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An Inclusionary Strategy Reaching Empowering Outcomes Ten Years after a Two-Year Participatory Land Uses Management

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Abstract

A participatory experiment conducted in Senegal in 1998 resulted in large scale lasting empowerment thanks to the use of a time-limited support but focused on tackling hurdles inherent in contextualised social and power practices in order to launch an enduring endogenous momentum. An evaluation conducted 12 years after showed that some progresses in empowerment were made at both local and national scales. This paper is a detailed analysis of the way in which the approach achieved its impacts, thanks to a specific strategic framework, called Rainbow Spiral, which enabled the creation of an empowering contextualized process of scaling up.

Keywords: Impact, Participatory, Land, Management

1. Introduction

Participatory approaches often fail to succeed in scaling any local impacts they achieve out and up (Blomley & Ramadhani, 2006; Sneddon & Fox, 2007; Das & Takahashi, 2009; Scoones, 2009; Mansuri & Rao, 2013). Indeed, there are many social, institutional and political barriers to the scaling out and up of the first steps towards empowerment that a support may achieve in the local context. Yet, too often project teams consider these obstacles merely as externalities which can limit potential beneficial impacts, whereas in fact, they should be recognized as the

main challenge to a participatory strategy (Pimbert, 2004). Thus, overcoming social and institutional obstacles to lasting scaling out and up remains a major challenge, given the modest means represented by a time-limited intervention.

The main question is what kind of time-limited intervention is capable of causing local changes that can become lasting changes and enable scaling up? Creating lasting changes first implies accounting for the empowerment progress targeted as part of a whole social process, in other words, bringing the totality of society and social institutions into play, which must necessarily be the aim of the intervention. Second, the scope of the intervention must not only include local target groups but also higher levels and the social actors and institutions in the environment that need to change not only to launch the process but also to make it last. The challenge is not only achieving changes in local target groups but also in the people who hold the power and in key institutions capable of destroying the empowerment momentum once the intervention is over.

The context is thus crucial in participatory approaches (Ribot, 2001; Edmunds & Wollenberg, 2001; Pozzoni & Kumar, 2005). Our methodological interpretation of this challenge is to create a contextualized strategic framework that embraces the whole social and institutional context but in order to remain workable and achievable, focuses on the first minimum empowerment progress needed to turn it into a lasting achievement.

A pilot operation on participatory land uses management was implemented in late 1990s in Senegal (d'Aquino et al., 2002b), then in 2012, a field survey of ten-years-after impacts was conducted in which it was noted that impacts on the empowerment process were still visible ten years after the intervention. In this paper, we analyse how and why these empowerment outcomes are reached. We describe the impacts of the experiment at local and national level, and the strategic framework we designed and used. Finally, we discuss how our specific focused on the design of the strategy supports a real scaling out and up of local effects.

2. Method

A participatory experiment was conducted in Senegal between 1998 and 2000 with the aim of obtaining large scale lasting empowering changes in local land use management. The approach focused on a specific strategy to launch a lasting endogenous momentum which itself embeds first empowerment progresses not only at the local but also at the national level.

2.1 First, Designing a Participatory Strategy: Our Rainbow Spiral Framework

The whole method is underpinned by a thoroughly pragmatic questioning process: in the context of the planned intervention, what hurdles need to be overcome and how, to achieve the first but workable progress in empowerment in the context concerned? Which key people and institutions will need to be changed first, and how, to achieve this initial progress? These questions may seem obvious but experience shows that going beyond simple solutions like involving everybody, especially disadvantaged groups, in participatory workshops, remains difficult. Indeed, among the many stakeholders, who are the first who need to be changed to make the context amenable for lasting change? What are the preconditions or the external factors which may limit and even prevent the local and global targeted impacts, which consequently need to be considered as priority goals rather than as externalities?

Our experience shows that this apparently obvious questioning requires a particular process, which we call "spiral questioning", to define a sufficiently precise operational strategy. "Spiral questioning" means deeper repeated probing of each question after progress has been made by answering the questions that follow, and so on, until the answers no longer evolve. As a result, the spiral questioning progressively turns general considerations on participatory issues into refined and operational priorities. Several questioning loops are usually needed to define a sufficiently precise and pragmatically empowering targeted impact that fits the context. In particular, this progressive highlighting of the key pragmatic constraints often implies accepting as new central targets, factors that were originally identified as simple preconditions or external pitfalls. The crux of this eliciting process is the Knowledge Management loop, which requires defining the exact nature of the "progress in knowledge" that is needed (Figure 1).

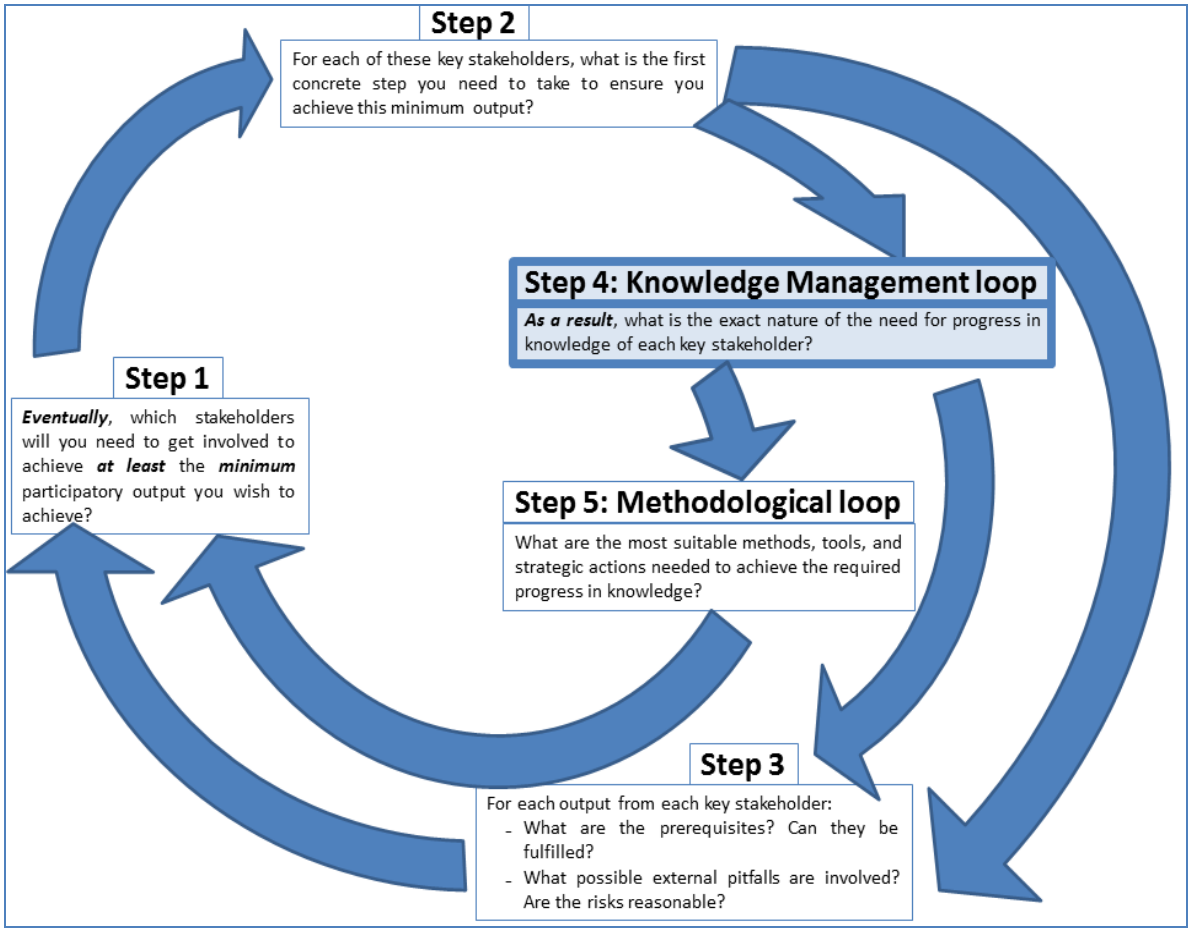

Figure 1. The Rainbow Spiral framework some incremental eliciting loops of the empowering strategy

At this stage of this Knowledge Management loop, irrespective of the words used to define the different knowledge changes targeted, experience has shown it is easy to be trapped by too general concerns. For each of the key people who need to change, including higher level and surrounding social actors and institutions, what kind of knowledge improvement does this change first require? What exactly is needed from each key person, from merely being present,

ensuring that the person receives particular information, developing specific know-how, changing certain attitudes or rebalancing power (this typology is a practical synthesis of different theoretical learning concepts)? The Knowledge Management loop uses a colouring specification to constrain the focus on true operational and contextualised aims (Figure 2). This 4th eliciting loop ends up as a workable long-term empowering strategy, which has been progressively fine-tuned to fit the local context. It forces us to frame the initial outputs targeted by the intervention within more modest short-term objectives but within a more ambitious long-term frame: the minimum conditions and operational processes needed to launch a momentum which will be able to achieve the first priority, i.e. a lasting empowerment, even after the intervention has ended. Again, this added eliciting step may still entail redefining the previous strategic options, as specifying knowledge outputs can reveal some preconditions and pitfalls which were overlooked and may need to be transformed into new priority objectives.

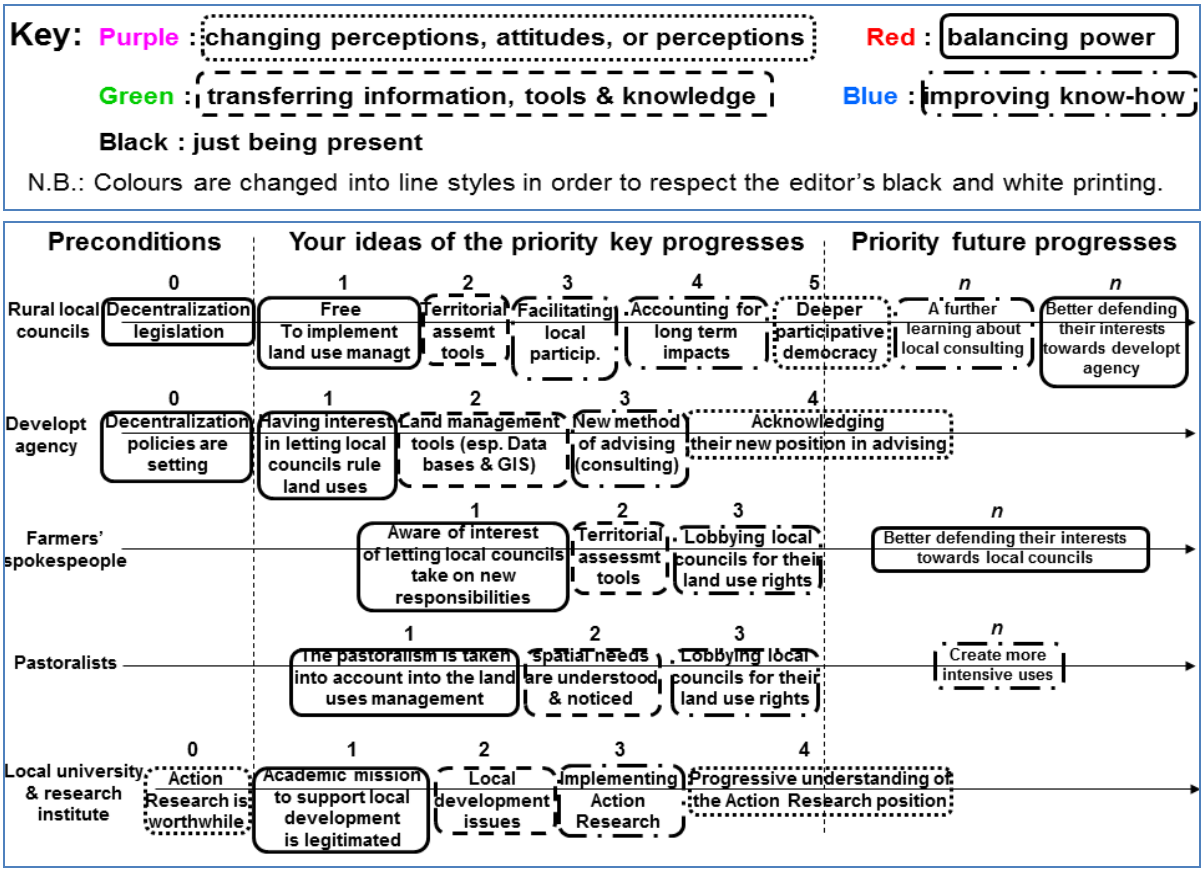

Figure 2. Outputs of the first eliciting loops of the Rainbow Spiral framework

Using this knowledge management step with many different teams lasting recent years has shown that the same words can be coloured differently depending on the facilitator's viewpoint, even within a team which has been working together for some years (see the end of the Results section). This result means that the same usual formulation of a participatory objective or output can involve dissimilar knowledge challenges…and consequently requires different participatory methods or tools. Consequently, only when this clarification is reached can methods be selected. Thus, only the last loop of the Rainbow Spiral framework supports the identification of the methodologies which need to be used (see the last loop in Figure 1). This

loop forces us to select each precise methodological support and action that is indispensable to deal with each distinct knowledge progress identified in the previous steps.

Positioning the identification of a method at the last step means our approach is not based on a supposedly perfect participatory or empowerment method which can be used in all contexts with guaranteed precision and success. On the contrary, our approach is based on the assumption that methods can only be deduced from the previous step in contextualizing the key empowerment issues. For example, if information transfer turns out not to be the primary objective due to the particular contextualization of the empowerment objectives, the participatory approach should not start by presenting new knowledge to stakeholders.

Figure 3 shows the diversity of methodological means selected using this form of methodological strategy: participatory appraisal or planning, training, learning by doing exercises, personal exchange, social networking, institutional lobbying, etc. Some unusual actions can be identified, for example, acts that give confer a higher status to certain stakeholders in the process could jeopardize achieving the most important impacts. Thus, unlike many participatory approaches, selecting the methodology is not the entry point, but requires that a wide range of participatory methodologies are identified and mastered by the support team.

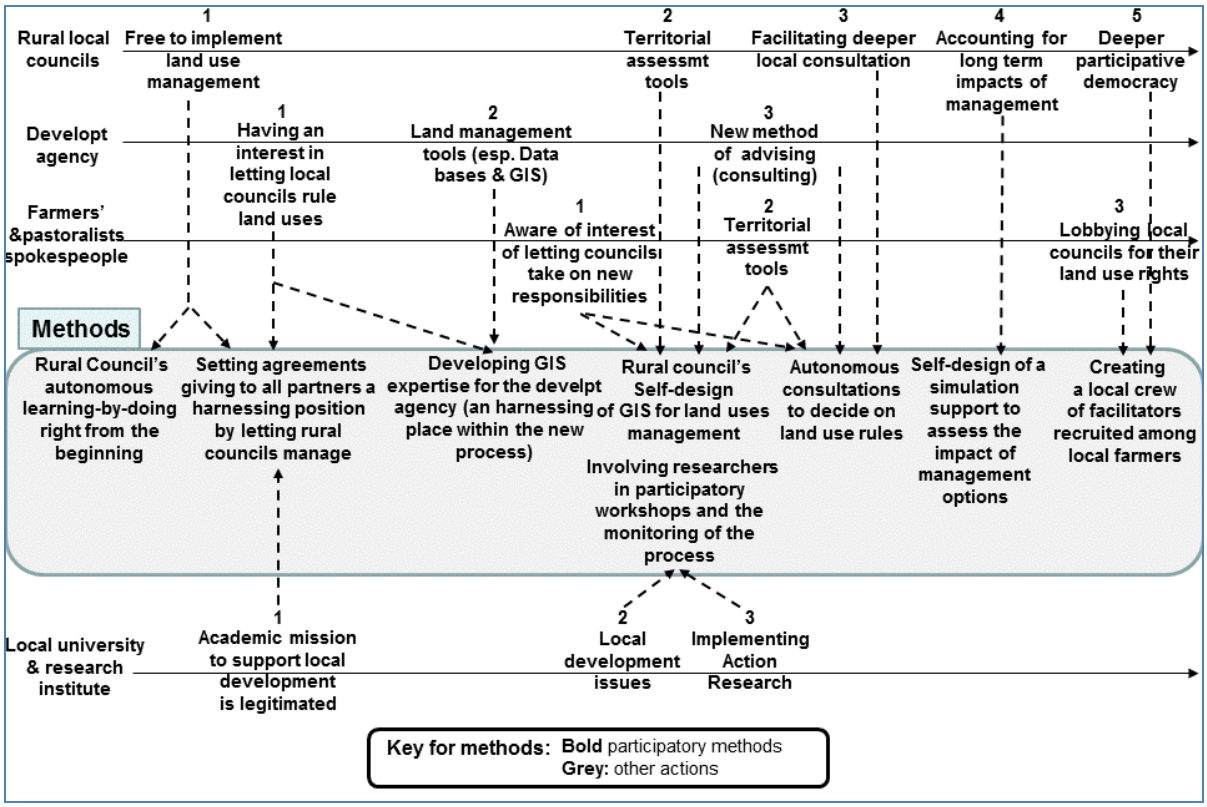

Figure 3. Methodological outputs that result from the second eliciting step of the Rainbow Spiral framework

Lastly, the Rainbow Spiral framework ends by pointing out the particular milestones of the contextualized participatory process (Figure 4).

Loop 1

What is the **minimum** participatory progress you would like to achieve by the end of your intervention?	
Before the start of the intervention:	
At the end of the intervention:	
Your overall participatory challenge of this project, but in **reasonable** terms with respect to the length and means represented by the project:	

Loop 2

The Rainbow Spiral	1) Which key people need to change in order to achieve the minimum participatory progress you have defined ?
	The key people
1	

Loop 3

The Rainbow Spiral	Preconditions			Then, colour your answers according to the following key ⟶		BLACK: Only need to be present	GREEN: Transferring knowledge, information, data...	BLUE: Developing know-how, practices...	RED: Re-balancing responsabilities, charges, power...	PURPLE: Changing attitudes, perceptions, behaviours...	External obstacles		
Key people 1:	'	'	'	'	'	'	'	'	'	'	'	'	
0	'	'	'	'	'	'	'	'	'	'	'	'	
Key people 2:	'	'	'	'	'	'	'	'	'	'	'	'	
0	'	'	'	'	'	'	'	'	'	'	'	'	
Key people 3:	'	'	'	'	'	'	'	'	'	'	'	'	

Loop 4

The Rainbow Spiral	6) Which methods, tools or other actions match each step?										
Steps:	1	2	3	4	5	6	7	8	9	10	11
Key people 1:	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
Which ones from this key people's progresses?											
Key people 2:	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
Which ones from this key people's progresses?											
Key people 3:	0	0	0	0	0	0	0	0	0	0	0

Loop 5

The Rainbow Spiral	7) INCLUSIONARY PLANNING: Exactly which steps match each key people? Colour in grey the appropriate square, i.e. the square at the intersection of the appropriate column (for the step) and row (for the key people).							
	1	2	3	4	5	6	7	8
Who can you rely on for support? Who has the greatest interest in your impacts succeeding? Who could be interested in blocking your efforts? ...Finally, do you need to add any new key people? ↓								
▫								

Figure 4. Excerpts from the main pages of the Excel file that guides the Rainbow Spiral eliciting process

2.2 Collaboratively Devising the Eliciting Strategy

A deep knowledge of the context is required to fill in the Rainbow Spiral framework and progressively refine, loop after loop, a contextualized strategic position. In addition, there is always a subjective dimension to choosing the contextualized participatory priority issues. Consequently, to implement this eliciting process, it is worth sharing knowledge of the context and views between key partners. One can even say that bringing together some key local

people to fill in the Rainbow Spiral framework, in other words to collaboratively devise the whole participatory strategy, may be the best initiating loop, which will allow the first definition of the objectives thanks to key local partners. Of course, this first implies deciding what we mean by local partner, in accordance with our strategic and contextualized stance, that is, a local strategic alliance, which is identified and rallies those involved around shared empowerment goals right from the beginning of the project.

2.3 Contextualizing the Participatory Strategy: a Newly Re-Engineered Approach for Each Different Context

Rainbow Spiral questioning was first applied in 1998 in Senegal to design the participatory strategy for a land use management pilot project, called POAS for "*Plan d'Occupation et d'Affectation des Sols*"[i] (d'Aquino et al., 2002a). A peculiar participatory process emerged to fit the precise objectives tailored by the Rainbow Spiral framework. The first priority in the eliciting process was increasing the rural councils' autonomy in relation to the State development agency. To break this dependence required a specific methodological position: an autonomous participatory appraisal, without the involvement of a technical or scientific advisor. This led to a specific participatory methodology, we called the "self-design" process (d'Aquino et al., 2002b), which lets local stakeholders design the devising process and appraisal supports on their own (Figure 5). Local stakeholders were brought together so they could decide which priority land issues they wished to deal with first, what information they thought would be useful to tackle these issues on their own, and even which stakeholders they thought should be involved and how, to be able to address the issues on their own. The process combined some widely used participatory tools, some innovative uses of other knowledge supports, and a completely novel participatory simulating method.

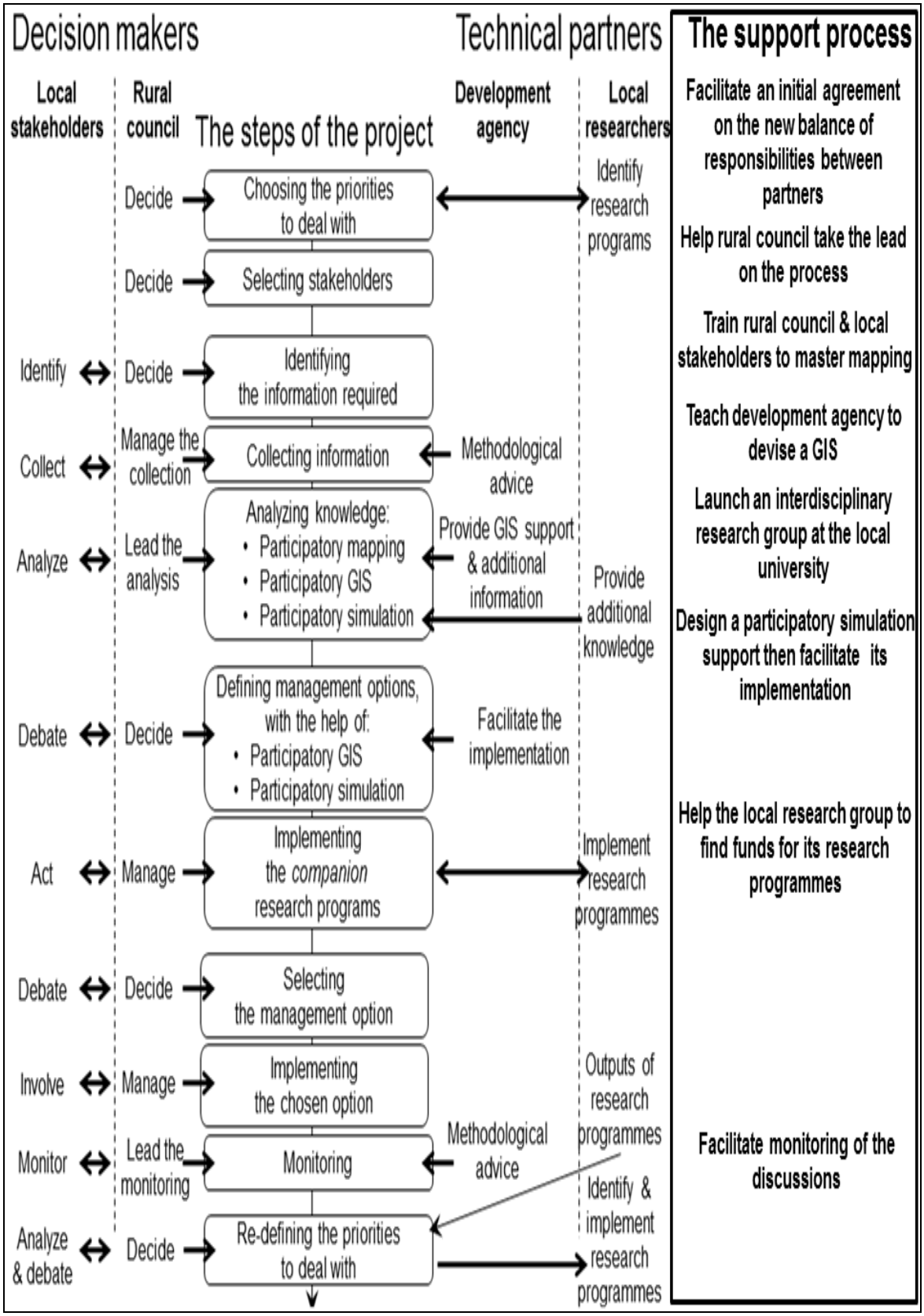

Figure 5. The particular "self-designed" participatory method built from the last loops of the Rainbow Spiral eliciting process.

First, a new form of participatory planning was shaped to replace the progressive transfer of management abilities towards rural councils, which was considered to be too controlled by the government agency to be an efficient empowerment process. The new method of participatory planning lets stakeholders improve their management abilities through 'learning by doing'. The Rainbow Spiral enabled this new planning process to be both global and operational, which meant not only new participatory methods, i.e. a self-designed GIS (d'Aquino, 2007), but also the self-devising of local land use rules and some actions and lobbying to ensure the new land use planning became a permanent component of the overall institutional context (see above Figures 2 to 4).

Next, a novel participatory simulation method was designed, called *Self-Design Modelling* (d'Aquino et al. 2003; d'Aquino & Bah, 2012), to fulfil the need to help stakeholders think about the medium and long -erm impacts of their current land uses. *Self-Design Modelling* uses simulation games and participatory agent based models to launch autonomous exploration of possible land use management scenarios. It has been increasingly recognised that, when dealing with complex environmental issues, modelling and participation can be mutually reinforcing (e.g. Bousquet & Lepage, 2004; Voinov & Bousquet; 2010). *Self-Design Modelling* is based on the 'learning-by-doing' hypothesis which states that capacity building is more efficient when people act alone and then progress by analysing the outcomes of their acts on their own (e.g. Reed et al., 2010). As a 'real' learning-by-doing land management process would be too time consuming and carries a risk of having a negative impact during the learning stage, the learning-by-doing stage was replaced by a "learning-through-simulation' stage. Consequently, a simulation game, very similar to a role playing game, was designed using the outputs of the customary participatory appraisal, and then participants "played" the game and enriched it from their own points of view. Once the "game" had been validated by the participants, they used it to first design and then simulate their own land management scenarios, and finally to assess the medium and long-term impacts which emerged while they were using the board game. The game was then transformed into a computerized simulation model the participants used to explore their land management scenarios.

The aims of *Self-Design Modelling* are to (i) make sure the variety of users' logics is reflected in the players' roles, (ii) monitor the effects of the scenarios on all the stakeholders and on other key elements including the environment, in other words, different assessment indicators, and (iii) make sure the different stakeholders' points of view of the issue remain intact, including what they consider would be "good" or "bad" effects (Scoones, 2009). This is a basic difference between this self-simulation method and other participatory supports: the aim is not to reach consensus about an issue and its solution but to shape an agreement about the variety of points of view about an issue and its possible solutions. In this way, participants become progressively more able to appropriate the complexity of this kind of "no simple solution problem", in other words, achieve a post-normal management position (Funtowicz & Ravetz, 1994). In the early 2000s, the outcomes of this early participatory modelling experiment fed the design of an innovative participatory modelling approach called *Companion Modelling*, which focused on environmental management by multiple stakeholders (Bousquet et al., 2002; Barreteau et al., 2003; Etienne, 2011).

The last loops of the Rainbow Spiral point to the peculiar milestones of the process (Figure 6).

3. Results: Some Inclusive Outcomes Still Visible Ten Years Later

3.1 A Specific Way of Supporting Participatory Processes

The use of this multi-loop eliciting framework produced a dual output. First, the progressive narrowing down of the expected impacts led to a genuine shift in the usual objectives of a participatory approach: the priority was no longer progress made by local stakeholders, but rather facilitating changes in the "top-down" attitudes surrounding the local stakeholders.

This primary objective involves obtaining the agreement of the "surrounding" actors to allow local councils to self-manage land use. The Rainbow Spiral helped highlight this masked but major hurdle to acceptance by the all-powerful local actors. This is the first step in launching any empowerment progress in local land use in this context. Senegalese decentralization laws already define local councils' responsibilities in land use management, but no key members of the administration and technical services believe that local stakeholders are capable of land use management (or would wish them to be). In political science, it is known that a policy is not what it states but what people themselves acknowledge from what it states. The strategic framework of the Rainbow Spiral helped to pragmatically focus on this socio-institutional reality surrounding empowerment issues. Thus, the first output was an unprecedented formal agreement between the first rural council targeted by the pilot operation[ii], the State development agency[iii] and the Senegalese research centre[iv] concerning the self-capacities of local stakeholders for land use management, This agreement officially gave the local council the leading role in designing land use management, rather than simply making them targets of support programmes.

In the same strategic perspective, the name of the participatory planning tool accompanying the autonomous process[v] was chosen with the help of the local key partners in the project, with a view to supporting and scaling up long-term impacts: the chosen name was already mentioned in the decentralization law but was not clearly defined, which means it was possible to 'fill in' the name of the approach, and from there, get officials to support it.

Furthermore, focusing on long-term impacts got the project team to face the serious risk of failure in the long term right from the beginning of the project. The State development agency, which lost some of its power in the new balance of responsibilities brought about by the intervention, is in a good position to destroy any innovations after the end of the intervention. The interests of this omnipotent institution were consequently taken into account by giving it a position of power in the new balance of responsibilities, whilst also giving rural councils their autonomy. Accordingly, first expertise in GIS then a participatory facilitation in GIS was transferred to the State agency during the course of the intervention. Again, one of the strategic ways of achieving lasting empowerment was not using a method focused on progress by the local stakeholders but on changes in the surrounding stakeholders. The support team continued to reinforce these initial shifts throughout the intervention, either targeting State services[vi] or populations[vii], thanks to several actions or behaviours which had appeared appropriate while the Rainbow Spiral framework was being filled in.

The strategic framework also led us to think differently about building local stakeholders' capacities. Thinking about long-term stakeholder autonomy made us decide not to directly advance local stakeholders' knowledge but to establish a lasting, efficient, local support for such an advance. This option appeared to be appropriate because our first priority was not to advance local stakeholders' knowledge (see Figure 2 above) but to ensure progress was made by the surrounding actors. Consequently, improving local stakeholders' knowledge was only launched at mid-term, when an autonomous local support structure was set up. Thus, a local research team working on local development and decentralization issues, and closely linked with the rural councils, was rdeveloped during the second year of the intervention. The project team organized academic sessions to give added value to applied research on local issues and links were facilitated between academics who were open to local issues and between these academics and the local council.

This strategic focus on modifying the surrounding context can be considered as the major process towards empowerment in this context, although this is not a formal methodology or process. The project team's facilitation expertise is thus applied less to local stakeholders than used to achieve changes in surrounding institutions. The support provided focused on enabling the local stakeholders to learn by doing right from the beginning, through the autonomous collective design of their management actions. The role of the support team was strictly limited to facilitating the launching of this autonomous learning-by-doing process and to overcoming both external constraints and any constraints inherent to the context that could prevent it. The team's priority was to launch a process to ensure learning-by-doing continued after the end of the time-limited project, to the extent that it affects the whole institutional context, from local to national levels.

Apart from this specific strategic approach to the empowerment process, the second result produced by using the Rainbow Spiral framework was methodological: a genuine "self-designed" participatory method was created in response to the contextualised challenge. The "self-designed" method was specifically designed to match the contextualized challenge of the project, i.e. helping rural councils free themselves from top-down attitudes. The eliciting framework helped to preserve the autonomous principle of the "self-design" stance at every high point of the methodological process, for instance by letting rural councils themselves identify which stakeholders to involve, choose the priority issues, design the GIS, choose the most suitable management option, etc. without the help of the support team (see Figure 4 above).

The Rainbow Spiral framework first helped shape and then implement the autonomous scaling out and up using a strategic approach to achieve a workable impact considered to be an outcome of an endogenous change. Focused on workability, the framework requires the team to detail the first smallest change in the context needed to reach the first lasting impact. The framework then leads the team to decipher -within this small but lasting change- what changes are required both in the surrounding actors and in the target groups.

In practical terms, this fine tuning finally led to a 'light' support for (i) the initial co-design of the participatory strategy (see the Rainbow Spiral) through the alliance with local key partners,

(ii) three 2-day workshops with local stakeholders for the self-design and use of GIS, spread out over a period of 2 years[viii], (iii) a few 3-day simulation workshops in hot spots where local stakeholders needed more support to reach agreement on land use management, and above all, informal but considerable facilitation of changes in the surrounding institutions and social actors (Figure 6). In operational terms, this support was also designed to be implemented at a large regional scale: two people were responsible for the support, one for facilitation tasks (see figure 11 below) and the other for the implementation of GIS both of whom were capable of providing support for autonomous local momentums throughout the Senegal River valley (45 000 km²). As detailed in the methods section, the challenge was to create initial conditions that would result in a self-perpetuating dynamics after the intervention ended. This required, (i) continuous improvement by the target groups in their local management actions, (ii) increasing the influence of these local target groups in the local and national institutional context. In other words, direct impacts were not expected during - and due to - the intervention, whose time and means were limited in comparison with the ambitious long lasting changes expected, but the approach was designed to be achieved by the target groups and their surrounding context, thanks to the few key capabilities set in motion during the course of the intervention.

Duration of the stage	6 months	2 months	1 month	1 month	1 month	3 days	1 month	2 months	1 month	1 month	3 months	1 month	1 month	1 month	1 month	1 month	6 months	1 month	1 month		1 year
The nature of diffent steps:	Awareness of the institionnal context	Proposing the approach to different rural councils	Patnerships building up with the rural council	Devising the approach with the rural council	Gathering available cartographic information	Cartography training for stakeholders	Restitution of the available cartog. infor.	Self-collecting of field information	Restitution of the collected inform.	Self-validation of cartogr. inform.	Self-analysis then use of inform.	Self devising of new land uses rules	Rural council's restitution of the progresses towards the citizens	Inter villages debating about the rules	Enriching/correcting rules by rural council	Rural council's restitution of deicied rules to citizens	Applyins rules	Simulating sessions on hot spots	Rur. counc. identifies its specif. needs of tech. Advic.	Restitution of technical Knowledge	Self-experimenting of technical innovations
Key people	10	20	8	10	2	20	6x30	2	5x30	5x30	-	25	10	-	6x30	6x30	-	3x20	25	80	-
Cirad geographer																					
Saed sociologist																					
Isra sociologist																					
Saed deput. Director																					
Saed GIS expert																					
Ugb leader																					
Rural Council leader																					
Rural council represent. (3)																					
Rural council President																					
Oth. rural counc. people (15)																					
Rural council facilitators																					
Users spokepeople (25/zone)																					
Village chiefs (3/zone)																					
Technical agents (5)																					
Regional techn. Directors																					
Région. Admin. Territ.																					
Ugb researchers (10)																					
Local Admin. territ.													?								
Region. Council President																					
Reg. Devltp. Agency																					
Djoudj park agents																					
Isra zootechnician																					

Figure 6. A visual analysis of the inclusionary strategy, which is the result of using the last eliciting loops of the Rainbow Spiral framework

3.2 Local Impacts on Empowerment and Capacity Building

The "POAS" pilot operation was implemented between 1999 and 2000, at a small regional scale (30 000 km²) in the delta region of the Senegal River Valley in Senegal[ix] (d'Aquino et al., 2002b). Between April and July 2012, a field survey of ten-years-after impacts was funded by IFAD[x] (d'Aquino & Papazian, 2012). This field enquiry observed that impacts of the empowerment process were still visible ten years after the intervention, both local endogenous improvements in the original autonomous actions, and with respect to scaling out and up, the progressive embedding of local outcomes in national policies.

First the enquiry revealed some local short-, medium- and long-term outcomes. After two years and with only 'light' support (see above), the targeted rural council 'self-devised' appropriate land-use rules. During this two-year learning-by-doing stage, the rural council designed and then implemented its own approach to devising land rules (d'Aquino et al., 2002b). The rural council became able to (i) choose the form of participation (number of workshops, participants' profiles, etc.) and its management; (ii) identify the information required to support the local users' consultation, (iii) collect this information itself; (iv) using the information it collected, analyse the GIS maps drawn by the State agency; (v) organize debates with local users to draw up new rules. Furthermore, the autonomous devising of new rules encouraged innovative thinking and stakeholders drew up some original thought-provoking rules to cope with their irregular Sahelian climate: rather than partitioned zoning of the different uses, which jeopardizes use of the land because of the geographical irregularity of rainfall, they came up with the idea of priority uses, meaning that while all uses are theoretically allowed everywhere, some are of higher priority than others, depending on the zone concerned (d'Aquino et al., 2002b). This simple rule means other land uses cannot take precedence over the priority use, thereby preserving resources for every possible use under an uncertain climate, while at the same time establishing planning priorities.

In the medium term, i.e. a few years after the intervention ended, the rural council had drawn up both shared rules for the different uses, and mechanisms for their monitoring and management (d'Aquino et al., 2002b). These new endogenous rules take disadvantaged groups better into account, especially pastoralists whose need for access to land and water was acknowledged and supported, which was a true innovation in the local context (id. cit.). Key water points for pastoralist were identified and protected[xi], and new water infrastructures were created if required, for example, new water points, bridges to allow livestock to cross canals, etc. All these decisions were self-devised by local stakeholders without help from the support team (since the intervention had ended few years earlier), or from the development services. The community also went as far as setting up a new internal organisation to facilitate its participatory land use management: the territory was divided into local zones with 'participatory commissions' which included elected representatives, village chiefs and users' representatives. These commissions not only managed the implementation and monitoring of the land use plan, but gradually took over other local negotiations which were not directly related to the land use plan (d'Aquino & Papazian, 2012). Lastly, while monitoring their own plan, the local stakeholders realized that a local facilitating team would be useful and put one together to ensure the inclusiveness of local monitoring of the management plan (id. cit.).

In addition, the few simulation sessions (see above) made participants aware of the long-term effects of existing rules and practices. In this way, they realised that better preserved space for livestock (see their common rules above) would not be sufficient: participatory simulations highlighted the need to increase the availability of fodder by reserving natural fodder or even the need to cultivate fodder crops. Yet, the idea of cultivating or irrigating fodder had been inconceivable to the farmers before the intervention: despite the fact development services had long been attempting to convince them, farmers had continued to believe cultivation and irrigation were acceptable to achieve food security for themselves but not for livestock. However, letting them simulate their own scenarios of future trends made them aware of this need. As this appraisal was endogenous, two years the intervention ended, the rural council was sufficiently motivated to find the means to implement some of the necessary infrastructure. This was the case in the village of Ngnith (Figure 7), or in the buffer zone of the Djoudj National Park where artificial flooding was tested to enable the grass to grow during the dry season (Corniaux et al., 2003; d'Aquino et al., 2003). The second example shows that the endogenous process gives local stakeholders the ability to come up with innovative ideas, like controlled flooding to facilitate regrowth of natural fodder.

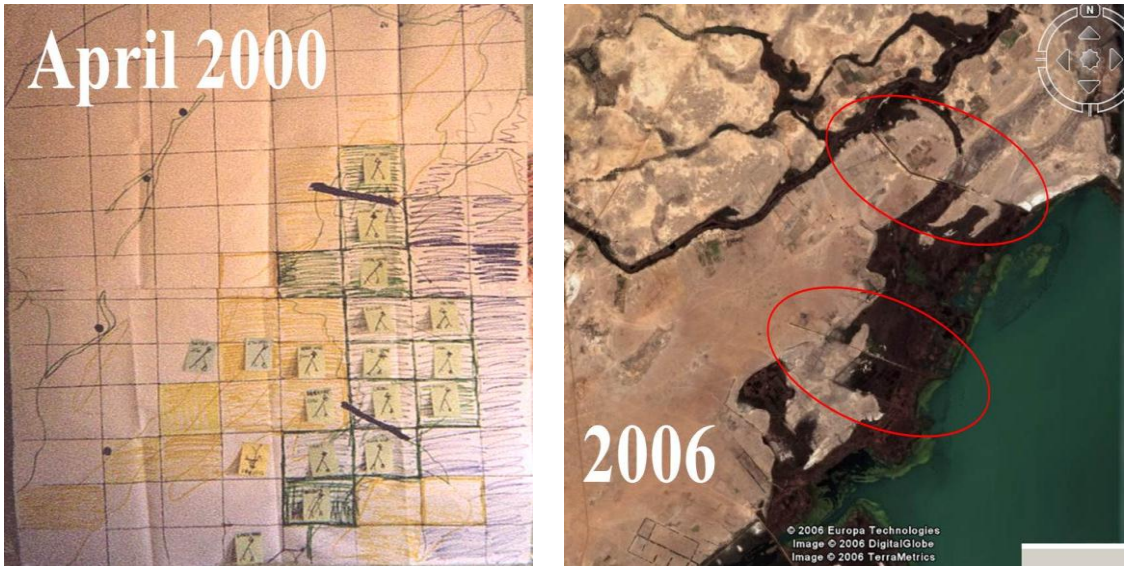

Figure 7. Local impacts of a three-day participatory simulation session in 2000 at the village of Ngnith, close to Guiers Lake, in the northern part of Senegal

Some other medium-term outcomes concerned the relationships between the scholars and the farmers. Driven by the Rainbow Spiral framework, the support team had encouraged links between rural council and the young (1996) UGB local university (see above), which led to an original partnership between some UGB academics and the targeted local council. With the aim of achieving institutional acknowledgement of the new local council's rules and abilities, some legal academics at UGB helped adapt the rules in order to better embed them in law. Geography professors based their research on the specific questions raised by the community when its first land use plan (sustainable multi-uses of lowlands, competition between breeders and farmers for water, preservation of woody vegetation, etc.) was drawn up. A new interdisciplinary research group was created in UGB in 2001[xii], with the cross-cutting issue of

addressing the local council's questions concerning local sustainable management issues. The students' work has been regularly co-defined by the university group and the local councils and, as a result, enriched the local stakeholders' understanding of land management issues. Reciprocally, this collaboration has progressively increased the University's participatory research on land use. The University group went on to organize regular meetings[xiii] to enable exchanges between academics, students, and local stakeholders. At that time, it was very rare for a university to focus on development and decentralization oriented research.

In the medium term, progress in empowerment in the relationships between local stakeholders and their surrounding institutions continued, and even increased, long after the project ended. The Ross Bethio rural council ensured that the new shift in the balance of power that occurred during the initial support provided by the project was sufficiently embedded to stay the course. Thus, when public institutions turned out to be less open to change than the UGB, the rural council forced the changes through. In 2001, the managers of a national park[xiv] located on community territory invited local stakeholders to validate their zoning map, which had been drawn up without the local inhabitants. Local stakeholders protested and demanded the map be revised to take into account the local uses and needs specified in their POAS maps and chart. Similar protests and demands were expressed when the new research team at the agricultural research centre[xv] (created in 2001), asked them for what was merely formal validation of its new research program.

Indeed, the progress made by the rural council led its members to formulate not only very local needs but also relevant research issues for land use management. Thus, after they became aware of the likelihood of a shortage of fodder in the long term (see the outputs of simulation sessions), in 2002, the council itself asked livestock experts to come and present techniques for improved fodder production. For this purpose, the rural council succeeded in bringing together 80 farmers' representatives in a workshop during which they decided to conduct parallel trials of the least and the most demanding options (Corniaux et al., 2003). This success story revealed the progress made by the stakeholders, whether concerning their relationships with State institutions, their understanding of land management issues, or the inclusiveness in their internal decision-making.

The new empowered attitude of the local council was even expressed towards the all-powerful SAED development agency. In 2002, an important public project was set up to build a 50-kilometer canal across community territory[xvi]. An impact assessment had been undertaken in 1995 and had not encountered any opposition from local stakeholders. Yet, after the POAS process, the rural council had increased its capacity sufficiently to play a more active role. The council was not only able to identify gaps in the project[xvii], but also -despite pressure from the government- to halt it. The stronger links built between rural council and villagers during the past POAS process (see below) enabled broad-based mobilisation, supported by technical arguments based on their land uses maps (d'Aquino & Papazian, 2012). Subsequently, the rural council continued to stay the course. When in 2003, SAED was asked by the government to disseminate the "POAS method" to other rural communities in the Senegal Valley, the rural council forced SAED to conserve the empowerment features of the original methodology. Thirteen years after the operation, a different relationship exists between local communities

and SAED. Thus, during the renewal of a rural council in 2011[xviii], the new electives forced SAED to update the POAS, irrespective of the cost for SAED. This reveals both the value of POAS for rural councils and the legitimacy of what the council asked SAED to do.

Changes in the balance of power concerned not only the rural council and its surrounding institutions, but also relationships between the rural council and the farmers. In Senegal, a rural community's territory includes a large number of villages[xix]. As the decentralisation policy established that at this community level, local representatives were to be elected, the traditional village leaders felt they were being dispossessed of their responsibilities, while local electives considered village chiefs as a symbol of obsolete power. However, throughout the autonomous learning-by-doing stage of land use management, both actors gradually became aware of the interest of working together to increase their effectiveness, both to make local voices heard at higher levels (see mobilisation against the Emissary delta project above) and to make locals comply with the land use rules. Thus, at the end of the Pilot operation, the rural council included the traditional village leaders in the land use commissions[xx]. In 2008, the rural council even persuaded those in charge of a public project aimed at developing rural councils' capacities to add the village chiefs to the group of beneficiaries.

In 2012, mutual commitment between the local council and village leaders was not observed in rural communities that had not been influenced by the POAS Pilot operation (Papazian, 2012). Nevertheless, the livestock corridors and water points established in 1999 are still acknowledged. Opening and closing dates of the agricultural calendar are still discussed each year. In our survey, 60% of respondents told us that conflicts between farmers and pastoralists have decreased. Many local people consider POAS to be "a tool to help them negotiate with but also to oppose others" (Papazian, 2012). Thus, during violent protests against local land grabbing in 2011[xxi], one of the arguments put forward by the protesters was their POAS zoning.

Long-term impacts on UGB University are also apparent. Research oriented towards local development has gradually spread throughout the university, to the point where the university has become specialised the field, and is recognised as such throughout the region. In 2012 within the university, the GIRARDEL group was still recognised for its applied research on development.

3.3 Overall Impact on Inclusiveness and Advocacy

The 2012 evaluation also revealed impacts at national level. The first desired impact was to succeed in scaling both the method and the issues it comprised up to the national level. Two years after the project ended, the POAS method and its results was brought to the attention of policy makers by local partners. As a result, the council of ministers recommended that the method be disseminated throughout the country. Whereas at the beginning of the project in 1998, government agencies considered that local councils were not capable of managing their own territory, the success of the POAS approach changed their mind. The SAED sixth engagement letter written by the council of ministers included the extension of the POAS method to the whole Senegal River valley. This meant that the two-year Pilot Operation succeeded in launching an autonomous momentum not only limited for the local council's own progress but also endogenous support for the dissemination of the method. As a result, in 2012,

POAS was being applied in 42 communities in the Senegal River valley only funded by Senegalese institutions. Beyond this adoption of the empowerment method, scaling out included concepts which had not yet been acknowledged in the late 1990s in Senegal, like the legitimacy and ability of local elective people to manage land uses or the need to officially reserve space and resources for pastoralists.

Whereas the Pilot Operation was a local initiative not known to national institutions, the Senegalese President himself officially handed the first POAS to the Ross Bethio Rural Council. In 2002, a new Agro-Sylvo-Pastoral Orientation Law (LOASP) stated that all rural communities in Senegal have to implement a POAS. In 2012, every new public project on land use in Senegal referred to POAS. Better yet, as regards scaling out, a few years later, the POAS method became mandatory in bordering countries, as knowledge about it was disseminated through exchanges between farmers' organizations.

The key point here is that these large-scale impacts were not achieved by the support team during the course of the project, but by enabling stakeholders to pursue the objectives on their own. Different factors were decisive in achieving the impacts described above, each being responsible for a specific aspect of success (figure 8). At the local level, the success of autonomous management by the local council was due to the choice of a genuine learning-by-doing process, meaning really letting people learn on their own without giving them advice or choosing the knowledge the project team considers they need, then carefully transforming this choice into a specific participatory method, the self-design method. Secondly, progress in the local empowerment of the rural council and farmers was long-lasting because particular attention was paid to making the necessary changes in the surrounding context, even before local stakeholders began to progress. Thirdly, improving local understanding by taking long-term sustainability into account was achieved thanks to the innovative self-simulation support. At the global level, the successful scaling out and up was first due to the creation of a key local alliance, which helped tailor the project to the best institutional form. For instance, the choice of the name POAS was perfect to embed the approach in the national framework. Secondly, scaling up was accomplished by the all-powerful local institutions, because the strategic approach used ensured them an advantageous place in the process of empowering rural communities, while the scaling out, including to bordering countries, was accomplished by local stakeholders' organisations.

Lastly, in terms of facilitation, three features of the pilot operation were crucial: first, not aiming to implement a process but rather to create the necessary conditions for an autonomous learning-by-doing process right from the start; second, reviewing the strategy and constantly re-adjusting the facilitation strategy with the help of the Rainbow Spiral framework; lastly, not promoting a specific participatory method or tool but rather drawing on the whole range of methods and designing the methodological support that best matched the contextualized challenge at each step of the process.

Impacts reached		Factors leading to the impact		
		Participatory method	Rainbow Spiral framework	
			Strategic institutional approach	Form of facilitation
Progress in local knowledge	Local autonomous management	Self-design of different participatory tools		Not implementing a process but set conditions for an autonomous process (learning-by-doing process) Not promoting a specific participatory method but contextualising from the diversity of methods
	Improving the local understanding of medium and long term sustainability	Self-simulation of medium and long term scenarios		
Local empowerment			Focused on initial changes within local context	Helping the surrounding institutions to evolve, by making them aware, transferring to them new capacities to accept and support the empowerment process, and by every possible other way.
National embedding			Framed by the shaped local alliance	
Scaling up supporting			Give an advantageous place for almighty institutions	
	Scaling out supporting	Locals' capacities, thanks to the self-design		

Figure 8. The three key factors of successful impacts: specific participatory methods, a particular strategic approach and a specific form of facilitation.

3.4 Some Extended Uses of the Rainbow Spiral Framework

The Rainbow Spiral framework has been tested in West Africa, South East Asia, Pacific islands and in some European countries[xxii] in the last ten years. It helped to elicit and contextualize strategic approaches to empowerment in contexts as different as shared environmental management in a European democracy and policy design in an authoritarian political context like Vietnam. In a workshop lasting only a few days, the framework never fails to produce a workable and contextualized approach, which combines the best participatory methods and tools needed to progressively improve inclusiveness and empowerment.

In these trials, the Rainbow Spiral framework was not only used to frame the initial implementation of an empowerment process, but also for mid-term monitoring and/or re-framing of certain projects. In these cases, its use often revealed that members of the same team were pursuing different participatory objectives, even though they used the same vocabulary and had worked together for several years. This confirms that the eliciting process of participatory challenges is often not completed during the course of a project. Sharing this information within the team helps to improve team efficiency and to work towards lasting impacts.

In addition, the framework can reveal some veiled consequences of inclusiveness resulting

from the way the key stakeholders are involved during the course of the project (figure 9), which makes it possible to reposition the key people who were inadvertently not appropriately involved.

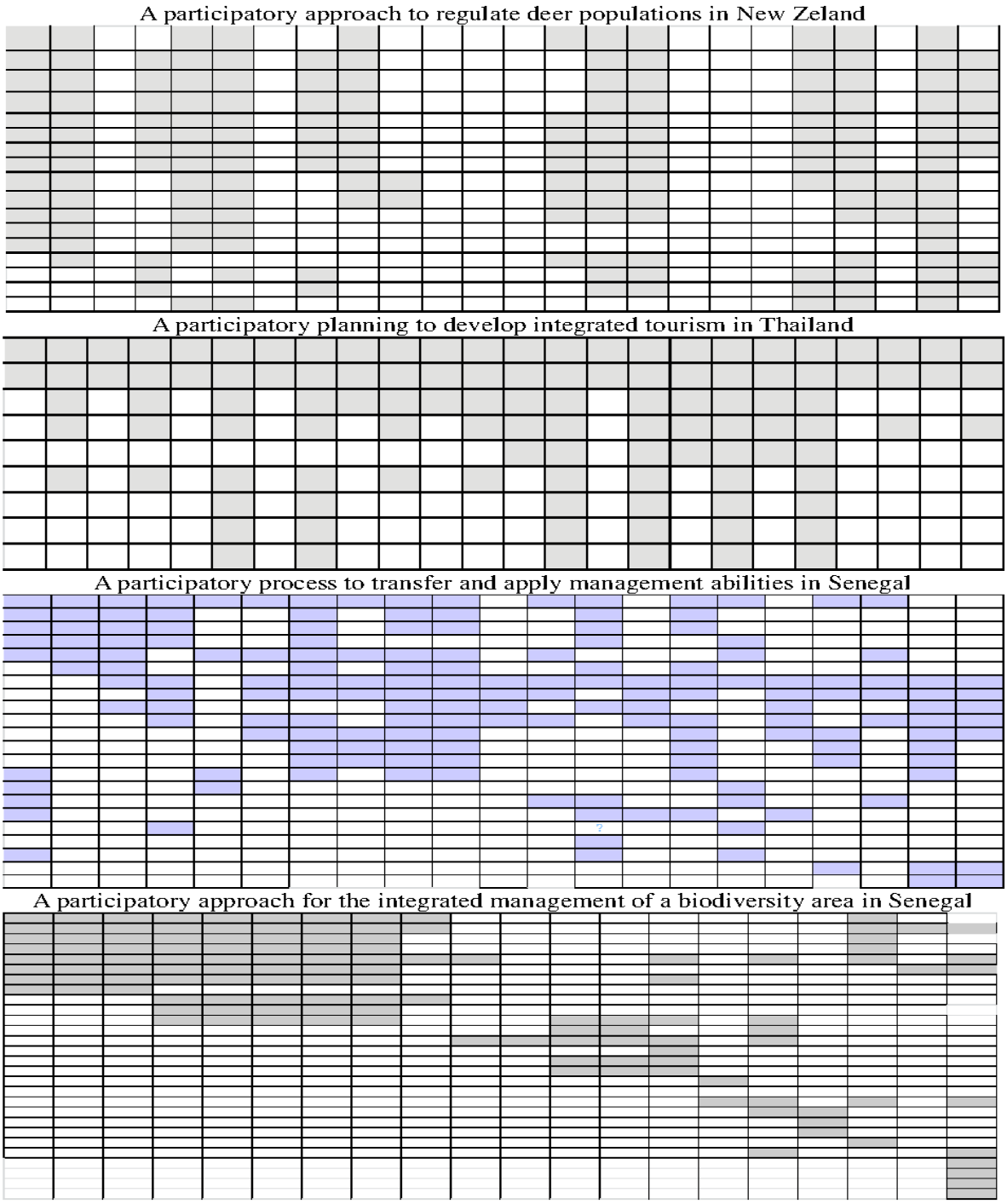

Figure 9. A final output of the Rainbow Spiral eliciting process when applied to different cases

4. Discussion

4.1 Unpacking Impact Chains for Complex Social Changes: A High Methodological Hurdle

Outcomes of POAS experiments are tangible, both at local and larger levels. However, framing these facts in an impact evaluation structure is quite tricky. Although the initial action and the final impacts are well identified, how can we track social interactions which have ended up as substantive impacts over a period of ten years? Long-term empowerment objectives highlight the gap between the time a project takes and the time political changes take: how well do methodological and conceptual frameworks for the evaluation of the impact of projects meet the need for the assessment of the kind of long-term socio-political impacts pursued by empowerment objectives? It is clear that the empirical but tangible empowering impacts mentioned above cannot easily fit the standard frame used for the evaluation of the impacts of a project, because it is not structured for the classic comprehensive data and impact indicators used in economic frameworks. Furthermore, identifying chains of social impacts is not relevant in the case of long-term social impacts, as too many diverse social events and facts interact over time. How can we prove that the changes that are observed today were brought about by actions undertaken ten years previously, and do not have other possible causes? Conceptualising this issue may involve exploring a two-lane route to evaluating long term impacts: one sociological and one empirical. Evaluation of long term empowerment impacts like the ones described in the results section fit political sociology frameworks better than the usual economic frameworks used for project evaluation. In peculiar, pragmatic sociology (Blokker 2011) addresses theories of social changes within time scales suited to long term empowerment impacts processes, especially the new field of ballistic sociology (Chateauraynaud 2011). Yet, impact evaluation is not yet covered by these schools of thought and the route will be explored in the near future.

4.2 The Temptation of Social Engineering

Opting for a strategic approach of empowerment should not lead to a mechanistic view of society and to pretending to be capable of organising social evolution. This is a subtle but absolutely fundamental difference: providing a strategic framework for empowerment does not mean assuming one can identify ways to handle social changes but rather cautious questioning to enable thoughtful consideration of which conscious postures have to do with social, institutional and power context.

4.3 Capacity-building, from Knowledge Management to Changing the Balance of Power

The framework described in this paper includes changes in the surrounding actors as a key way of supporting a target group. To this end, the concept of capacity building should include, and often even focus on, actors other than those in the target group (d'Aquino et al., 1999). In this case, figure 2 can be considered as a capacity building framework. Alternatively, this figure can be considered as a knowledge management loop, like in our case, but this would mean including the objective of changes in power in the concept of knowledge management.

4.4 Between Social Change and Knowledge Improvement

The three last peculiar features raise some discussion points. First, making it clear that there is no "right" participatory method or tool questions the appropriateness of focusing on the participatory tool in an empowerment process in the first place, and conversely, highlights the

key role of the facilitator's strategy, practices and behaviour (Kumar & Kapoor, 2003; Mansuri & Rao, 2004; Mansuri & Rao, 2013). Indeed, the debate between different teams over the use of the Rainbow Spiral in the last ten years points to truly opposing views between practitioners and scientists, as most practitioners accept the use of non-essential tools and supports to better elicit facilitation practices and their rationale, while many scientists believe that framing the social context and the facilitation strategy beyond the usual participatory appraisal is beside the point. The debate, which began in the 1990s (Agrawal & Gibson, 1999; Schneider, 1999; Sellamna, 1999) is thus still underway. For many scientists, the objective of participatory methods is not necessarily bringing about a social change, in which case these methods can be thought of as a way to involve target groups in the research process, with no intention of changing the stakeholders or their social position. Actually, the recent development of participatory methods in some highly technological fields like modelling or ICTs strengthens this argument. However, even those who support this position are generally referring to the changes they hope to achieve with their work, whether changes in local knowledge or, on the contrary, changing scientific knowledge by integrating local knowledge (d'Aquino & Bah 2013). The Rainbow Spiral is a procedure that brings the two parties closer, in particular through its knowledge management loop (see figures 2 and 5, above).

4.5 From General Quality Ranking of Participation to Contextualized and Dynamic Qualification

Our structuring principle of focusing on "the most urgent feasible but lasting change" is underpinned by a peculiar understanding of the "quality" of participation. We consider that ranking approaches according to the quality of participation is not realistic, appropriate, or objective. Not realistic because the changes which are expected to occur through participation touch deep subjective values, like valuing local knowledge, or deep power balances, like empowerment objectives, and are consequently too strong to be changed by an external time-limited intervention. These approaches are not appropriate because they are underpinned by the idea of a single way of progressing along a participatory pathway, even though the variety of learning pathways (Sawyer, 2006) as well as institutional trajectories (March & Olsen, 1990; Rosenau, 1992; Putnam, 2002) is widely acknowledged. Lastly, these approaches are not objective because ways of ranking the quality of participation are partly culturally and value dependent (Sellamna, 1999; Keeley & Scoones, 2003; Rao & Walton, 2004; Kilby, 2006; Scoones, 2009; de Vries & Petersen, 2009; Agarwal, 2010). Furthermore, another layer of subjectivity is added when selecting the "right" participation progress in a particular context, given the diversity of participatory challenges in each context. Consequently, only presenting the unpreventable subjective part in a rebuttable argumentation about the chosen participation objective will enable a more objective approach to participation. This is what our Rainbow Spiral framework attempts to do. We believe the appropriate way to overcome the issue of subjectivity is applying a scientific refutability process, based on the detailed and logical justification of the intended implementation. And this is what our Rainbow Spiral framework is designed to enable.

5. Perspectives: a Multi-Level Policy Design with the Same Characteristics

How to go beyond the 'first lasting changes' mentioned above? Ultimately, the challenge of reaching progressive but long lasting changes implies involving the whole social context in the momentum (Shah & Youssef, 2002; Wakeford & Pimbert, 2004; Newig & Fritsch, 2009) which is called institutionalizing participation (Pimbert 2004). To further develop the above approach with this policy perspective in view, only one element needs to be changed: the inclusionary method needs to bring local stakeholders from different parts of the country and the policy decision makers together in the self-design and self-modelling process. Since 2009, an approach has been experimented in Senegal, which combines a multi-scale simulation support and a multi-level inclusionary process for a multi-level policy design of new types of land tenure (d'Aquino & Bah, 20014).

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[i] Land use and land allocation plan.

[ii] The Ross Bethio Rural Council. Ross Bethio was chosen as a test case because of its complex features: it is the largest rural community in Senegal (2000 km²) and it presents the hottest competition for natural resources (deadly conflicts), between irrigated schemes, pastoralism, international nature conservation, demographic growth, etc. (d'Aquino et al,. 2002a).

[iii] National Society for the agricultural development and exploitation of Senegal River valley (SAED).

[iv] National institute for agricultural research (ISRA) and Gaston Berger University of Saint Louis du Sénégal (UGB).

[v] "Plan d'occupation et d'affectation des sols".

[vi] In 1999, the sub-prefect banned the first workshop because he was not invited. The support team left the local council to manage this first challenge by itself by convincing the sub-prefect to support the process.

[vii] In 1999 the newly elected rural council,, had to establish its legitimacy and prove its capacity to the citizens, especially to the traditional chiefs of the villages in its territory. This was done gradually over the last two years of the intervention.

[viii] As the rural council decided to introduce zoning for these workshops, around ten workshops were held.

[ix] The Senegal River valley is located at the northern border of Senegal (closed to Mauritania) and the part of the valley located in Senegal comprises 50 000 km².

[x] Supported by the Policy Technical Advisory Division of IFAD and the Swiss Agency for Development and Cooperation.

[xi] Like prohibiting cultivation in the livestock corridors and around pastoral water points, drawing up a limited agricultural calendar, regulating exchanges of crop residues and manure, etc., between farmers

[xii] Called GIRARDEL (*Groupe Interdisciplinaire de Recherches en Appui à la Régionalisation et au Développement Local*), it brings together geographers, sociologists, economists, environmental, legal and computer academics with the aim of undertaking the applied research required by decentralized development.

[xiii] The "GIRARDEL Wednesdays".

[xiv] The Djoudj National Park of Birds (http://whc.unesco.org/fr/list/25/).

[xv] The Senegalese Institute of Agricultural Research (ISRA).

[xvi] "Emissaire Delta" (2001-2002), the building of a channel for the evacuation of the drainage water from public irrigated schemes.

[xvii] The planned route of the future canal would cut off vital livestock corridors.

[xviii] Rural council of Ronkh, Department of Dagana.

[xix] Fifty for the Ross Bethio rural community.

[xx] A rule which was already included in decentralization texts but was not applied by rural councils.

[xxi] The conflict in Fanaye village, in October 2011 (www.rfi.fr/afrique/20111027-accaparement-terres-projet-biocarburant-fait-deux-morts-vallee-fleuve-senegal).

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