GAINING MUTUAL KNOWLEDGE ON MODES OF INTERVENTION : A CRITICAL LEARNING ISSUE FOR COLLECTIVE ACTION

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Abstract

The success of rural management projects relies mainly on collective learning among participants. In this paper, we review several of our research experiences with such projects which share the feature of gathering heteregeneous institutions. Our purpose is to investigate the content of collective learning, and more precisely to examine the role of mutual knowledge on modes of intervention.
We propose first to consider these projects as collective design settings in which participants first meet to agree on a common goal and then have to carry out actions to reach this goal. We then argue the need for cognitive and operational synchronisation in such collective design settings. We point out the lack of operational synchronisation in the cases we studied: coordination tasks are not really taken into consideration, new tasks arise which require new skills while the technicians belonging to various institutions have neither the legitimacy to assume the coordination tasks nor the opportunity to develop new skills. We suggest that this could have been avoided if technicians had had the opportunity to discuss their modes of intervention, to better synchronise their representations on the way new tasks should be carried out, and to learn the types of coordination that acting together in order to reach a common goal implies. Further issues about how to facilitate such learning, and in particular, which supports can be designed for this purpose, are finally discussed.

Keywords: Rural projects, collective design, mutual knowledge, learning.

Introduction

Local development projects are more often than not designed by the setting up of *ad hoc* groups which have no permanent existence (Couix and Hubert, 2000). These settings are mostly viewed as collective decision making devices or negotiation devices allowing concerted approaches. Generally speaking, the term “concerted approach” refers to the practice of individuals exchanging points of view to develop a project in common. In the literature, these exchanges are usually studied as negotiation procedures between staakeholders with different or even diverging interests. Such are, for example, the “approches patrimoniales” which have been extensively developed in France (Natali and de Montgolfier, 1987; Barouch, 1989; Mermet, 1992). Other studies analyse such exchanges as an elaboration of agreements by identifying the different registers of justification mobilised by the actors according to *“economies de la grandeur”* principles (Barbier, 1997; Beuret, 1999). All these analyses focus, in fact, on the elaboration phase of action schemes which are to be implemented and do not concern themselves with either the future of projects or with actions which have to be carried out.

Other analyses, like that of Röling (1993, 1998) around “platforms for agricultural resource use negotiation” focus on the process of social learning at play in the negotiated or concerted management of renewable resources. Such an approach constructs a framework of negotiation and collective learning in which the different actors deal with the goals of renewable resource management and the interventions in the field which will make it possible to achieve them. The question of the common modes of action and notably of the coordination which these innovations could be expected to involve is approached from the vantage point of the resource management institutional context and the framework needed to favour such negotiation. But, the question of whether collective learning on working procedures should be achieved or not remains implicit in these approaches.

In this paper, we argue that actors involved in such heterogeneous settings need to learn about the way to achieve coordination in the implementation stage, i.e., in other terms, to gain mutual knowledge on their respective modes of intervention. First, on the basis of data we collected on various development projects, we propose to view these situations as collective design activities requiring cognitive and operational synchronisation. We then show that, in several projects we have studied, new organisational tasks arise during the implementation stage and that new coordinations have to be achieved between the various activities carried out by the actors involved in at that stage. We then show that lack of mutual knowledge about modes of intervention was found to be the bottleneck of all these projects. This allows us to outline some further issues in order to facilitate the acquisition of such mutual knowledge.

1. Agricultural or rural management projects as collective design activities

The rural projects we are involved in may have various objectives such as rehabilitation of a maritime pine forest area following a severe forest fire, redefinition of extension procedures relevant to the diversity of farms, or implementing new environmental and quality management tools on farms. These projects share some common features however. One of them is that, while technicians work together in what may be called a technical group, professional or/and administrative executives are mainly those who give the guidelines, decide the follow up of the design work and the way it should be implemented by the technicians. Distinguishing these two levels is important as the administrative excecutives are the only ones able to decide changes in the technicians’activity; but as these executives do not participate in the technical debates, they are not always aware of the consequences that proposals elaborated by the technical group may induce in the technicians’activity. Also this issue is an importantone , we will not address it in this paper. It should nevertheless be kept in mind as a background to all our situations.

1.1. Projects carried out within heterogeneous and non permanent settings

Another important shared feature is that all the rural projects we studied involved technicians from various socio-professional organisations as well as from a diversity of institutions (research units, administration, industries, cooperatives, local authorities…). These technicians work together to design a conceptual representation which gives a view of what will subsequently need to be achieved by them or by other technicians who did not participate in the design phase due to the need to keep an acceptable size for the group. The technicians’ participation in such design groups is generally accepted by their administrative or/and professional executives but it should be noticed that the work done by the technicians within such groups is only a small part of their whole work.

More often than not, participation of these technicians in the implementation stage lays out of the scope of the project. Frequently, the technical group breaks up when it has achieved the design of a conceptual representation of what will then be implemented in the field.Therefore,

in addition to heterogeneity of actors involved, these groups share the characteristic of being short-lived.

1.2. Problem solving processes analysed as collective design activities

Our situations also show common characteristics when examined as problem- solving processes. In particular, in these situations the problem-solving process displays characteristics that cognitive psychologists (Darses and Falzon, 1996) and management scientists (Midler, 1995, 1996; Hatchuel, 1996; Hatchuel and Weil, 1999) attribute to collective design problems:

- The problem formulation and development of solutions are handled together. Even if initially the procedure addressed a need expressed by a group of actors, a point of dissatisfaction or even a catastrophe, the problem to be solved collectively is defined progressively as each of the potential paths of action are identified;
- there is no perfect solution, but rather only acceptable solutions**.** For instance, several solutions can be envisaged to rehabilitate farm terraces. They can be used as vegetable gardens, as pasture for herding, or planted to orchards. They can also be treated chemically or mechanically, etc. Moreover, depending on locally defined orientations, the initial goal of rehabilitating can be reformulated along different lines which can vary, for instance, from the settling of a livestock farmer in the community to that of the creating a training activity.
- different types of competence and different forms of logic are brought together but it is often difficult to specify, at the outset, all the competencies and hence, all the actors needed.

We then propose to consider such settings as design settings as their purpose is to produce, among other things, new conceptual representations of the local development issues. The activities carried out by the members of the group can then be analysed as collective design activities.

1.2.1. Distinguishing between co-design and distributed design

Darses and Falzon (1996) distinguish between two types of collective design activities according to the mode of involvement of the actors: co-design activities and shared design activities. Co-design activities correspond to situations in which the actors develop solutions together. They all share the same goal and contribute their specific competence so as to reach it. Distributed design activities correspond to situations in which design tasks are attributed to the various actors mainly according to their respective expertise. The individual actors then address the tasks as “sub-goals” so as to collectively solve the problem.

This distinction seems interesting to us in studying collective procedures in our situations for two reasons. First, it makes it possible to take into account the different periods or phases often found in the rural and agricultural management projects we investigated while considering them to be part of a single collective design process: periods during which intense collective work is carried out by the participating parties in groups, commissions or committees; phases of much more individual work by each party or of work done by the technicians with each of the beneficiaries or small groups of beneficiaries. This second step is seldom analysed in the literature as a continuation of the concerted approach. In our opinion, it can generate distributed design activities but may also result in new concertation needs as shown below.

1.2.2. Distinguishing between cognitive and operational synchronisation

Darses and Falzon (1996) also point out that during the running of the two types of collective design activities the modes of cooperation between the actors differ, particularly as far as the nature of the exchanges between them is concerned. According to these authors, all collective activity is carried out through interaction between actors with two complementary goals: synchronising at the cognitive level and synchronising at the operational level. Cognitive synchronisation corresponds to communication processes aimed at establishing among the actors a *"context of mutual knowledge"* about the situation (information on the problem, envisaged solutions, hypotheses retained, etc.) as well as about the field of knowledge considered. Operational synchronisation aims at assuring task distribution among the actors and coordinating the schedule for carrying out the actions (sequence of actions, simultaneousness of certain actions, pace, etc.).

According to these authors, co-design mainly relies on cognitive synchronisation. Actors discuss in order to construct a shared representation of the situation or problem to handle, explain proposed solutions, justify or criticise choices so as to develop solutions together. Distributed design relies mainly on operational synchronisation. In this case, exchanges among the partners are based more on task distribution – where these are new this gave rise to actual negotiations among the actors - on the constraints and complementarities of the solutions each participant foresees and on continuing coordination over time.

2. Need of mutual knowledge on modes of intervention in order to act together

Such an interpretative framework leads to analysing the content of participants' exchanges from the vantage point of the nature of knowledge they share or need to achieve a commom goal. It nevertheless should be underlined that different forms of knowledge distribution among the project partners can be distinguished during the running of the process:

- shared knowledge, that is the knowledge which each participant possesses and needs to achieve the common work: it remains implicit in most cases and can increase along the life of the working group;
- mutual knowledge, which is the knowledge that a participant has on the other actors, their goals, and their ways of working. It may be useful for reciprocal adjustments while carrying out a common task, or pursuing a common goal;
- distributed knowledge, which is the knowledge located at a given level within a project in which different sub-groups had been assigned to a given task. Distributed knowledge is a term which is also used to emphasise that knowledge is distributed among the participants and the tools they used to achieve a given common task.

In the situations we worked in, these different forms of distribution of knowledge are merged and we are not always able to identify them precisely. Therefore, in the following sections, we consider that exchanges aim at gaining mutual knowledge, even if sometimes they may also aim to build shared or distributed knowledge. Examining further the nature of this mutual knowledge, we already showed that it is mostly technical[1] knowledge (Couix, 2001; Girard, 2000). As a matter of fact, focus is mainly on the formalisation of the technical options being discussed[2]. But few attention is paid on mutual knowledge about the modes of intervention of each technician participating in the project. We will now elaborate about some results which lead us to consider that such mutual knowledge is critical in the projects we studied.

[1] By technical knowledge we mean knowledge on the way to control biophysical processes and on these processes.

[2] It should be noticed that decision support which are designed to support such approaches often focus on technical issues. Such systems either search for a technical optimum or simulate and compare a range of options (Girard and Hubert, 1999).

2.1. Design of procedures to support coordination between technicians

One project concerned land rehabilitation of a pine area in the Cévennes (southern France) following a severe forest fire. Initially, a workgroup, named Technical Cell, was set up and a researcher from the INRA was designated to chair over it. The group included 10 technicians from different socio-professional organisations (farm extension services and private forest services) and various administrations. To monitor and validate the work of the Technical Cell, a group known as Enlarged Group, chaired by the Prefect of the Gard Département was set up. It included locally elected officials, administrative executives, representatives from the local communities and from professional organisations of the Gard Département and the Region. The Technical Cell worked during six months and drew up a general rehabilitation plan for the area. Then, the members of the workgroup submitted their conclusions and proposals to the Enlarged Group. Their proposals were validated and the Technical Cell was disbanded. The land rehabilitation plan was officially recognised as a goal to be reached. But**,** the design activities of the different technical and administrative partners continued in a more "distributed" manner, in the Darses and Falzon sense of the word. There was an explicit distribution of tasks by the Prefect to the different services according to the administrative expertise of the participants. The technicians were to work with the beneficiaries of the operation (farmers, forest owners, local communities) in developing and implementing actions on the basis of the land rehabilitation plan.

But, given the highly "integrated" character of the land rehabilitation plan, the Technical Cell identified different types of coordination during the implementation stage to assure the overall logic of the total project:

- the plan was to guide the various partners in preparing the projects with the beneficiaries: it contained guidelines for the role the specific plots were to play in terms of fire prevention and, consequently, for the types of projects to be implemented, depending on the zone in which the mobilised or potentially mobilised plots were located;
- the beneficiaries would first be grouped around operational goals (forest management, mobilising land for sheep farming, organising the grazing of flocks, etc.) to work with technicians in preparing the actions and then, a structure grouping all of the participating parties was to be created to facilitate coordination of the actions undertaken (investments, maintenance, facilitation etc.).
- the annual sharing of the budget mobilised to finance operations was to be considered as a whole so as to avoid contradictions in the required coordination of certain operations.

Another project we are involved in[3], aims at implementing new environmental and quality management tools on farms. In this project, it was observed that people involved in the design stage, elaborate coordination procedures. The project was first pushed by farmers elected to the Picardie Chambres of Agriculture who undertook to develop environmental, quality and security guarantees in order to enhance the image of Picardie agriculture. A local agency[2] was designated to carry out the design stage with the support of INRA researchers already working on this issue. This agency was ascribed the task of designing the tools needed to implement such guarantees on farms. Each Chambre of Agriculture of the Region (there are four, one for each of the three Départements, and one at the regional level) participates in the design process through the involvement of one technician. Both the researchers and the project manager appointed by the Agency were also involved in this process. Together, the latter, the researchers and the technicians worked out a protocol[4] and tools to perform audits

[3] This project is coordinated by Agro-Tansfert, an Alternatech unit, and had been financed by a state research programme. The Chambres of Agriculture of Picardie involved in the "concertation phase", are the main participants in the "action phase".

[4] This protocol is a standard of good agricultural practices.

and provide advices to farmers willing to apply the protocol. Tests were carried out on farms to enable the partners to adjust this protocol. They agreed on a given protocol and on the need for a group charged with revising it during the implementation stage. Furthermore, the Chamber administrative executives, with the support of a researcher and of the project manager drew up the main features of the farm label and of the verification schemes which had to be perform to implement the protocol on the farms and to give a "farm label" to farmers who apply it. Therefore, new coordination tasks were assigned to some technicians :

- in each Département, one technician is in charge of assigning the audits and advisory work on farms to the various technicians who belong to diverse institutions (Chambres, accounting centres, cooperatives, industries…) and of preparing the documents needed when a farmer claims a farm label for his/her farm,
- at the Region level, training for audit work is organised by the regional Chambre and data is centralised in order to monitor the number of farmers who implement the protocol, those who ask for an audit, etc…. The Regional Chambre also checks whether written procedures are applied by the technicians responsible for developing the farm label scheme (advice and audit) at the Département level. The group in charge of the protocol revision is also responsible for implementing the verification scheme and identifying bottlenecks as well as suggesting some improvements to the farm label scheme as a whole.

However, although some coordination tasks were identified during the design phase in each of these projects, we observed a lack of coordination in the field, with a resulting land use that was rather different from the one drawn up in the first project, and in only a small number of "labelled" farms in the second[5].

2.2. A lack of coordination in the field

In the pine forest rehabilitation project, our interviews with some technicians in the Technical Cell and statements made by the technicians who replaced them, revealed that there was little coordination between the different partners to implement the design work. There were no more meetings between technicians to discuss their tasks and progress, to examine the constraints generated by one another's actions, to identify potential complementarities of silvicultural actions and farming projects, or to draw up a schedule of operations, etc. Each of them simply prepared separate projects with their habitual contacts. The different approaches, proposed by the Technical Cell to coordinate actions were, in fact, only partially implemented. What is more, the approaches proposed did not make it possible to coordinate the design activities of the different actors:

- The Technical Cell had specifically stated that to implement the design work it was necessary to think in terms of small geographical entities, not in activities. However, the common work procedures required by such an approach were not defined;
- Each time an action needed to by carried out, the technicians favoured particular groups of beneficiaries: groups of forest owners, groups of communes. Setting up a collective structure to coordinate the overall set of planned actions was not part of the clearly defined competence of any administrative or technical entity. None of the partners had really been put in charge of such a task neither following internal negotiations between the members of the Technical Cell nor by the Prefect.
- A technical land-use management commission, which had existed before the operation began, was supposed to discuss the annual implementation programme of the actions laid

[5] One can also argue that the number of farms targeted was unrealistic or that having only two years of history is too short a period. The need to make farmers aware of the availability of and need for quality and environmental management tools had certainly been underestimated.

out in the plan. The farm files were, hence, dealt with by the technical commission. However, the programming of forestry investments followed its normal route, which did not include being dealt with by the commission. The commission could not, therefore, play any type of coordinating role.

In the second project, although the scheme of action has been implemented as drawn up during the design stage, an assessment of the results obtained two years after the farm label scheme was launched showed that only few farms had obtained a label. In fact, some constraints arose which had not been foreseen. Coordination became difficult to achieve in practice, due to:

- the time that technicians could really spend in carrying out these coordination tasks as well as in performing audits or in providing environmental and quality advice to the farms;
- lack of financial support, as some measures involved in the protocol entailed the building of tanks (for fuel and fertilisers), the cost of which was excessive in relation to the benefits farmers could expect from building them. It took some time for the administrative executives in the three Départements to become aware of this problem and find a solution. Coordination at their level was in fact more political than operational, and here also they were faced with some technical issues which did not enter the scope of their usual meetings.
- the need to follow each farmer, as some time may elapse between the first meeting and the agreement of the farm label. Since this is done by a technician who often belongs to another institution than the one in charge of the farm label scheme at the Département level, the latter has little means of putting pressure on the technician if he/s does not provide the needed service;
- lack of competencies to elaborate the procedures which could have facilitated the coordination work (the information system, for instance, was too poor to allow the Département technician to supply the Regional Chambre with the requested data)

Finally, in both projects, it appears that the technicians had few means to deal with new emerging tasks and were not trained to achieve coordination. Institutions did not realise that carrying out coordination was a job in itself, and none of them decided to develop the necessary skills and to allocate some technicians to that job.

2.3. Emergence of new tasks and need for new competencies

In the case of the land rehabilitation project, the various technical and administrative partners were, in fact, faced with new tasks which did not enter explicitly into their normal spheres of competence: facilitating the overall project, drawing up silvopastoral projects linking forest owners and livestock farmers, setting up a transversal facilitation structure, coordinating the different lines of State credit, etc. In short, the most transversal tasks, as distinguished from the more “classical” tasks, came into being due to the integrated character of the plan. According to Darses and Falzon (1996), in the distributed design stage, the attribution and running of tasks requires far greater discussion and coordination when the tasks are new. In our opinion, above and beyond a discussion about task allocation, it appears necessary to reflect on the running of new transversal tasks.

The same occurred for the environmental and quality guarantee project: technicians in charge of coordination at the Département level had to face various unexpected tasks. First they needed to find ways of identifying farmers volunteering to implement environmental and quality tools on their farms. Therefore, they needed to build new tools such as self-diagnosis tools or training sessions in order to sensitise farmers to their approach. Moreover they had to set up a network of technicians able to either audit the farms or advice the farmers, and to find incentives in order to get the technicians’ agreement on the new additional work assigned to them. Finally, the Département technicians had great difficulties in collecting information

from the local technicians in order to check wether a follow-up of each volunteer farmer was really done and the files required for the farm labelling prepared, and so on. Finally, although each Département technician worked out some solutions, this shows a lack of regional coordination although a single procedure had been designed to describe the way the farm label should be attributed. Could this have been avoided ?

3. Discussion: further issues to facilitate such learning on modes of intervention?

In fact, it appears necessary to go beyond the first step which had focused on negotiating a common conceptual representation (a map, a standard) in order to implement it efficiently. Various elements can influence the efficiency of collective action: we propose to focus on the need for mutual knowledge in modes of intervention.

3.1. Characterising the notion of modes of intervention

Gaining mutual knowledge on modes of intervention first means gaining mutual knowlegde on each other's purposes. Having common purposes is often given as a condition to cooperate and act together (Bannon and Schmidt, 1993). But this is not sufficient and sometimes not necessary. We sooner think with Zacchary and Robertson (1990), that beyond having a common purpose, gaining evidence on other partners' purposes, and integrating them in one's action so that the other partners may act according to their purposes is one of the most important features of successful cooperative action.

In our situations this means that a collective structure has to be maintained after the concertation stage of the project in order to support the implementation stage so that participants in the collective action may discuss their respective purposes and those of their respective institutions. Furthermore, this structure will allow discussions about other important features of modes of intervention: what is the operating process of each participant, what is his/her world view and the one of his/her institution, what are his/her constraints to carrying out operations, how are decisions made on the way of operating together, what is the place of this collective action in the daily activity of each participant, how will he/she articulate the shared vision that he/she gains in the collective group with the one of his/her colleagues in his/her institutions?

Gaining mutual knowledge on respective modes of intervention is therefore a task in itself and means that dialogue between different forms of knowledge has to be instituted. This can not happen without external support allowing technicians to express their implicit knowledge on the way they handle problems and act in daily situations. Guiding these dialogues is useful to identify the bottlenecks in each other's activities targeting a common goal, to highlight the synergies which can be used to achieve this goal, and finally to point out the way this collective action transforms each other's skills and activity.

Nevertheless, this support has to overcome limitations pointed by Argyris (1993): the discrepancy between a person's "theory of action" which he/she formulates when asked about the way he/she acts, and the person's "theory of use" which an oberver can infer from the analysis of the way that person acts. Theory of action is mainly based on beliefs, values, rationality, while the latter reveals the theory that is really in use. Actors spend a lot of energy in obliterating the discrepancy between the two theories especially in situations where learning is particularly crucial.

3.2. Mediating representations to facilitate individual and collective reflexivity

We believe that different forms of mediation can facilitate dialogue but we focus below on various mediating representations[6]. Ford *et al.* (1993) define mediating representations as being "*sets of conventions for describing some aspect of the world*". According to these authors, "*the mutual development of an external cognitive artefact supplementing the exchange of information between participants promotes and enriches communication, leading gradually to a shared understanding of […] the domain*". A convergent idea for cognitive artefacts (as Norman, 1993, used the term) can be found in Jeantet (1998) with the concept of "*intermediate objects*", that is texts, graphs, models, maquettes,… used. According to this author, these objects "*play a threefold role as: a translation of organisational objectives, an intermediary among designers and an image of the project pursued*". But Jeantet (1998) underlines that, in order to play a satisfactory mediating role in the process of collective design, these "*intermediary objects*" must meet some conditions such as "*a truly shared knowledge of the adopted formalism and of its underlying conventions; [their] adequation to the demands of the diverse actions for which they must be mobilised"*. Beyond the statement that these mediating representations have to be connected to the activity of the actors, we would like to examine further the content of these representations, that is the objects -physical or conceptual ones- that they designate.

3.2.1. Representing the technical knowledge to stimulate reflexivity about modes of intervention

A first way of achieving mutual knowledge, is to make technicians aware of the link between their way of intervening and the technical knowledge which they possess. This was achieved in one situation we were involved in, where the administrative excecutives requested the technicians to widen the target public and to better take into account the diversity of sheep farming systems. It was decided that to reach this goal, the technicians were to draw up a typology of sheep systems. The INRA researcher involved was asked to support the technicians in their analysis of farm diversity and help them to share their knowledge on sheep systems. According to cognitive studies such those of Visser and Falzon (1992), categorisation is known to depend on the task an actor must carry out. Therefore, formalising farm typologies made it possible to work in parallel on farm categories and on the mode of intervention that technicians adopt for each category. In this example, it appeared that technicians mainly supported single-job holders by providing them technical know-how without considering their localisation or socio-economic environment. When the researcher detected, with the technicians, multiple-job holders having a different relation to land use and to husbandry practices, and formalised them as categories in the typology, the technicians realised that no mode of intervention had been developed for these categories. At this stage of the project, the formalisation of technical knowledge showed itself as an efficient means of bringing to light the need for reflexivity on modes of intervention.

3.2.2. Representing modes of intervention

Nevertheless, such representations of technical knowledge may also show themselves to be a constraint at some stages in a project, as emerged in the Cévennes project. The tools used first gave priority to the representation of the different kinds of knowledge relating to forest fire prevention. During the Technical Cell's work in 1986, a graphic representation of the

[6] Therefore the methods for elaborating mediating representations would be an interesting field of knowledge in which to invest effort, both from the viewpoint of participatory research methodology and from that of project accompaniment.

collectively chosen action principles to use in developing an area which would be less sensitive to fire was progressively drawn up. This process made it possible to foster dialogue between researchers and technicians having different competencies and to reach agreement as to the type of vegetation cover to be established locally. In this sense, the representation was truly a mediating object inside the group. Thereafter, the resulting map was of more or less importance in guiding the technicians in their actions: the agricultural dossiers were drawn up with reference to it, but the same was not true in the case of private forests. The map was, however, frozen in its development: no updates or adjustments were made to it throughout the progress of the implementation stage. This map, in fact, satisfied a logic of vegetation cover structuring, a logic which in and of itself is not directly integrable *a priori* by the forms of logic used to guide agricultural and forestry actions. The map quickly became a norm to respect, but when technicians found themselves incapable of satisfying it as a norm, they simply worked their way around it.

This experience plays in favour of representing directly the actors' modes of intervention: this has been done in the Cévennes project, where subsequently, the actors considered the reasoning processes underlying the design and running of the projects (Forest Protection Against Fire, and others). Since 1995, a participatory research framework has been set up which includes INRA researchers and technicians from the main institutions that were represented in the 1986 Technical Cell. The work aims to cause the technicians to reflect on their own modes of intervention. The approach consisted in inducing the technicians to describe these modes within the context of different land-use management project and in formalising these modes of intervention in different forms (graphic, textual, …). On this basis, discussions within the group allowed a better understanding of coordination needs among the technicians and of current dysfunctions. The group was then in a position to identify several pathways to solve the problem.

In the project aimed at promoting quality and environmental management in farms, the experience we gained from our study as well as the one the technicians gained while facing some unforeseen taks, drove us to attempt to build action scenarii as a basis for discussing coordination needs as well as new skills required. For instance, such scenarii explicitly establish the role of each participant in the collective action, the information flows between these participants and the tools which will support interactions among participants. We are now testing such scenarii to see whether, by comparing various scenarii, technicians or their administrative executives are able to detect the bottlenecks which may arise in each scenario (time shortage, skill shortage, unshared vision of the purpose of action, and so on) and so gain mutual knowledge on their current modes of intervention.

Conclusion

In this paper, we first show the interest of considering rural management projects as collective design settings. This enables us to demonstrate that design does not only occur in the first stage where participants to *ad hoc* settings meet to agree on a conceptual representation of a common goal (a rehabilitation plan in one case, a protocol and farm label and verification schemes in the other) and on the main guidelines of an action scheme to implement this representation. Design actually also occurs during the second stage in which technicians perform actions in order to support farmers and other rural owners in their own projects in accordance with the conceptual representation. We pointed out that in such projects, which involve heterogeneous institutions, further coordination needs to be achieved once *ad hoc* settings are disbanded. But, none of the participants in the second satge had been in charge of this coordination, or, as in the second project, although some participants had to assume this coordinating role, they did not really have the means to achieve it. Moreover, it appeared that new tasks emerged requiring new skills that technicians did not have the opportunity to

develop. Our opinion is that such failures could have been avoided if technicians had been given the opportunity to discuss their modes of intervention. We propose to use mediating representations to support individual or collective reflexivity on these modes of intervention. Nevertheless further investigations are needed to assess these mediating representations and the role of the facilitator who participates in the use of such representations.

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