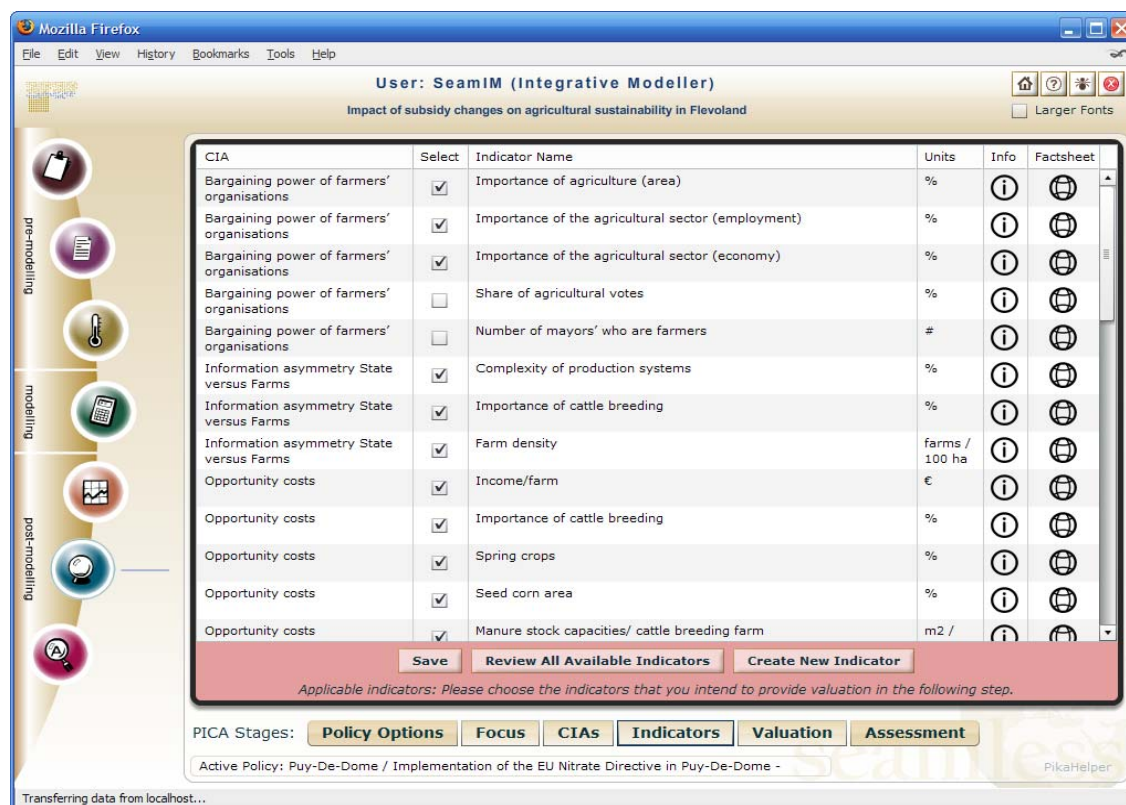
Figure 22: The CIA browser



Institutional Indicators: For PICA Step 3 Indicator selection, the graphical interface contains a list of indicators, which are useable to characterise the pre-selected CIA and to empirically assess its extent. The indicators are part of a current library of institutional indicators. This (for the moment static) library is based on institutional indicators which were initially compiled by a literature study (Table 3.5. in D2.4.2) and previous PICA runs (PD 6.5.5.2) as a starting point.

These static lists include, for each CIA, the name of the institutional indicators and their units. Further they offer information and a factsheet for more detailed descriptions. In these list, e.g., the initial linkage with the CIA as listed in Table 3.5 in D2.4.2 (*Initial linkage*) and the assumed linkages (*Specific linkage*) with the corresponding CIA for the policy option under scrutiny (here EU Nitrate Directive in Allier, Puy-de-Dôme) are précised. The *Geographical level* at which indicators are constructed is indicated together with the *Data source(s)* used for calculation. 'National level' means that the indicator can be assessed at the national level; 'Regional level' means that the indicator can be assessed at the regional level; 'Departmental level' indicates that data is also available on the local level; 'Vulnerable Zone level' means that data is available even specifically for the respective vulnerable zones. The *Status* column indicates whether the indicator was selected from the current library (Table 3.5 in D2.4.2) or was newly defined, by previous PICA runs. The *Degree of relevance* as well as the *Motivation* for the assignment of such a degree to each indicator is given in the last columns (Figure 23).

Figure 23: Initial list of indicators for selected CIA



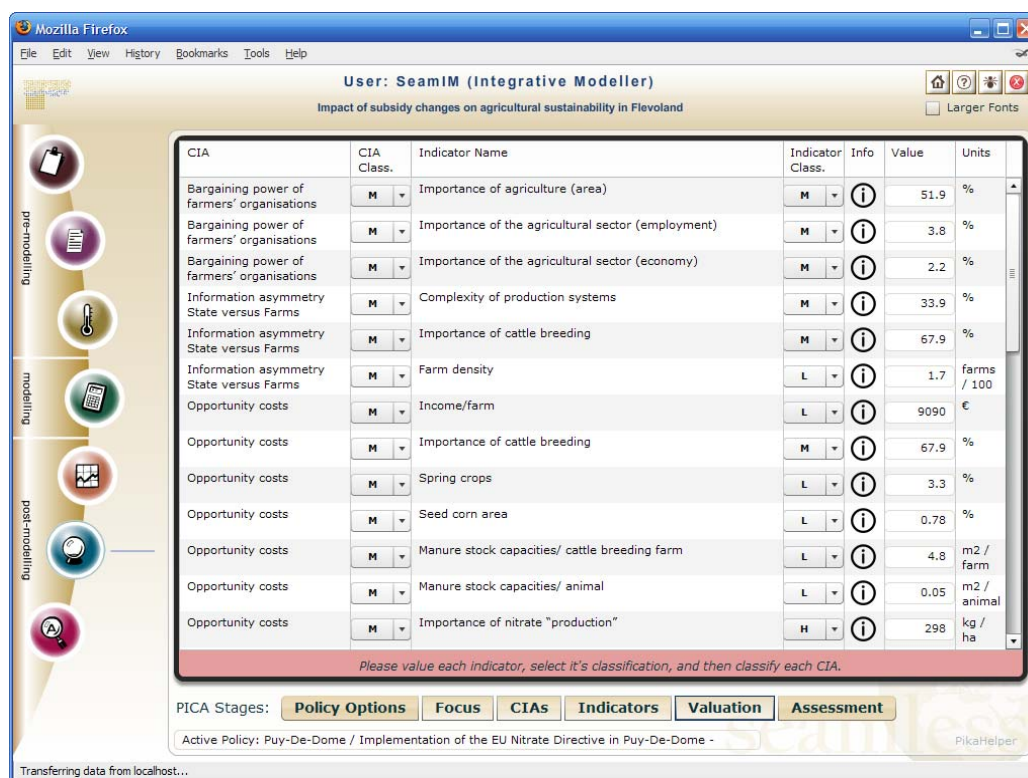
Similar to the CIA browser, the PICA GUI contains an institutional indicator browser. It covers for the moment only static lists of all potential useable institutional indicators, including their linkage to respective CIA, their explanatory power, and wherever possible their status in terms of accessibility and availability.

By the end of the project it is not possible to 1) add Indicators from the browser, 2) to create new ones, and c) to save them. This remains to be further developed.

Valuation: For CIA valuation (PICA Step 4.1) indicator values are presented in form of tables, and partly texts (qualitative statements) to make them transparent to the User(s). For the valuation process, first, the values for each institutional indicator characterising a particular CIA can be classified as ‘high’, ‘medium’, or ‘low’ by a scroll-down function. This can be done e.g. as a comparative assessment like realised in the three test cases for the policy option 'EU Nitrate Directive'. Second, the extent of each CIA can be then similarly assessed as ‘high’, ‘medium’, or ‘low’ on the basis of the classified values of the institutional indicators related to the respective CIA. The indication given by the classified value of one indicator for the extent of the corresponding CIA depends on the linkage between this indicator and the CIA (Figure 24). Further, more information about the indicators can be retrieved by clicking on the information button.

By the end of the project it is not possible to fill in and to save indicator values. In this step as well as in the next step 'compatibility cluster', a save button is missing. This needs to be adjusted in the future.

Figure 24: Valuation of indicators and CIA extent



The screenshot shows a web browser window with the URL 'User: SeamIM (Integrative Modeller)' and the title 'Impact of subsidy changes on agricultural sustainability in Flevoland'. The main content is a table with the following columns: CIA, CIA Class., Indicator Name, Indicator Class., Info, Value, and Units. The table lists various indicators such as 'Bargaining power of farmers' organisations' and 'Importance of agriculture (area)'. Below the table, there are 'PICA Stages' buttons: Policy Options, Focus, CIAs, Indicators, Valuation, and Assessment. The 'Valuation' stage is currently selected. A message at the bottom of the table area reads: 'Please value each indicator, select it's classification, and then classify each CIA.'

CIA	CIA Class.	Indicator Name	Indicator Class.	Info	Value	Units
Bargaining power of farmers' organisations	M	Importance of agriculture (area)	M	i	51.9	%
Bargaining power of farmers' organisations	M	Importance of the agricultural sector (employment)	M	i	3.8	%
Bargaining power of farmers' organisations	M	Importance of the agricultural sector (economy)	M	i	2.2	%
Information asymmetry State versus Farms	M	Complexity of production systems	M	i	33.9	%
Information asymmetry State versus Farms	M	Importance of cattle breeding	M	i	67.9	%
Information asymmetry State versus Farms	M	Farm density	L	i	1.7	farms / 100
Opportunity costs	M	Income/farm	L	i	9090	€
Opportunity costs	M	Importance of cattle breeding	M	i	67.9	%
Opportunity costs	M	Spring crops	L	i	3.3	%
Opportunity costs	M	Seed corn area	L	i	0.78	%
Opportunity costs	M	Manure stock capacities/ cattle breeding farm	L	i	4.8	m2 / farm
Opportunity costs	M	Manure stock capacities/ animal	L	i	0.05	m2 / animal
Opportunity costs	M	Importance of nitrate "production"	H	i	298	kg / ha

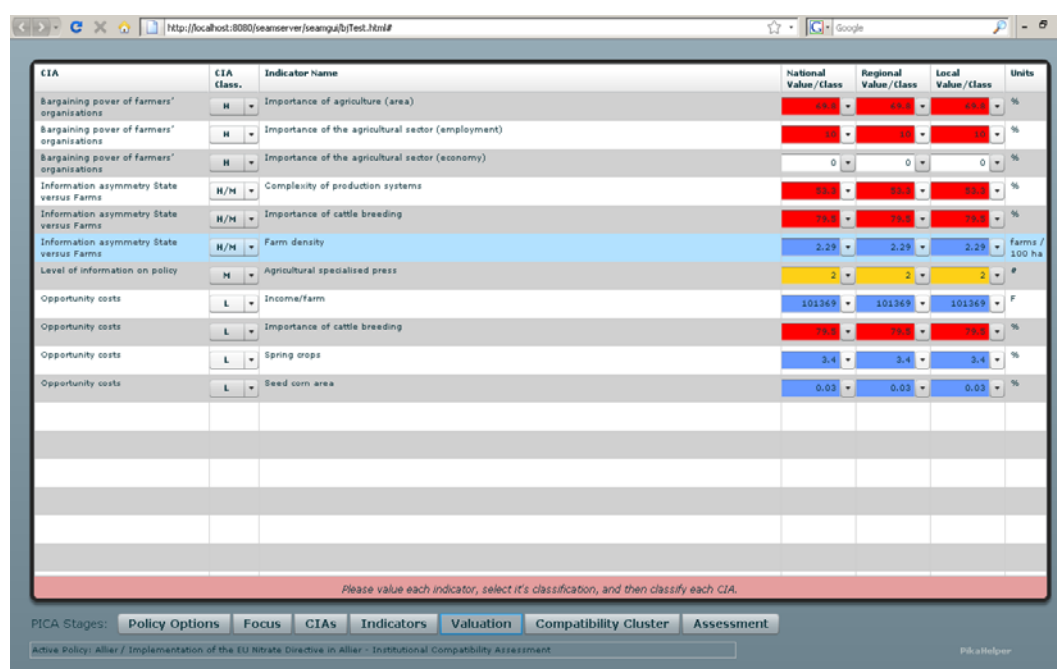
Also, indicator values as well as CIA valuation need to be modified in the GUI to inform the policy experts. Specific (Master) Use rights then will insure that only previously defined members of the PICA board can include new developed CIA and/or indicators in master (current) libraries, or skip or modify existing indicators and CIA in the respective libraries. Therefore, these browsers are also dynamic, growing by further PICA applications. A use right assigning system does not exist by the end of the project and needs to be developed in the future.

Assessment: The institutional compatibility between the policy option (here, the EU Nitrate Directive) and the institutional contexts is assessed by following three different sub-steps (PICA Step 4.2):

a) Thematic categories of institutional compatibility grouping the CIA identified as potentially hampering/fostering the implementation of the policy option (EU Nitrate Directive) were defined by the PICA experts.

b) Each CIA within each thematic category can be i) ranked according to its importance and ii) its influence characterised as ‘fostering’ or ‘hampering’ with regard to the process of policy implementation. Also, each thematic category can be ranked vis-à-vis the other categories by importance for the policy option in the respective geographic context (Figure 25).

Figure 25: The compatibility assessment



CIA	CIA Class.	Indicator Name	National Value/Class	Regional Value/Class	Local Value/Class	Units
Bargaining power of farmers' organisations	H	Importance of agriculture (area)	20.0	15.0	15.0	%
Bargaining power of farmers' organisations	H	Importance of the agricultural sector (employment)	10	10	10	%
Bargaining power of farmers' organisations	H	Importance of the agricultural sector (economy)	0	0	0	%
Information asymmetry State versus Farms	H/M	Complexity of production systems	20.0	20.0	20.0	%
Information asymmetry State versus Farms	H/M	Importance of cattle breeding	20.0	20.0	20.0	%
Information asymmetry State versus Farms	H/M	Farm density	2.29	2.29	2.29	Farms / 100 ha
Level of information on policy	H	Agricultural specialised press	2	2	2	#
Opportunity costs	L	Income/farm	101269	101269	101269	F
Opportunity costs	L	Importance of cattle breeding	20.0	20.0	20.0	%
Opportunity costs	L	Spring crops	3.4	3.4	3.4	%
Opportunity costs	L	Seed corn area	0.03	0.03	0.03	%

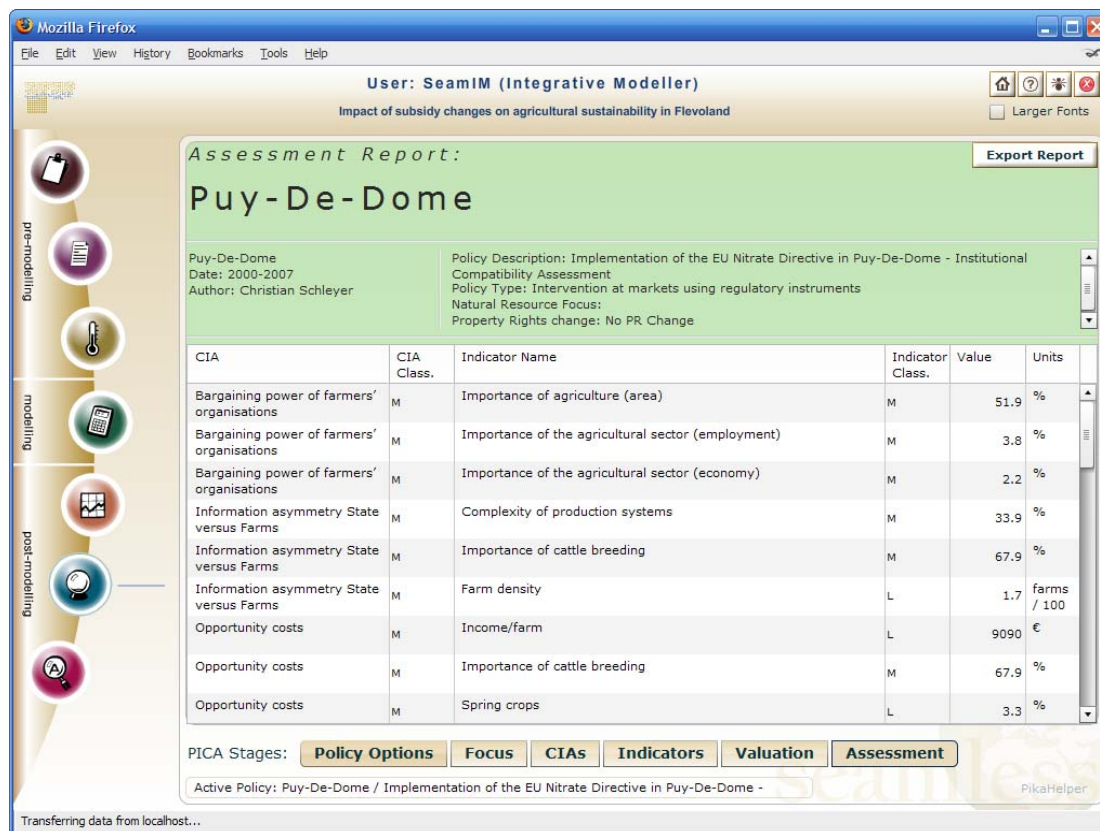
Please value each indicator, select its classification, and then classify each CIA.

PICA Stages: Policy Options | Focus | CIAs | Indicators | Valuation | Compatibility Cluster | Assessment

Active Policy: Allier / Implementation of the EU Nitrate Directive in Allier - Institutional Compatibility Assessment

Assessment report: Finally, a summary report appears at the end of the assessment, which can be exported to the policy experts PC. It summarises the most important assessment results of the application like: the ranking results of the CIA; the ranking results of the compatibility clusters, as well as the final compatibility statements (Figure 26).

Figure 25: The final institutional compatibility assessment report



In **March 2009** a new **PICA GUI version** has been developed by WP5. At the time this report is written, it is not available on the SEAMLESS server. It illustrates the latest PICA GUI development and can be seen as a basis for future work dealing with PICA. This version is linked to the SEAMLESS GUI AND the SEAMLESS-IF database. Compared to the Prototype before, it contains only metadata, i.e. static information. Besides this, it has a different design oriented towards the overall S-IF GUI. Metadata contain the matrix of policy types, so far used CIA (including background information, like described before) and all used indicators (including explanations). For the preparation of this last integrated PICA GUI, the PICA database was separated, i.e. the metadata as a basis for the PICA model (the tool used for an application) were isolated, and all application data (i.e. from Allier and Puy-de-Dôme) suppressed. This data preparation and integration constitute the mayor improvement of the latest PICA GUI development

For illustration purposes, key screenshots of this new PICA model are presented (Figures 27-31). The logic of the workflow is the same like described before, as well as the kind of information and functionalities needed for the institutional compatibility assessment. Therefore, explanations stay the same like in the previous prototype section and will not be repeated again. Future PICA GUI development work should predominantly focus on the dynamic functions, that is, on the possibilities to adjust the static information to the policy option and institutional context under scrutiny.

Figure 26: The CIA library

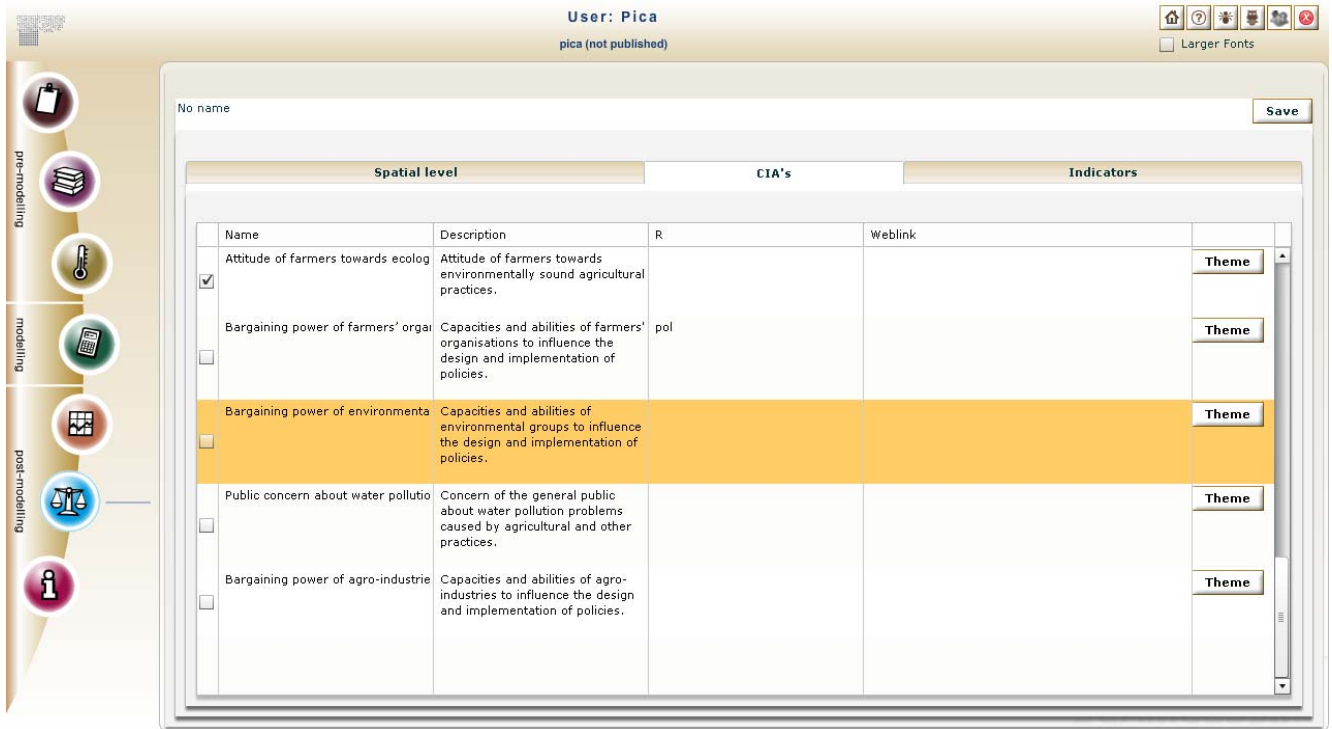


Figure 27: The Indicator browser

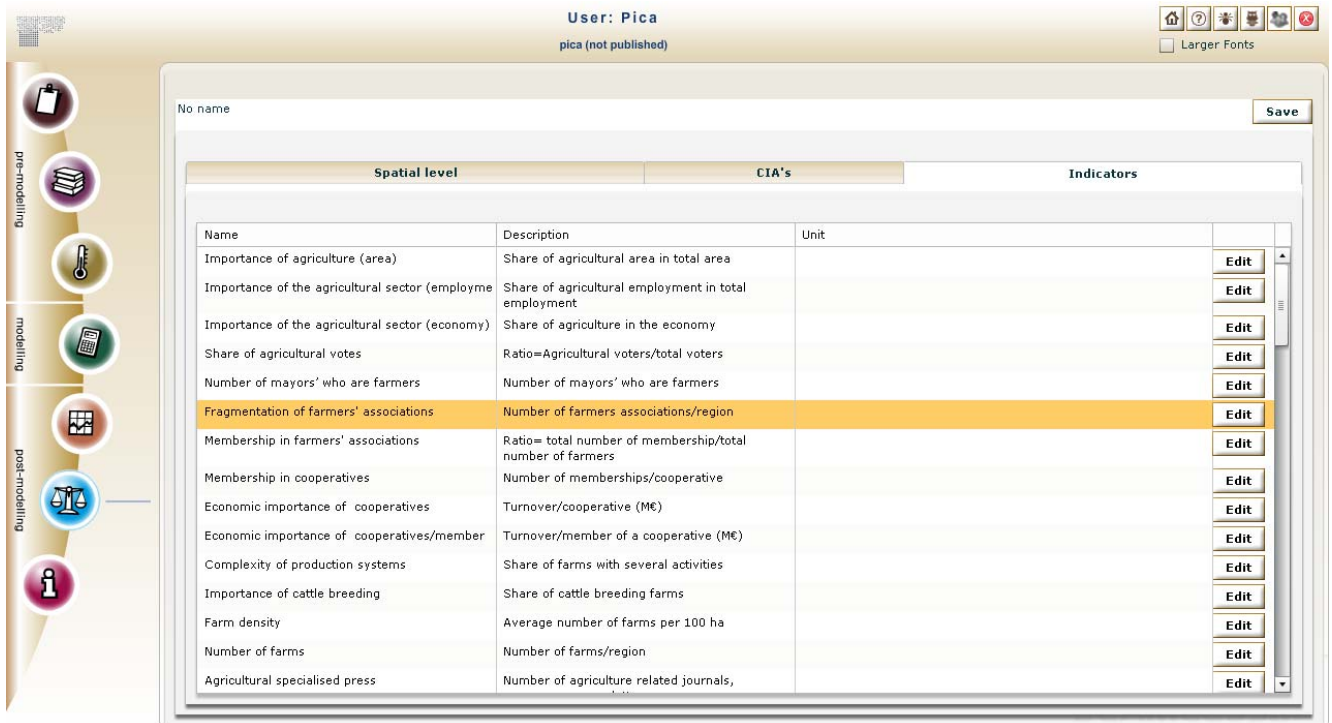
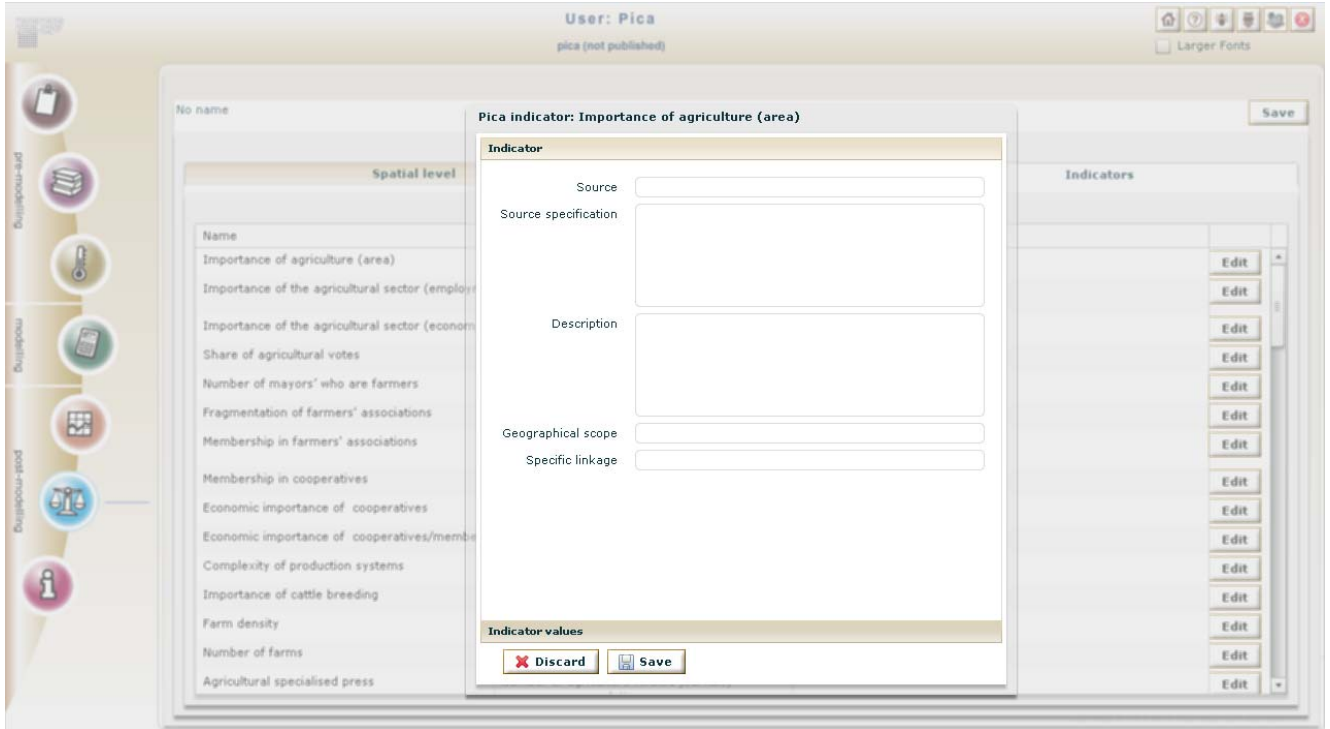
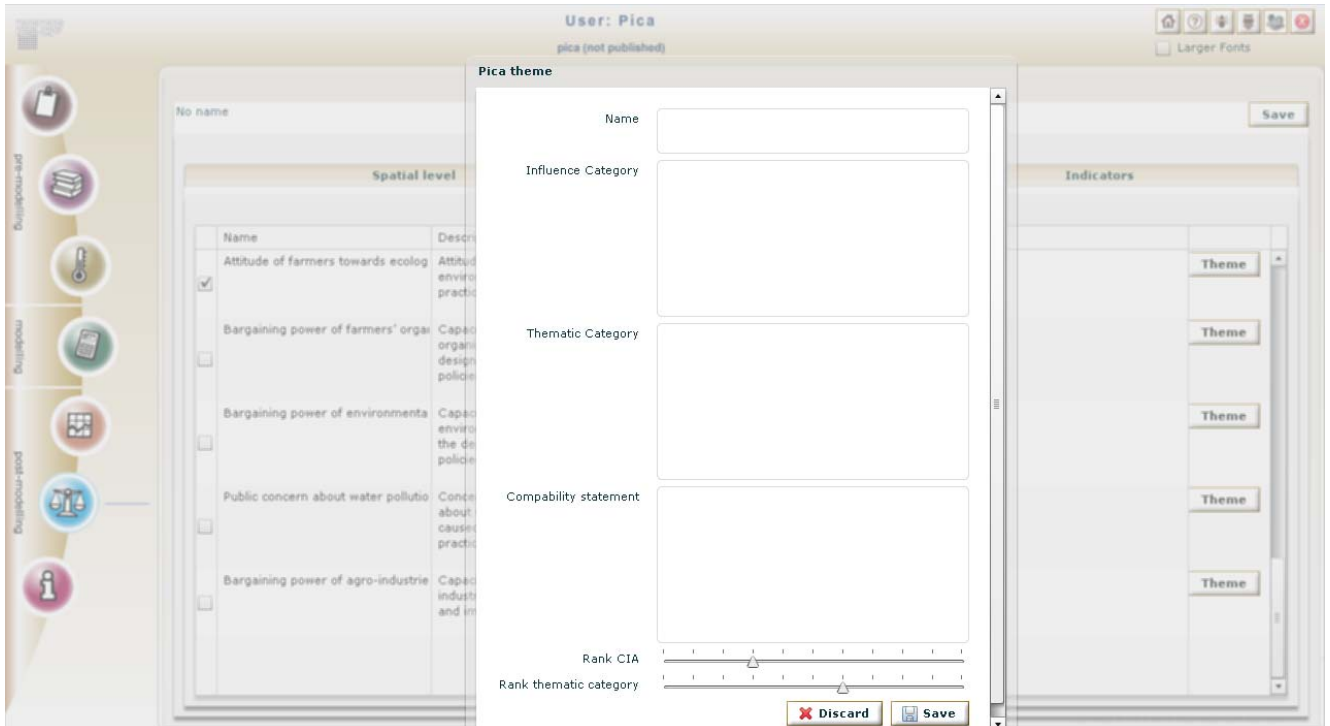


Figure 28: Example of an indicator factsheet



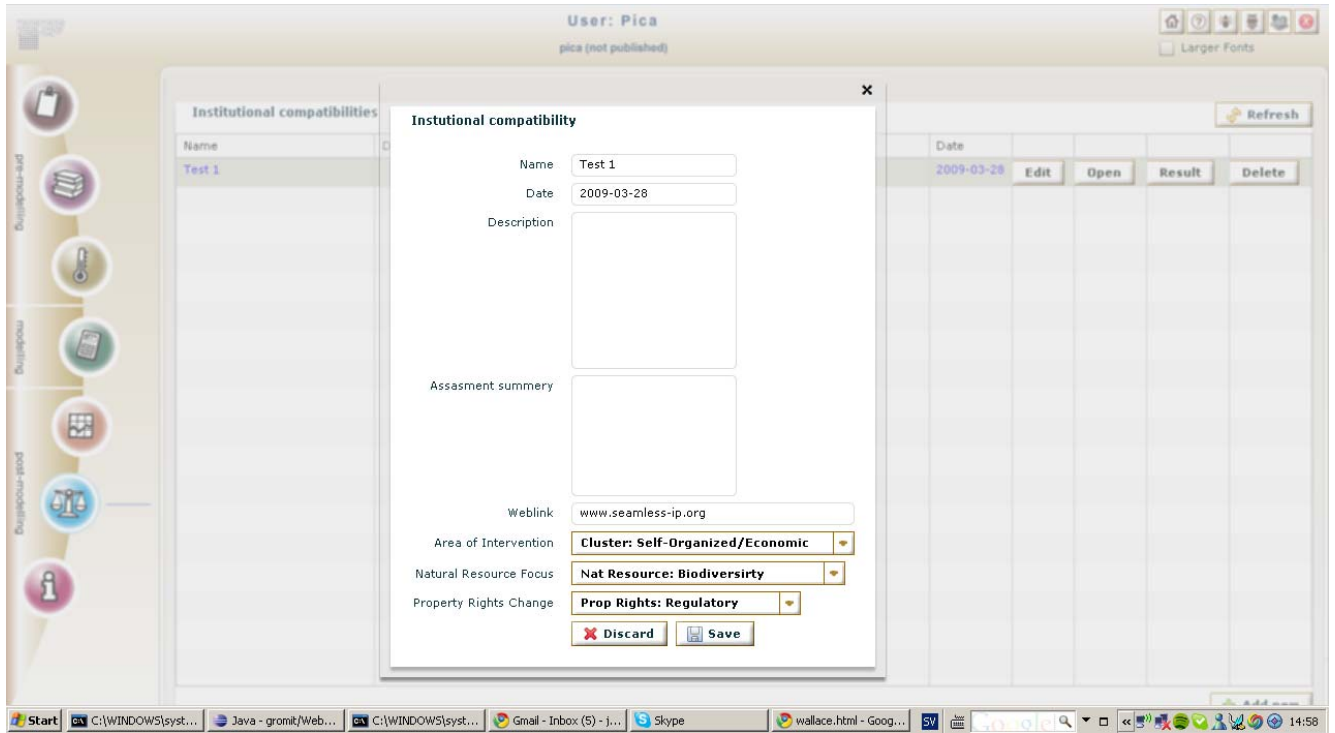
The screenshot shows the Pica indicator factsheet interface. The user is logged in as 'Pica' (not published). The main window displays a list of indicators under the heading 'Pica indicator: Importance of agriculture (area)'. The selected indicator is 'Importance of agriculture (area)'. The interface includes a 'Spatial level' section, a 'Name' field, and a 'Description' field. The 'Indicator values' section at the bottom has 'Discard' and 'Save' buttons. On the right, there is a list of indicators with 'Edit' buttons for each.

Figure 29: Valuation of indicators and CIA extent



The screenshot shows the Pica theme valuation interface. The user is logged in as 'Pica' (not published). The main window displays a list of themes under the heading 'Pica theme'. The selected theme is 'Attitude of farmers towards ecology'. The interface includes a 'Name' field, an 'Influence Category' field, a 'Thematic Category' field, and a 'Compability statement' field. The 'Rank CIA' and 'Rank thematic category' sections at the bottom have sliders and 'Discard' and 'Save' buttons. On the right, there is a list of themes with 'Theme' buttons for each.

Figure 30: The compatibility assessment report



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Glossary

<i>Crucial institutional aspects</i>	Crucial institutional aspects (CIA) are those institutional factors that foster or hamper the effective and cost-efficient implementation of policies.
<i>EU Nitrate Directive</i>	The EU Nitrate Directive (Council Directive 91/676/EEC) has been adopted by the European Communities Council in 1991. This Directive aims at limiting the diffusion of nitrates from agricultural sources in surface and ground waters. The application of this policy includes the designation of vulnerable zones where nitrate rates are higher than 50 mg/l, or higher than 40 mg/l with an upward trend; to be revised every four years. Further, in these vulnerable zones action programmes that entail compulsory measures (for farmers) have to be implemented to reduce nitrate rates. Outside vulnerable zones, a national code of good agricultural practices has to be applied voluntarily.
<i>Institutions</i>	Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. They are made up of formal constraints (e.g., rules, laws, and constitutions), informal constraints (e.g., norms of behaviour, conventions, and self-imposed codes of conduct), and their enforcement characteristics.
<i>Institutional compatibility</i>	Institutional compatibility refers to the compatibility between policy instruments and the respective institutional context to assess the effectiveness and cost-efficiency of policymaking.
<i>Institutional indicators</i>	Institutional indicators are defined as variables and proxies that are used as input to the institutional analysis within PICA. Unlike the common understanding of indicators within Work Package 2 and in the overall SEAMLESS project institutional indicators, such as members in farmers' associations, or government effectiveness do not represent the information/results of the institutional analysis given to the User(s). Further, institutional indicators often also encompass indicators that are usually referred to as economic, ecological, or social indicators.
<i>Focus groups</i>	Focus groups are facilitated group discussions to explore people's views and experiences on a specific set of questions. Group interactions are explicitly used to produce data and insights.
<i>Vulnerable Zone</i>	According to the EU Nitrate Directive, all areas where nitrate rates are higher than 50 mg/l, or higher than 40 mg/l with an upward trend have to be designated as vulnerable zones. Here, action programmes that entail compulsory measures (for farmers) have to be implemented to reduce nitrate rates. The nitrate rates have to be monitored regularly and the vulnerable zones are to be revised accordingly every four years.

Appendixes

- Appendix 1: Interview guidelines for the identification of Crucial Institutional Aspects (in French)
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Appendix 1: Interview guidelines for the identification of Crucial Institutional Aspects

Guide d'entretien PICA Midi-Pyrénées

A) Phase préparatoire: (*brève explication des motivations de l'entretien*)

Projet SEAMLESS-IF → *présenter le flyer de SEAMLESS-IF*

PICA: analyse *ex-ante* de la compatibilité institutionnelle des politiques dans un contexte donné/ analyse complémentaire du reste de la procédure SEAMLESS → *test de la méthodologie*

Région de test: Région Midi-Pyrénées (Tarn, Gers et Haute-Garonne)

Principes de l'entretien → *ouvert, documenté, anonyme*

B) Brève présentation de la personne enquêtée (*fonction dans l'institution, depuis combien de temps, rôle dans le processus de mise en place de la directive nitrate...*)

C) Départ: Présentation d'un scénario sur une extension hypothétique de la zone vulnérable du département concerné, dans le cadre de la Directive Nitrate. (*Objectif: amener et cadrer le sujet dont on veut discuter*)

Voici un scénario hypothétique :

Dans les prochains mois, la zone vulnérable sera étendue à tout le département. Comme le définit la directive nitrate, au sein de cette zone vulnérable, les mesures prévues quant aux pratiques de fertilisation seront obligatoires.

D) Ouverture (*question aisément compréhensible et à laquelle les enquêtés peuvent répondre facilement*)

Quand vous pensez à la possibilité de l'extension de la zone vulnérable dans votre département, quelle est votre position/impression générale sur cette politique et ses conséquences pour le département ?

E) Vue générale des aspects institutionnels cruciaux (*début de la discussion sur les Aspects Institutionnels Cruciaux (AIC)*)

Sur quel plan pensez-vous que la mise en œuvre de la Directive Nitrate dans votre département est potentiellement problématique et, au contraire, sur quels aspects pensez-vous que cette mise œuvre peut se faire sans problèmes ?

F) Autres exemples (*structuration de l'entretien*)

Est-ce que les aspects que vous avez évoqués sont les principaux points cruciaux auxquels vous pensez ou est-ce qu'il y a d'autres aspects de la mise en œuvre potentielle de la Directive Nitrate dans votre département dont vous pourriez nous parler? (*proposer les aspects non cités*)

1. Les asymétries d'information entre les agriculteurs et l'état (*capacité de l'administration étatique à contrôler le respect des agriculteurs des restrictions prévues par la Directive Nitrate (en termes de ressources humaines et financières)*)

2. Le niveau important d'opportunisme/coût d'opportunité élevé (*dans la zone considérée, est-ce que les agriculteurs sont plus disposés ou non à respecter une réglementation sur leurs pratiques ?*)

3. **Le niveau important d'opportunisme/Facteur psychologique** (*dans la zone vulnérable, sentiment des agriculteurs d'être défavorisés/lésés par rapport aux autres agriculteurs hors des zones vulnérables*)
4. **Coûts de transaction importants dans l'administration** (*est ce que, du fait de l'organisation d'une administration, la mise en œuvre de la Directive Nitrate est susceptible de souffrir de coûts de transaction importants (transmission de l'information, distribution des responsabilités, organisation de la prise de décision...)*)
5. **Problèmes d'interférences entre administrations** (*est que la coordination entre les administrations de l'agriculture et de l'environnement pose problème ?*)
6. **Superposition des cadres réglementaires** (*superposition des cadres réglementaires (Directive Nitrate, PMPOA, ICPE) qui peut entraîner une confusion et un manque de cohérence*)
7. **Niveau insuffisant d'information sur la politique** (*niveau d'information dont disposent les agriculteurs en zone vulnérable sur les mesures qu'ils doivent respecter*)
8. **Coûts de transaction importants pour les agriculteurs** (*est-ce que le respect des mesures obligatoires de la Directive Nitrate induit des coûts de transaction pour les agriculteurs (rédaction de dossiers, déplacements...?)*)
9. **Manque de confiance dans les solutions apportées par la loi** (*solutions considérées inefficaces, localisation des points de mesures des indicateurs considérée pas cohérente, évaluation du risque dans les zones vulnérables dites de « précaution » contesté...*)
10. **Attitude des agriculteurs quant à des considérations écologiques** (*sensibilité des agriculteurs dans la zone considérée aux considérations de protection de l'environnement et positionnement par rapport au rôle qu'ils peuvent jouer*)
11. **Pouvoir de négociation des organisations agricoles** (*importance de l'influence des organisations agricoles sur le processus de mise en œuvre de la politique*)
12. **Force des groupes environnementaux** (*importance de l'influence des groupes environnementaux sur le processus de mise en œuvre de la politique*)
13. **Fonction de préférence des contribuables** (*conflit sur la responsabilité des sommes à payer pour les infrastructures nécessaires à rendre l'eau potable, à maintenir l'étiage, ...*)

G) Vérification de la cohérence des réponses

Vous avez mentionné les aspects suivants comme **étant** importants quant au succès/échec de la mise en œuvre de la Directive Nitrate dans votre département (*répéter tous les AIC ex ante identifiés par l'enquête*) Est-ce que vous pouvez les classer par ordre d'importance pour la mise en œuvre effective de la politique ? Est-ce que vous pouvez expliquer votre classement?

H) Remerciements

Merci beaucoup pour votre aide et votre temps ! Nous vous informerons des résultats de notre étude et vous enverrons un rapport/résumé en septembre.

Appendix 2: Description of the Crucial Institutional Aspects identified ex-ante

1. Interplay between administrations

The crucial aspect the most mentioned by the interviewed stakeholders as likely to constrain the implementation of the EU Nitrate Directive to the whole region was the *Interplay between administrations*. This encompasses a) the problems of interplay between the different types of administration, i.e. environmental and agricultural administration, and b) the problems of interplay between the different vertical levels of administration. The implementation of the EU Nitrate Directive is characterized by the intervention of many different administrative bodies at different levels, which may create a lack of consistency, e.g., between the rules decided at the national level, the consultation made at the watershed/regional level (by the French water agency 'Agence de l'eau' and DIREN) and the concrete implementation taking place at the département level (where the DDA, Préfet de département, and MISE -Mission Inter-Services de l'Eau- intervene).

Additionally, objective and priorities of the Directive are perceived as not being clear by some stakeholders and/or are understood differently among the administrations. This may lead to contradictions in the actions undertaken at the different vertical levels by the different types of administration. For example, contradictions may arise between the actions undertaken by the agricultural administration and the activities of the environmental administration. Within the agricultural administration, the preventive and educational activities of the agro-environmental department may not be articulated with the suppressive/repressive activities of the control department. Furthermore, the different administrations use distinct measurement systems to assess nitrate rates in ground and superficial waters, leading to different interpretations which may slow down the decision process with regard to the implementation of the policy.

2. Resources of state administrations for the water issue

The second potential constraint to the implementation of the vulnerable zone extension mentioned by the interviewees is the lack of *Resources of state administrations for the water issue*. Since the last decade, the importance of regulation is increasing in the context of European agriculture, but at the same time there are less human and financial resources for the administration functioning. In consequence, interviewees explained that it is getting more difficult to carry out controls (their number has to be reduced as well as the time devoted to each control). The lower resources devoted to the administrations could be thus a constraint to the extension of the vulnerable zones to the whole Midi-Pyrenees region, all the more that the resources devoted for the monitoring by the administrations in charge (DDA) are not correlated with the size of the vulnerable zone in their territory.

3. Resources for local government for the water issue

The local councils (Conseils Généraux, Conseil Régional) are also involved in the implementation of the EU Nitrate Directive through, e.g., the financing of PMPOA (Programme de Maîtrise des Pollutions d'Origine Agricole = Program of Reduction of Agricultural Nitrate Pollutions) or the transfer of information to farmers. However, these administrations have not necessarily an agricultural division. According to the interviewed stakeholders, the low resources devoted to these local administrations are also an important factor potentially constraining an extension of the vulnerable zones in Midi-Pyrenees.

4. Information asymmetry state versus farms

Another aspect mentioned as potentially hampering the implementation of the VZ extension is the level of *Information asymmetry between state and farmers*. This institutional aspect reflects the difficulties of monitoring the application of mandatory rules by farmers. They are particularly high in the case of this kind of environmental policy which targets non-point pollution from agricultural activities.

Furthermore, the controls conducted in a vulnerable zone focus mainly on the administrative documents farmers fill in to register their practices but not on the practices themselves. Thus, inspectors tend to check if farmers understand the meaning of the administrative documents and the way to fill them out in order to get an idea of the farmers' effective practices. As a consequence, the controls do not reduce much the information asymmetries and tend to be subjective, depending on the interpretation made by inspectors of the farmers' answers.

5. Degree of contradiction/consistency with other policy instruments

Another CIA quoted during the interviews is the high *Degree of consistency of the EU-Nitrate Directive with other policy instruments* as a factor potentially fostering the implementation of the EU Nitrate Directive in the whole region.

The PMPOA (Program of Reduction of Agricultural Nitrate Pollutions) was a national programme implemented between 1993 and 2006, which was financing partly the improvement of storage capacities for manure of cattle breeding farms. The program was implemented in priority in VZ. Thus, in départements where cattle breeding is dominant, farmers lobbied for a vulnerable zone to be delineated so that they could benefit from this financial help. However, the program is now terminated, and these same farmers now complain to be located in a vulnerable zone and to endure the controls and the documents to fill in each year.

Among other policy instruments which can support ND implementation, tools for phytosanitary inputs reduction and environmental conservation such as SAGE or “Contrat de rivière” have been identified. These programs compensate financially farmers who change their practices to reduce water pollution.

In contrast, no contradictory policy instruments could be identified.

6. Interplay between stakeholders

Interplay between stakeholders was mentioned in the open part of the interview by only one stakeholder. However, when checking this CIA during the second part of the interviews, all other interviewed stakeholders highlighted the importance of this aspect. A more participatory consultation was rated as a factor affecting positively the implementation of a policy such as the EU Nitrate Directive.

In Midi-Pyrenees, the MISE (Mission Inter-Services de l'Eau, the official cooperation/communication structure between environmental and agricultural administration at the département level) is often including other stakeholders in their meetings dealing with the EU Nitrate Directive implementation, such as members of the Chamber of agriculture or environmental associations. However, according to the interviewed stakeholders, there seems to be a difference in the proactive function of MISE within the different départements. Furthermore, at the regional level, an unofficial working group (GRAMIP) including all the stakeholders involved in the implementation of the EU Nitrate Directive, meet for more participatory consultation. This may ease the implementation of the extension of the VZ since there are some communication structures already in place to discuss related problems.

7. Level of information/training on policy requirements

The institutional aspect *Level of information/formation* on policy has been identified in Midi-Pyrenees as crucial for the extension of the vulnerable zones to the whole region. This CIA was mentioned by several interviewed stakeholders. They all consider that farmers working in a vulnerable zone are generally informed about the EU Nitrate Directive. However, it doesn't seem always clear who is in charge of information and training to improve practices. Moreover, Agricultural Chambers are generally strongly involved in the diffusion of information regarding the ND policy. In some départements, such as Gers, farmers' cooperatives are responsible for this activity. According to the interviewees, the information provided to farmers can, thus, be considered as rather biased.

Furthermore, a substantial part of farmers lack initial training to comply with the required practices. More training would be thus needed to foster the effective implementation of the policy.

8. Opportunity costs for farmers

The institutional aspect *Opportunity costs for farmers* turned out to be crucial in Midi-Pyrenees. While the opportunity costs for crop producers related to their farming practices are considered to be low, because the action programmes do not entail major changes for crop production, opportunity costs faced by cattle breeding farmers who have to improve their storage capacities for manure are very high. In spite of PMPOA funds, the investments needed mean a significant private contribution, even though these investments are unproductive. Yet, these high opportunity costs for cattle breeding farmers could result in reconversion of animal production to crops production, helped by the current conjuncture of crop prices. In this context, new issues may emerge like biodiversity, mineral lixiviation for crops production, erosion, etc. In terms of the ND objective, this could lead to a counterproductive effect, as stated by two stakeholders.

9. Psychological factors affecting farmers' level of opportunism

Psychological factors is a new CIA that was included in the list. According to the interviews, this institutional aspect is an important aspect to be considered for the implementation of the VZ extension in the whole region. Beyond economic reasons (opportunity costs) and information asymmetry (difficulties to observe if farmers are cheating), psychological factors have a high influence on farmers' behaviour. The main underlying reason of opportunism by farmers was seen by the interviewed stakeholders in the farmers' feeling to be unfairly judged by society about their guiltiness in water pollution.

Another psychological aspect is linked to the farmers' feeling that regulations and controls are interfering with their activities. Furthermore, they fear control (even for farmers who apply good practices) because they are never sure if they exactly comply in all aspects with the law. Thus, for these reasons, some farmers protest being in vulnerable zones. For example, some crop producers for whom ND is not costly to implement (as it implies no real change for their practices at the moment) refuse to show documents during controls, even if they pay a penalty (actually, they lost part of their CAP subsidies). The EU Nitrate Directive is often regarded by the farmers as a "No carrot but stick!" policy.

Farmers' unwillingness to comply with the ND rules due to psychological rather than economic reasons turned out to be an important aspect that could potentially hamper the implementation of vulnerable zones extension.

10. Bargaining power of farmers' organisations

The interview results suggest that the strong *Bargaining power of farmers' organisations* is an important aspect that needs to be considered for the implementation scenario in Midi-Pyrenees. The strong *Bargaining power of farmers' organisations* can be explained by the high importance of the agricultural sector in the region in terms of agricultural working population, agricultural area, and share of the agricultural sector in the regional economy, and by a generally well organized production. Farmers' organisations are led by the cereal producers of the plains area. Yet, farmers' organisations are strongly opposed to the extension of vulnerable zones in Midi-Pyrenees. It was further explained that, officially, they fear the economic consequences implied for farmers to change their farming practices; unofficially, those cooperatives which are in charge to sell cereals but also to provide agricultural inputs such as fertilizers to their members, are afraid their profit could decrease on this second activity. Thus, only cooperatives which provide also services to improve the fertilization systems in farms (such as software services) promote the implementation of the EU Nitrate Directive.

11. Attitude of farmers towards ecological considerations

Attitude of farmers towards ecological considerations arose as a relatively important aspect for the implementation of the VZ extension in Midi-Pyrenees. One interviewee said that farmers are generally concerned by the agro-environmental issues in this region. Farmers have been made sensitive to the water pollution problem by the voluntary operations within the «Ferti-mieux» programme managed by the Agricultural Chambers. Further, the region shows the highest number of organic farms in France, and numerous farmers are involved in voluntary agri-environmental programs (CTE and CAD). According to the interviewees, farmers are willing to take into account ecological considerations in their activity, but under the condition that it remains a voluntary option rather than a legal constraint. Moreover, to be adopted by farmers, better practices for the environment must be also a way to increase added value for the farm.

All in all, farmers in Midi-Pyrenees have no reluctance to improve their practices. That could be an institutional aspect that fosters the implementation of an environmental policy insofar as they can give value to this consideration and that is not perceived as a state interference in their activity.

12. Bargaining power of environmental associations

The low *Bargaining power of environmental associations* might be a crucial aspect which potentially slows down the implementation of the VZ extension. Some environmental associations are involved in the regional and local (e.g. in Gers) consultative process organised for the delimitation of vulnerable zones and the definition of action programmes. However, according to some interviewees, their sometimes radical opinion in working groups suffices to discredit their action and participation. The low *Bargaining power of environmental associations* is a crucial aspect likely to hamper the implementation of environmental policy measures such as the vulnerable zones extension.

13. Public concern about water pollution from agriculture

The low Public concern regarding the quality of waters might also slow down the implementation of the vulnerable zones extension. According to the interviews, there are only few problems with drinking water sources and the price of water is relatively low in Midi-Pyrenees. The absence of public concern is generally considered as a crucial aspect affecting negatively the implementation of an environmental policy.

Appendix 3: Interview guidelines for the qualitative assessment of institutional indicators values

<p>Evaluation qualitative des aspects institutionnels cruciaux PICA Midi-Pyrénées</p>
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1. Interactions entre administrations (DIREN, Agence de l'Eau, MISE)

Pensez vous que les différentes actions des services de l'Etat impliqués dans la mise en œuvre de la DN concordent dans leurs objectifs et leurs moyens?

- Très concordantes
- Concordantes
- Assez concordantes
- Peu concordantes
- contradictoires

2. Complémentarité des politiques avec la Directive Nitrate (DIREN, Agence de l'Eau, MISE)

Pensez-vous que les outils et instruments politique concernant l'agriculture aujourd'hui tendent à concorder avec les objectifs de la Directive Nitrate?

- Très complémentaires
- complémentaires
- Assez complémentaires
- Peu complémentaires
- contradictoires

3. Perception des agriculteurs vis-à-vis de l'image qui est véhiculée d'eux dans la société (JA, Chambre d'Agriculture)

D'après vous, en Midi-Pyrénées, les agriculteurs ont les sentiments d'être :

- très bien perçus par le reste de la population
- bien perçus
- assez bien
- mal
- très mal

Est-ce différent en Midi-Pyrénées par rapport à la France en général ? (plus fort, plus faible)

D'après vous, en Midi-Pyrénées, le sentiment des agriculteurs d'être injustement visés pour responsable de la pollution est :

- très fort
- fort
- assez fort/moyen
- faible
- très faible

Est-ce différent en Midi-Pyrénées par rapport à la France en général ? (plus fort, plus faible)

4. Perception des agriculteurs vis-à-vis de l'encadrement étatique (contrôle...) (JA, Chambre)

D'après vous, en Midi-Pyrénées, une directive telle que la directive nitrates est perçue par les agriculteurs comme une réglementation :

- inutile et absurde
- négligeable
- assez importante et utile
- importante et nécessaire
- importante et pas encore suffisante

Est-ce différent en Midi-Pyrénées par rapport à la France en général ? (plus fort, plus faible)

D'après vous, en Midi-Pyrénées, les agriculteurs ont une perception des aspects réglementaires et de contrôle dans les exploitations:

- très mauvaises
- mauvaises
- assez mauvaise
- normal
- indispensables

5. Pouvoir de négociation des associations environnementales (DIREN, Agence de l'Eau)

D'après vous, en Midi-Pyrénées, le pouvoir de négociation des associations environnementales est :

- très fort
- fort
- assez fort/moyen
- faible
- très faible

Est-ce différent en Midi-Pyrénées par rapport à la France en général ? (plus fort, plus faible)

Appendix 4: Ex-ante identified Crucial Institutional Aspects (CIA), selected institutional indicators, linkages, status and relevance

CIA	Indicator	Description	Source	Specific linkage	Europe * Germany	France * Metropole	Midi- Pyrenees	Degree of relevance	Weighting coefficient
Interplay between stakeholders 0.2 Medium	Horizontal linkages	Existence of GRAP (Groupe régional d'Action contre les Pollutions par les Produits Phytosanitaires; Regional Working Group against Pesticide Pollution)	gramip.fr	The existence of a GRAP in a region indicates a high interplay between stakeholders		1 medium	1 medium	+	0.1
	Horizontal linkages	Number of participants to the GRAP	gramip.fr	High numbers indicate a high level of interplay between stakeholders		31.7 medium	36 medium	+	0.1
Interplay between administrations -1 Low	Administration consistency	Answer to the question: Do you think the activities conducted by the different State services for the ND implementation are consistent in their objectives and means?	Qualitative assessment (DIREN, Agence de l'Eau)	High values indicate a weak consistency of activities of the different administrations involved		2//5 medium	3//5 low	+++	0.5

	Bureaucratic quality	World Bank indicator for government effectiveness	http://info.worldbank.org/governance/wgi/mc_chart.asp	Low values indicate problems of interplay between administrations	92.4* medium	88.6* low		++	0.25
	Bureaucratic quality	World Bank indicator for regulatory quality	http://info.worldbank.org/governance/wgi/mc_chart.asp	Low values indicate problems of interplay between administrations	92.7* medium	85.9 low		++	0.25
Resources for the State administration for the water issue 0.15 Medium	Financial potential of public agricultural administration	Ratio= agricultural administration budget/total national budget	Ministry of Agriculture website	A low ratio indicates a low importance of resources	0.34 % medium	0.22 % medium		+	0.10
	Financial potential of public environmental administration	Ratio= environmental Research & Development budget/total Research & Development budget	http://213.25.3.134.43/ocd/pdfs/browseit/0105061E.PDF	A low ratio indicates a low importance of resources	3.1 %* medium	2.9 % medium		+	0.10
	Financial potential of public environmental administration	Ratio = pollution reduction and control expenditures/ GDP 2005	http://213.25.3.134.43/ocd/pdfs/browseit/0105061E.PDF	A low ratio indicates a low importance of resources	1.6 %* medium	1.7 % medium		+	0.10

Resources for the local government for the water issue 0.5 High	Financial potential of regional administration for the agricultural issue	Regional expenditures for agriculture and fishing (€/inhabitant) 2006	http://www.dgcl.interieur.gouv.fr/workspaces/members/desl/documents/fiances/region/fr2006/fr2006_00/downloadFile/file/FR2006_publici.pdf	A low value indicates a low importance of resources		4.4* medium	7.5 high	++	0.25
	Environmental regional expenditure for water policy	Environmental regional expenditures for water policy (€/inhabitant) 2006	http://www.dgcl.interieur.gouv.fr/workspaces/members/desl/documents/fiances/region/fr2006/fr2006_00/downloadFile/file/FR2006_publici.pdf	A low value indicates a low importance of resources		2.6 medium	3.3 high	++	0.25
Information asymmetry State versus Farms 0.25 Medium/high	Complexity of production systems	Share of farms with several activities	Agreste	A high share indicates higher information asymmetries		33.3 % medium	56 % high	++	0.25
	Importance of cattle breeding	Share of cattle breeding farms	Agreste	A high share indicates higher information asymmetries		60.8 % medium	54.7 % low	+++	0.5

	Number of farms	Number of farms/region	Agreste	A high number indicates higher information asymmetries		18455 medium	31893 high	+++	0.5
Degree of consistency with other policy instruments 0.25 Medium/high	Agricultural policy instruments consistency	Answer to the question: Do you think the agricultural policy instruments with the objectives of the Nitrate Directive?	Qualitative assessment (DIREN, Agence de l'Eau)	A high value indicates a high degree of complementarity between policy instruments		3//5 medium	3//5 medium	+++	0.5
	Importance of PMPOA	Implementation rate of PMPOA 1998	http://agriculture.gouv.fr/sections/publications/rapports/rapport-devaluation-sur-la	A high value indicates a high degree of complementarity between policy instruments		25.7 % medium	18.5 % low	++	0.25
	Number of "River contracts"	Number of "River contracts"	http://www.gesteau.eauffrance.fr/contrats/	A high value indicates a high degree of complementarity between policy instruments		21.6 medium	32 high	++	0.25

	Number of SAGE	Number of SAGE	http://www.gesteau.eafrance.fr/contrats/	A high value indicates a high degree of complementarity between policy instruments		14.7 medium	16 high	++	0.25
Level of information/training on policy 0.5 Medium	Agricultural education level	Share of farmers with an agriculture university level	Agricultural Census	A high share indicates a high level of training		0.90 % medium	0.78 % medium	+++	0.50
Opportunity costs -0.1 Medium	Unemployment	Unemployment rate	http://www.dgcl.interieur.gouv.fr/workspaces/members/desl/documents/finances/region/fr2006/fr2006_00/downloadFile/file/FR2006_publicli.pdf	A high rate indicates low opportunity costs		8.3 % medium	8.4 % medium	++	0.25
	Income/farm	Agricultural net income/working person (1000 €)	Agreste 2007	A high income indicates high opportunity costs		25.3 medium	19.2 low	+	0.10

	Production value for crops	Production value for crops/ region (millions €)	Agreste 2007	A high value indicates high cereal opportunity costs		504 medium	726.9 high	+++	0.5
	Importance of cattle breeding	Share of cattle breeding farms	Agreste 2008	A high share indicates high opportunity costs		60.8 % medium	54.7 % low	+++	0.5
	Manure stock capacities/cattle breeding farm	Manure stock capacities/cattle breeding farm (m3/farm)	Agricultural Census	Low capacities indicate high opportunity costs		54 medium	38.6 low	+++	0.5
	Importance of nitrate	Quantity of nitrate bought in 2001 (kg/ha)	http://www.ifen.fr/fileadmin/publications/cahiers/centre/statistiques/nationales.pdf	A high value indicates high opportunity costs		94 medium	85 low	++	0.25
	Importance of organic nitrate production	Importance of organic nitrate in spread manure in 2001 (kg/ha)	http://www.ifen.fr/fileadmin/publications/cahiers/centre/statistiques/nationales.pdf	A high value indicates high opportunity costs		56 medium	51 low	++	0.25

	Importance of nitrate production	Nitrate pressure in 2001 (kg/ha)	http://www.ifen.fr/fileadmin/publications/cahiers/centre/statistiques/nationales.pdf	A high value indicates high opportunity costs		150 medium	136 low	+++	0.5
Psychological factors affecting farmers' level of opportunism 0.4 Medium/high	Perception by farmers of the vision of the society has about them	Answer to the question: How farmers think they are perceived by society?	Qualitative assessment (JA, Agricultural Chamber)	A high value indicates a low level of psychological factors		4//5 medium	3//5 low	+	0.10
	Feeling of farmers to be accused of pollution	Answer to the question: How strong is the feeling of farmers to be unfairly accused of being responsible of water pollution?	Qualitative assessment (JA, Agricultural Chamber)	A high value indicates a high level of psychological factors		4//5 medium	4//5 medium	+	0.10
	Perception of the Nitrate Directive by farmers	Answer to the question: How useful the Nitrate Directive is considered by farmers?	Qualitative assessment (JA, Agricultural Chamber)	A high value indicates a high level of psychological factors		2//5 medium	3//5 high	+++	0.5

	Perception of regulation and controls by farmers	Answer to the question: How farmers perceive regulation and controls of their activities?	Qualitative assessment (JA, Agricultural Chamber)	A high value indicates a high level of psychological factors		2,5//5 medium	2,5//5 medium	+++	0.5
Attitude of farmers towards ecological considerations 0.45 Medium/high	Age structure of farmers' population	Share of farmers less than 45 years in the total farmers population	Agricultural Census	A high share indicates a higher concern towards ecological considerations		33 % medium	35 % medium	+++	0.5
	General education level of farmers	Share of farmers with a general university level	Agricultural Census	A high share indicates a higher concern towards ecological considerations		6.3 % medium	6.3 % medium	+++	0.5
	Agricultural education level	Share of farmers with an agriculture university level	Agricultural Census	A high share indicates a higher concern towards ecological considerations		0.90 % medium	0.78 % medium	+++	0.50
	Organic area at the national level	Ratio = organic area/ total agricultural area 2004	http://stats.oecd.org/wbos/Index.aspx?datasetcode=SNA_TAB_LEI	A high ratio indicates a higher concern towards ecological considerations	4.5 % medium	1.8 % low		+	0.10

	Organic area at the regional level	Ratio = organic area/ total agricultural area 2007	http://www.ifen.fr/fileadmin/publications/cahiers/centre/statistiques/nationales.pdf	A high ratio indicates a higher concern towards ecological considerations		2 % medium	2.7 % high	+	0.10
	Organic farms	Ratio = Number of organic farms/total number of farms	http://www.ifen.fr/fileadmin/publications/cahiers/centre/statistiques/nationales.pdf	A high ratio indicates a higher concern towards ecological considerations		2.9 % medium	3.7 % high	++	0.25
Bargaining power of farmers' organisations 0.45 Medium/high	Importance of agriculture (area)	Share of agricultural area in total area	INSEE	A high share indicates a high bargaining power of farmers' organisations		53.8 % medium	56 % medium	+++	0.5
	Importance of the agricultural sector (employment)	Share of agricultural employment in total employment	INSEE	A high share indicates a high bargaining power of farmers' organisations		3.5 % medium	5.7 % high	+++	0.5
	Importance of the agricultural sector (economy)	Share of agriculture in the economy	INSEE	A high share indicates a high bargaining power of farmers' organisations		2.4 % medium	3.9 % high	+++	0.5

Fragmentation of farmers' associations	Number of farmers associations/region	http://www.ccopdefranc.e.coop/sites/CFCA/organisation/regions.aspx	High numbers indicate a low bargaining power of farmers' organisations		116 medium	184 high	++	0.25
Membership in farmers' associations	Ratio = number of memberships in farmers associations/total number of farmers	http://www.ccopdefranc.e.coop/sites/CFCA/organisation/regions.aspx	High numbers indicate a high bargaining power of farmers' organisations		0.772 medium	0.498	+++	0.5
Membership in cooperatives	Number of memberships/cooperative	http://www.ccopdefranc.e.coop/sites/CFCA/organisation/regions.aspx	High numbers indicate a high bargaining power of farmers' organisations		224 medium	163	++	0.25
Economic importance of cooperatives	Turnover/cooperative (M€)	http://www.ccopdefranc.e.coop/sites/CFCA/organisation/regions.aspx	High numbers indicate a high bargaining power of farmers' organisations		21 medium	23 high	++	0.25

	Economic importance of cooperatives	Turnover/member of a cooperative (M€)	http://www.ccopdefrance.coop/sites/CFCA/organisation/regions/regions.aspx	High numbers indicate a high bargaining power of farmers' organisations		0.12 medium	0.14 high	++	0.25
Bargaining power of environmental associations -0.6 Low	Membership in environmental organisations	Ratio = number of memberships in environmental associations/total population	Maison de l'Environnement	A high ratio indicates a high bargaining power of environmental associations		0.95%	No data	+++	0.5
	Perception of the bargaining power of environmental associations	Answer to the question: How strong is the bargaining power of environmental associations in France/Midi-Pyrenees?	Qualitative assessment (DIREN, Agence de l'Eau)	A high value indicates a high bargaining power of environmental associations		2//5 medium	1//5 low	+++	0.5
	EU Habitat Directive area	Share of area under the Habitats Directive (Natura 2000)	Eurostat	A high share indicates a high bargaining power of environmental associations		12.5 %* medium	8.5% low	+	0.10

Public concern about water pollution from agriculture -0.25 Low/medium	Green party votes/presidential elections	Percentage of votes for the green party at the president election 2007 (1st round)	http://www.interieur.gov.fr/sections/a_votre_service/resultats-elections/PR2007/FE.html	A high share indicates a high public concern about water pollution		1.57 % medium	1.45 % low	++	0.25
	Green party votes/regional elections	Percentage of votes for the green party at the regional council elections 2007 (1st round)	http://www.lesverts.fr/legislatives2007/circo?region=MI	A high share indicates a high public concern about water pollution		3.5 % medium	3.16 % low	++	0.25
	Environmental regional expenditures for water policy	Environmental regional expenditures for water policy (€/inhabitant) 2006	http://www.dgcl.interieur.gouv.fr/workspaces/members/desl/documents/finances/region/fr2006/fr2006_00/downloadFile/file/FR2006_publicli.pdf	A high value indicates a high public concern about water pollution		2.6 medium	3.3 high	++	0.25
	Price of water for consumers	Price of water for consumers €/m3	http://www.ecologie.gouv.fr/Le-prix-de-l-eau.html#ev02	A high price indicates high public concern about water pollution		3.04 medium	3.04 medium	+++	0.5

Appendix 5: Ranking sheets distributed to the participants in the focus group

"PICA, une méthode d'évaluation de la compatibilité institutionnelle des politiques. Le cas de l'extension des zones vulnérables de la Directive Nitrate en Midi Pyrénées."

Etape 4, Workshop, Mardi 26 aout 2008

Quelle est votre institution ?

Quel est votre département ?

Scénario : extension des zones vulnérables dans le cadre de la Directive Nitrate en Midi Pyrénées

1. Hiérarchisation de l'importance des facteurs institutionnels pour chaque catégorie ... (colonne A)

1= le facteur le plus important; 2 =le deuxième facteur le plus important

2. Evaluer l'influence de chaque facteur institutionnel sur le scénario politique ... (colonne B)

Impact positif : +; impact négatif : -

3. Hiérarchisation des catégories de compatibilité institutionnelle ... (colonne C)

1= la catégorie la plus importante; 2 =la deuxième catégorie la plus importante...

Commentaires:

Facteurs Institutionnels impliqués	A	B	C
	Importance (1, 2,...)	Influence (+ ou -)	Catégories de compatibilité institutionnelle
Manque d'interaction entre administrations	/ 5		Cadre Institutionnel <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; vertical-align: middle;">/ 4</div>
Niveau moyen des ressources des services de l'Etat	/ 5		
Niveau élevé de ressources des services régionaux	/ 5		
Problèmes d'observation sur le respect de la loi	/ 5		
Bonne complémentarité avec certains instruments politiques	/ 5		
Niveau moyen d'interaction entre les différents acteurs impliqués	/ 2		Information <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; vertical-align: middle;">/ 4</div>
Niveau moyen d'information et de formation des agriculteurs	/ 2		
Intérêt économique des exploitants agricoles de niveau moyen	/ 3		Exploitations agricoles <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; vertical-align: middle;">/ 4</div>
Assez forte réticence psychologique des agriculteurs pour la réglementation	/ 3		
Bonne conscientisation des problèmes environnementaux par les agriculteurs	/ 3		
Assez fort pouvoir de négociation des organisations de producteurs	/ 3		Groupes d'Intérêt <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; text-align: center; vertical-align: middle;">/ 4</div>
Faible pouvoir de négociation des groupements écologistes	/ 3		
Peu d'intérêt des citoyens pour la pollution de l'eau par l'agriculture	/ 3		

Appendix 6: Questionnaire for the evaluation of the policy experts' perception of PICA and their preferred modes of interaction

A) Votre activité

Organisation/service : _____

Poste : _____

Activité(s) : _____

B) L'évaluation de la compatibilité institutionnelle

1. Pensez-vous que l'évaluation de la compatibilité institutionnelle peut contribuer à une mise en œuvre plus efficace des politiques? *(1 seule réponse)*

- oui
- non

pourquoi? _____

2. Pensez-vous que la méthode PICA pourrait vous être utile dans votre activité professionnelle ? *(1 seule réponse)*

• oui → si oui, dans quelle mesure ? _____

• non → si non, pourquoi ? _____

3. Quels sont les aspects les plus intéressants de la méthode PICA ? *(détailler svp)*

4. Quels sont les points à clarifier dans la méthode PICA pour la rendre plus opérationnelle ? *(détailler svp)*

C) Si vous êtes amené à utiliser cette méthode...

5. Dans quel délai souhaiteriez-vous obtenir des résultats ? *(1 seule réponse)*

- une semaine (analyse succincte)
- trois mois
- un an
- un mois
- six mois
- autre:
- ne sais pas

6. Quelles modalités d'interaction avec les experts PICA vous conviendraient le plus ? (*plusieurs réponses possibles*)

- des réunions
- des échanges par mail
- un site internet dédié à PICA
- autre _____

7. Seriez-vous intéressé pour participer aux étapes intermédiaires de PICA (identification des facteurs institutionnels, des indicateurs institutionnels, catégories de compatibilité institutionnelle) ? (*1 seule réponse*)

- oui
 - non
- pourquoi? _____

8. Seriez-vous intéressé pour avoir des informations sur la réalisation des étapes intermédiaires et leurs résultats ? (*1 seule réponse*)

- oui
- non

9. Avec quel support préféreriez-vous avoir connaissance des résultats ? (*plusieurs réponses possibles*)

- présentation orale par les experts
- note de synthèse, rapport
- tableaux, graphiques, diagrammes...
- interface internet
- autre: _____
- aucune opinion

Ce questionnaire est anonyme et il sera traité en tant que tel. Si vous souhaitez rester en contact avec nous et disposer d'informations complémentaires, merci de nous indiquer votre adresse e-mail :

e-mail : _____

Nous vous remercions d'avoir répondu à ce questionnaire !

L'équipe PICA-Cemagref

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