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DEFINING AND IMPLEMENTING THE GREEN AND BLUE INFRASTRUCTURE IN GUADELOUPE: SOME MANAGEMENT ISSUES – CASE STUDY IN GUADELOUPE

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ABSTRACT: This communication aims at discussing the different management theories that could be used in order to define and implement ecological networks in Guadeloupe (FWI), known in France as « green and blue infrastructure » or “trame verte et bleue - TVB”. For several reasons, the adaptive management theory is seen as relevant to analyze the social and political processes to define, implement and manage the TVB. May it be, we demonstrate that it is not sufficient. Small islands question singularly the adaptive governance as they further reveal its limits. Other management theory has to be introduced. To reach this conclusion we will first make a literature review of adaptive management and governance. Then, we will present specificities of social and political characteristics of Guadeloupe through the proximity and illeity theory as through scientific literature and empirical observations. Finally, in the last part, we will propose a complementary management theory that focuses more on strategic aspects of management activities.

Introduction

Ecological networks aim at ensuring links between habitats of natural species by maintaining or creating corridors between “biodiversity tanks” through non-protected areas taking part in the physical connectivity of elements of the landscape (Baudry and Burel, 1999; Vimal, 2010). This connexion is meant to allow habitats and species lifecycles ensuring their capacities to freely evolve (Allag-Dhuisme et al, 2010) which constitutes an essential stake in the perspective of global changes. Global change, and more particularly climate change, will have specific expressions in small islands (Mimura et al., 2007) such as Guadeloupe.

TVB is the french legal translation for the concept of ecological networks. It is one of the most flagship resolution of the Grenelle process that occurred between June and November 2007 (Barthod and Deshayes, 2009). The TVB has a legal basis through the laws Grenelle I (n° 2009-967 of August 2009, 3rd) and Grenelle II (n° 2010-788 of July 2010, 12th) and it is a land management tool for biodiversity (decree n° 2012-1492 of December 2012, 27th). The green part of the TVB can be based on natural units, buffer zones and corridors linking these units. The blue part of the TVB can be composed by rivers, lakes, ponds and grasslands strips along the rivers, lakes and ponds (Barthod and Deshayes, 2009). The notion of ecological infrastructure or network is also promoted by the European Union in its strategy for biodiversity until 2020. The target 2 consists in maintaining and enhancing the ecosystems and their services by the establishment of a green infrastructure and the restoration of at least 15% of degraded

ecosystems (EU, 2011). At the international level, ecological networks have been introduced by the IUCN in his World Conservation Strategy published in 1980. More recently, one of the Aichi Objectives (from the Nagoya conference of the Convention on Biologic Diversity in October 2010) reasserts the need to create representative ecological networks at the Earth scale as it had been proposed during the conference of parties of the CDB in 2004 (Angeon and Caron, 2012). Despite this large political consensus around the notion of ecological infrastructures and networks, the scientific aspect of the concept is more controversial. What is indeed necessary is to think at landscape scales (Debray, 2011) and to imply the integration of ecological perspectives in human activities of economical development which matters in the relations between humans and non-human entities.

The governance system of this tool of public policy commits a chain of actors. The TVB has to be defined and implemented at different scales: national, regional, local and land plot. At national level, some strategic choices have to be defined, national and transboundary challenges have to be identified and a specific part has to be established for overseas department and regions (DROM). A TVB national committee has been created to define and manage those national orientations toward the preservation and the restoration of ecological networks. The committee is composed by five types of stakeholders: the French State, the representatives of local authorities, the socio-economic partners, the labor unions, and the NGOs; what is called "5 stakeholders governance" and has been initiated during the Grenelle process. (Decree n°2012-1492, Angeon and Caron, 2012; Barthod and Deshayes, 2009).

At regional scale, the Scheme for Regional Ecological Coherence (SRCE) takes into account national orientations and is co-constructed by the state and the regional representatives, through a TVB regional committee composed in the "5 stakeholders governance" spirit. The involvement of the different stakeholders becomes a standard for this new conservation and territory management tool and for its better social and political acceptance. The legal acceptance of the SRCE is at least related to a public inquiry. (Decree n°2012-1492, Angeon and Caron, 2012; Barthod and Deshayes, 2009).

At local scale, advice for a functional TVB encompasses various tools notably in the local plan of urbanism (PLU) that has to ensure objectives of ecological continuity, taking into account the SRCE recommendations. Finally, at the land plot scale, the owner or the user of the land should decide and act in a way to respect those advice. (Angeon and Caron, 2012; Barthod and Deshayes, 2009).

The integration of many new stakeholders, through different scales, in the management of the biodiversity by the TVB scheme, which is unclear and based upon non-stabilised scientific knowledge, generates some complexity, uncertainty and potential conflicts. This specific context implies some specific kind of governance and management to a better coordination between stakeholders in order to facilitate the common action and the decision-making. Related to the need of integrate the biodiversity question in the daily decisions of every one, a specific kind of management is needed which enables to learn (individually and collectively) about this topic, new for a large panel of actors. In

other words, TVB process calls for changes at a large scale: not just a single adaptation but a real general transformation of the social and political systems (Pahl-Wostl, 2009). In that extent, adaptive governance seems to be especially convenient.

Is this generic proposition suitable for Guadeloupe? The island of Guadeloupe (16°15'0" N and 61°34'60" W) is located in the Lesser Antilles and is a French department. Guadeloupe is concerned by french law, and so by TVB, while it composes a part of the caribbean natural narrow of avian migratory species between north and south America (Thompson and Byrkjedal, 2001). Within and outside, Guadeloupe has to deal with ecological networks defining and implementing his TVB.

Guadeloupe is very populated; 404.000 inhabitants live on a surface of 1.700 km² with a large part covered by a tropical rain forest (more than 173 km²) (Parc National de la Guadeloupe, 2012). Population is still dense and the growth rate is over 0.4% per year (between 1999 and 2010) (INSEE, 2013). This spatial closeness as well as many family links between people, especially in rural areas, are responsible for a high relational proximity we will discuss later. Economy is characterized (IEDOM, 2012) by a poor productive sector (mainly based on banana exportation – 29 million euros of exportations, sugar and ron industries – more than 18 million euros of exportations and tourism – 68 million euros of turnover in the hotels), a large part of employment is based on services (43.2%) and on public ones (15%) and social transfers are high. Therefore, its apparently developed economy relies on a high consumerism (IEDOM, 2012). We assume that the economy is doped; growth without (or with low) development.

This socio-economic outline drives us to consider the question of the capacity of the guadeloupean society to act as a collective mass (lived or worked by a sum of individuals) or as a common (a group of individuals sharing a common project and leaded by general interests) (Lafaye and Thévenot, 1993). In others words, will Guadeloupe collapse as the pasture of Hardin did (Hardin, 1968) or will Guadeloupe succeed to structure itself to manage and preserve the common resources it offers?

Thanks to those different elements, we are asking the following question: is an adaptive governance/management adequate to encompass this new challenge for biodiversity in protected and non-protected areas in Guadeloupe? First, we will make a literature review about adaptive management/governance. In a second part, thanks to the proximity and illeity theory and some empirical observations we have been able to make in a previous experience (completed by scientific literature), we will discuss about closeness and we will make some hypothesis about its use in the case of Guadeloupe. Finally, in a third part, we will propose a necessary and complementary mode of action, more strategic.

The adaptive governance; managing efficiently biodiversity in an adaptive way?

Our problematic can be summarized as Mermet et al. (2005) did for generic environmental problems. First, the TVB process is a kind of environmental management situation which highly links some social aspects (actors, rules, stakes, knowledge) to

ecological ones (animals, plants and ecosystems). This situation can be seen as a system of action 1. Second, there is the need for human groups to take into account their own responsibility in organizing themselves to face crisis. Then, the research process has to be implicated, the researcher closely linked with the operator.

On those basis, several management theories have been proposed, amongst integrated ones and, among them, the adaptive management (Termeer et al., 2010).

Contributions and limits of adaptive management

Adaptive management can be defined as “a systematic process for improving management policies and practices by learning from the outcomes of management strategies that have already been implemented” (Pahl-Wostl et al., 2007, Termeer et al., 2010). To expand the focus from adaptive management of ecosystems to broader social contexts that enable ecosystem-based management, Dietz et al. used the concept of adaptive governance (Dietz et al., 2003 quoted by Folke et al., 2005). Bygovernance, they mean “creating the conditions for ordered rule and collective action or institutions of social coordination”; governance is the structures and processes by which people in societies make decisions and share power (Folke et al., 2005). Then, would it be sufficient to produce a compilation and an analysis of previous management or governance strategies to implement an adaptive one?

Adaptive governance aims at developing new governance forms that encompass characteristics of systems constituted by social and ecological components whose delineation is artificial and arbitrary. Such social-ecological systems (or socio-ecological systems, SES) emphasize the integrated concept of: System of action : “(...) unnatural construction such as the institution always precarious and problematic of a human structure of the fields of action, a mode of rationality and a mode of social control governing collective action of humans in a given sphere of influence.” (Crozier and Friedberg, 1992, translated by us). Human in nature (Folke et al., 2005); while the TVB calls for the integration of nature in human systems which refers to the notion of “ecologization” of Latour (1995). This change of paradigm does not call for a simple adaptation but implies a real transformation of the social system.

We need to explain the difference between adaptation and transformation. Adaptability is assumed to be the “capacity of the social components in a system to manage ecological resilience”. Human actions can focus on maintaining a system within a desired regime that provides necessary ecosystem goods and services or restoring the system from an undesirable regime into a desired one (Gunderson et al., 2006). Transformability is the “capacity to create a fundamentally new system configuration” (Gunderson et al., 2006). The notion of adaptation is linked to the idea of staying in the same paradigm, in the same context while the transformation one implies to change the context and the paradigm and to meet new combinations. Social adaptation and transformation are both self-organised processes that involve interactions among key actors in the system, knowledge and understanding of the system, and the provision of conditions or opportunities for change (Gunderson et al., 2006).

The SES are characterized by complexity and unpredictability and they assume a world made of abrupt or continued changes having unpredictable consequences (Termeer et al, 2010). In our TVB problematic, we can consider two types of uncertainty. The first one is relative to the social components target. What do we want to preserve? Some biodiversity elements (if yes, which ones)? Some ecological functions? Some evolution or adaptive capacities? Those objectives are not predetermined and could be defined by stakeholders there is a need to identify and to choose in order to compose a collective. Those objectives will evolve in time thanks to changing conditions. The second type of uncertainty relates to the intensity of changes. Will they allow the SES to maintain its structures or will they be impacted? In other word, will those changes ask for simple adaptation or for transformation (Pahl-Wostl, 2009)?

Complexity can be analyzed through the notion of scale. Scales are numerous, next to the classical spatial and temporal scale, Cash et al. (2006) have considered jurisdictional, institutional, networks, management and knowledge ones (Termeer et al., 2010). Interrelations between scales are constantly changing in strength and direction; and those changes found the complexity of such environmental management problems, in particular TVB ones. To deal with this issue, several scales must be taken into account and two types of problems can appear (Termeer et al., 2010).

A cross-level issue is the result of cross-level interactions between multiple levels on a scale. Typically, a cross-level issue on the time scale occurs when short term solutions can aggregate in long term problems. (Termeer et al., 2010). On the institutional scale, a cross-level issue could be solved creating better links between the different levels, nor top-down, nor bottom-up but by a cross-level institution (Berkes, 2006).

A cross scale issue is the result of the existence of multiple relevant scales and the cross-scales interactions between them (Termeer et al., 2010). The most famous is a mismatch between the environmental scale and the social organization scale that generates a disruption of some functions of the SES (Termeer et al., 2010). Dominants responses are towards solutions that remodel the social scale, changing living institutions or creating new ones in order to match with the environmental problem scale (Termeer et al., 2010).

At the end, adaptive governance “takes the challenge of enhancing the capacity to create the right cross-scale and cross-level links at the right time, around the right issues.” (Termeer et al., 2010). The notion of scale is not pre-determined, framing a problem as local, regional, national or international, ofshort term or long term is a political act and raises in a strategic behavior (Delaney et al., 1997, Marston, 2000, Brenner, 2001, Kurtz, 2003, Lebel et al, 2005, Gupta, 2008, quoted by Termeeer et al, 2010). In the same way, the main benefit of an actor is to define by himself the relative scales of the worlds he is implicated in (Latour, 2010). As such, the actor is able to determine if he will (or not) assume a responsibility and reach (or not) a process of decision-making, will it be collaborative, or accession (or not) to resources.

The issue is then to deal with a “scale challenge” for the SES being resilient (Cash et al., 2006). Three common challenges have to be treated. The first one is relative to the ignorance of the importance of the cross-scales and cross-level interactions, especially the dynamics between spatial and temporal scales. The second challenge is a mismatch between scales and levels of scales, for instance between the large scale scientific knowledge and the traditional knowledge. The third challenge is to consider the plurality of solutions. There is not a single, correct or best characterization of the scale and a level challenge that applies to the system as a whole or for all actors (Cash et al., 2006). As such, the outcome has to be a negotiated one, not imposed by a group of actors or matching the preferences of one scale or one level of a scale. To face unpredictability and complexity and to address the three challenges above, several solutions can be implemented.

Solutions to Improve Management Policies and Practices

Management policies and practices can be improved by two types of solutions linked to the structure and process within the social part of the SES.

Some proposals in the forum field

The frame proposed by Cash et al. (2006) is based upon three prescriptions whose combination has to be renewed for each situation. The first prescription is to promote institutional interplay between institutions (understood as a set of rules) of adjacent levels or not at jurisdictional scale (formal or nonformal institutions). Some networks operating at different levels use a range of mechanisms to develop cross-level interactions.

The second prescription aims at improving the understanding of complex environmental problems, characterized by multiple interests. A solution could be to implement a co-management strategy. Co-management is a “continuum of arrangements that rely on various degrees of power-and responsibility-sharing between governments and local communities” (Cash et al., 2006). The notion of governments covers agencies, fields and political factions of communities that represent multiple interests, perspectives and political actors (this precision consolidates the idea that solutions cannot be pre-determined). Within this co-management system, links are created between organisations located at different levels. Those relations provide benefits to the human agents operating those links, through the use of information (Cash et al, 2006). Those human agents are defined as “relay” by Crozier and Friedberg (1992).

The third prescription is to manage boundary functions by boundary or bridging organizations. These functions aim at taking up the knowledge scale challenge. There are differences across levels about the perception of credibility, relevance and legitimacy of knowledge through the different levels of the knowledge scale. There are also differences of perception of scale and levels relevant to solve a particular environmental problem (Termeer et al , 2010 ; Cash et al , 2006). No more than eight principal characteristics to manage boundary functions are listed by the authors (Cash

et al., 2006) and they are all in the field of cooperation, coordination, sharing, trust and consultation. We will focus on three among them.

Key characteristics to manage boundary functions rely, partly, on the co-production of knowledge through boundary objects (maps, reports, forecasts) – also called forms by Latour (Latour, 2010). Such collaborative relations (Hibbert and Huxham, 2005) require time to reach a sufficient understanding of a phenomenon. They are also concentrated on what partners say during collaborative phases, however what they say is different of what they do (Argyris and Schon, 1974, quoted by Jones et al., 2011).

Boundary functions can be managed too by coordination and complementary expertise, through collaborative relations. Collaborative processes allow parties with a different vision of a problem to explore in a constructive way their differences and to search for solutions over their own limited field of possibilities (Gray, 1989 quoted by Nowell, 2009). However, within a collaborative process, the abilities needed for coordination are not the same needed to boot and conduct changes. The TVB process requires a huge change (a transformation) and not only coordination, in order to re-introduce natural considerations in human decisions (will they be individual or collective). While coordination is enough for first-order change (incremental shifts that are consistent with an established framework), other abilities are required for second-order change (change of the infrastructure of the system itself), such as an alignment of philosophies. (Nowell, 2009). Finally, this function of coordination is necessary but not self-sufficient to manage boundary function, by itself necessary but not sufficient to induce change.

Another key function is necessary for those boundary organisations: leadership. It is “important for developing and communicating a vision of ecosystem management for the area that can frame and give direction to the cross-scale or cross-level process.” (Cash et al., 2006). The ability to drive (or to lead) a group is directly linked to the question of resources allocation to the decision. That way, knowledge is a key resource, used by all stakeholders. However, due to unequal wealth repartition, the asymmetric power relations product some undesirable effects. In other words, if the more powerful stakeholders earn more from activities damaging environment, the negotiated solution between those “winners” and less wealthy actors will be biased in favor of the earnings of the more powerful (Boyce, 1994).

Examining several forum-type theoretical prescriptions we can already identify some limits. The main one relies on the fact that those propositions are very legalistic and prescriptive. The participation and the consultation running through those forum-type solutions are like ends in themselves more than means (Blatrix, 2012). They are efficient when they are used as means to reach an end whose direction is given by an agency (see § 1.2.2 bottom).

Some network-type solutions

The whole forum-type solutions proposed above constitutes the structure of a system of action. They are not operational by themselves. They are tools with need to come to life

with the aim of creating the right link at the right time around the right issue (Termeer et al., 2010). To hit this objective, an additional type of prescriptions is proposed, the constitution of a network leadership (Termeer et al., 2010).

Social networks have the potential to get together and transfer rapidly knowledge and then are able to play a part in the spread of social innovations and sustainable changes (Moore et al., 2011). We assume the Moore et al. (2011) definition of social innovation as “any initiatives, products, processes, or programs that change basic routines, resource and authority flows or beliefs of any social system.” The social innovations constitute a way to avoid rigidity trap defined by the repression of continuous innovation. This trap occurred when the structures of legitimacy (rules), of domination (resource and authority allocation), and signification (interpretation and meaning) become more homogeneous and more resistant to change (Moore et al., 2011).

However, the general resilience of a society depends on its ability to generate a steady flow of social innovations. This resilience is built balancing the capacity to learn and adapt in a period of growth and resource accumulation; and the ability to self-organise in a period of release and reorganization (Moore et al., 2011).

The constitution and the implementation of a social network is a way to stimulate and carry on social innovations. But each of the abilities needed for adaptation or for transformation relies on links of different strength. While bridging ties are appreciated in heterogeneous situations when creativity is relevant for innovations, bonding ties are determinant when reorganisation is the objective because people are more willing to share the risk of innovation (Moore et al., 2011).

The question is now to determine the direction of change, adaptation and/or transformation; the single existence of social capital is not sufficient. This question is answered through a notion that permits to form a targeted flow and so creates an interaction that might otherwise not have occurred (Moore et al., 2011). This notion is called agency and is a “temporally embedded process of social engagement, informed by the past (in its habitual aspects), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualize past habits and future projects within the contingencies of the moment).” (Emirbayer and Mische, 1998, quoted by Moore et al., 2011).

The agency has to be created and this is the job of the institutional entrepreneur. The institutional entrepreneur is an actor or a group of actors who seeks to change “particular institutional arrangements and who leverage resources to create new institutions or transform existing ones.” (Maguire S., Philipps N., Hardy C., 2001, quoted by Moore et al., 2011). Institutional entrepreneurs present specific skills we will summarize by this quotation : “They connect, span boundaries, mobilise resources of knowledge, power and resources, recognize and generate patterns, revitalize energy and keep alive a strategic focus” (Moore et al., 2011). To form an effective network, the entrepreneur focuses on “their missions not on organisation; on trust not control; and on being a node, not a hub” (Wei-Skillern and Marciano, 2008 quoted by Moore et al., 2011).

So, the institutional entrepreneur acts within a series of interactions between actors that focus on having an effect on problem formulations, solutions, and procedures regarding an approach to a specific policy issue. He is in the heart of a policy game (van Bueren et al., 2003). This game can be analysed by distinguishing a number of rounds characterised by impasses or breakthroughs (van Bueren et al., 2003). In that game, a crucial decision is a decision that offers an answer to a problem that caused an impasse and that determines (partly) the conditions for the next round (van Bueren et al., 2003). We could explain a policy game through the mean by which the parties reduce the uncertainties through their interactions and on the factors that contribute or not to this. Van Bueren et al. (2003) distinguish four series of factors: social, cognitive, institutional or related to the existence or absence of network management.

Then, we have demonstrated that a network approach is relevant but not sufficient. We have pointed out the importance of knowledge by the need of boundary organisations to take up the knowledge scale challenge and as one of the finalities of the social networks. We have described knowledge as a need to reach a certain level of certainty and as a mean to create, to re-organise and to generate some social innovations.

Ways to better learning practices

Defining and implementing a TVB in Guadeloupe calls for a huge change on the way to consider relations between humans and relations between humans and natural elements of the whole insular SES. This social innovation could be effective thanks to forum-types and network-types tools but huge knowledge would be helpful too, if no, necessary. Indeed, we have to recall the absolute necessity of transfers of knowledge and innovations between disciplines, of action beyond the boundaries of those disciplines and beyond the scales that characterize the actual social systems. In the same time, to change the relationships between humans and non-humans part of the system constitutes a new political paradigm that requires to “mill a new political life” (Latour, 1995).

To improve knowledge, and more broadly resilience of the SES, learning is a key ingredient (Pahl- Wostl, 2009; Gunderson et al., 2006). At this point, we must recall that learning is fundamental to implement adaptive governance (Pahl-Wostl et al., 2007, Termeer et al., 2010). So learning is a crucial aspect of our project. Learning can be defined as “a process of proposing conceptual models, then testing those models through empirical observation” (Gunderson et al., 2006). In other words learning is “an explanatory, stepwise search process where actors experiment with innovation until they meet constraints and new boundaries.”³ (Pahl-Wostl, 2009).

Collaborative learning processes

By the above definitions of the learning processes we can consider actors as stakeholders in a situation in which they come together to act or decide upon issues of mutual interest, so they are in a collaborative process (Everett and Jamal, 2004, quoted

by Hibbert and Huxham, 2005). Such collaborative learning processes occurs in a four steps way (Hibbert and Huxham, 2005) from which should arisen an interorganisational network able to deal with problems. First, at the start of the collaboration, stakeholders while working about what is trust can give to each other. Regarding to the question of the contributions, each one can produce. Second step is the commitment to the collaboration. Indeed the actor will try to answer two questions; what outcome is expected by our presence/what do they expect from me? and who are these people? The third step is the beginning of collaborative process in itself with the need of transferable learning processes. The fourth step is the development of the relation; the following key questions are expecting answers: who are really those people? And what kind of dialogue to implement to solve the problem and to make collaboration working ?

Along those four steps, Hibbert and Huxham (2005) identify three types of learning that can be summarized as “learning in and about collaboration”. They distinguish the substantive learning in collaboration. It has a flow dimension, collaboration is perceived as a vehicle for learning, the purpose could be the knowledge creation. Knowledge transferred is typically a technical one.

Those interactive and stepwise aspects of learning and solving problems can recall the sequences of the policy games (van Bueren et al., 2003). Folke (2005) allows us to interpret this fact: adaptive management is a mean to implement adaptive governance. So, the identification of problems and of the conceivable solutions (management activities) occurs with the type of stepwise structure than the settlement of those problems choosing an option amongst several conceivable ones (governance activity, political field), could be the knowledge transfer or the knowledge creation. Knowledge transferred is typically a technical one.

Another type of learning is the transferable collaborative process one aiming at enhancing understanding of the nature of collaboration and/or developing prescriptive approaches to guide managerial action (Hibbert and Huxham, 2005). The stakeholders focus on success factors, phases on a collaborative cycle, skills, tools, check list of actions etc ... It is expected from this learning to be transferable to other circumstances. Learning here focus on the process.

Then, an ultimate dimension of learning has to be considered, the local collaborative process, on which the particular collaborative context takes place. It is designed by specific circumstances to the local situation (its questions, its partners, its processes). It adapts transferable collaborative processes to the local situation. It is concerned with the process by which people take into account the idiosyncrasies of the particular situation and modify whatever general understanding they may have to fit the individual circumstances (Hibbert and Huxham, 2005). The local collaborative process has an evident strategic dimension.

Various loops of learning for diverse intensity of changes

According to Pahl-Wostl (2009), most environmental problems are not primarily linked to

resource but must be attributed to governance failures. The governance regimes co-evolved with technologies and other artefacts. This close interdependence is important to guarantee a functioning regime and convergence of the actors' expectation. At the same time, this interdependence can prevent changes and generates situations in which established and dominant technologies go on (lock-in situation). This kind of situation can be reinforced by a certain internal logic that excludes non-compatible approaches. Then the SES becomes rigid. Changing those governance regimes constitutes a social and societal learning process. The distinction between social and societal shows the significance of learning respectively in multi-actor settings and of structural change in the governance regime as a whole.

Based on a collaborative process, learning may have different levels of intensity and scope generating adaptation or transformation (Pahl-Wostl, 2009). So, the learning process is conceptualised by a tripleloop of retroaction. Each retroaction loop impacts the system at different level, generating different intensities of change. The Pahl-Wostl (2009) framework describes the causality chain as following: a context influences some frames that command some actions with several outcomes. Such a chain could be retroacted at different levels through different feedback-loops learning.

The single-loop learning provides an incremental improvement of established routines, without questioning the truth and guiding assumptions. Incremental changes aim at improving the achievement of goals. This phase could include a first improvement of the capacity to make or to implement collective decisions (Pahl-Wostl, 2009).

The double-loop learning enables to question the guiding assumptions by reframing within the same structural constraints. Actors have a reflection on goals and problem framing (new aspects, change boundaries of system analysis) and on how goals can be achieved. Social learning processes are essential. The double-loop can lead to changes in the network of actors that characterizes the resource regime governance. The implementation of innovative approaches might be hindered by structural constraints of the context stabilizing the dominant frame (Pahl-Wostl, 2009).

The triple-loop learning refers to transitions of the whole regime and of its structure. Implementing a triple-loop learning calls for questioning the underlying values and beliefs and the paradigm or vision of the world if the actual one is no longer bearable. The structural change will lead to a transition of the networks of actors by the coming of new groups of actors to changes in the structure of power and in the boundaries of the regime and at the end to the introduction of new regulatory frameworks (Pahl-Wostl, 2009).

“This conceptualization addresses thus the importance of power to impose certain values and norms” (Pahl-Wostl, 2009). Social learning will have to deal with this reality. Social learning is a stepwise process between single, double and triple-loop learning to manage different intensities of changes (adaptation to transformation).

For an efficient (with environmental perspective) governance regime of the TVBs in

Guadeloupe, we can assume that the aim would be to pursue the same objective of “ecologizing” (Latour, 1995) the practices. As such non-humans elements are considered as means and ends that change the relationships between humans and non-humans elements, and change the dominant relational mode from intense production to a more protective one (Descola, 2011). With that in mind, it is necessary to make some new actors or new actors networks coming in the policy game. Related to biodiversity, it should be some associations of environmental protection. They exist in Guadeloupe, but we were said that their presence in some collaborative processes blocks those processes (personal communications).

The process of change is described in literature related to adaptive governance and we will consider it very useful to analyze and to understand such on-going processes even if we must have in mind that reality is more complex and less mechanical than in those descriptions.

Analyzing Change Processes

A Mechanical Analysis ...

Olsson et al. (2006) note that the governance regimes able to match the inherent complexity of SESs and to deal with uncertainty and change require substantial changes in the way humans currently relate to and govern those systems. They analyze transformation of a socioecological system through four steps.

The first step relates to prepare change thanks to building knowledge, the emergence of leadership and the constitution of networks. We assume those phenomenon are linked and they reinforce each other. Building knowledge is made upon the description and steady state of the SES and the identification of the different stakeholders and trust that can be given to them at this time of the collective action (substantial and local collaborative learnings of Hibbert and Huxham, 2005). At the same time, the leadership emerges (Gunderson et al., 2006; Olsson et al., 2006) and aims at generating knowledge and supplying social memory, a long term vision of the SES and finally developing a strategy to reach the desired SES state (Pahl-Wostl, 2009). In other words, leadership aims at implementing an agency (Moore et al., 2011).

Building networks is a key factor to prepare change. Formal networks are well established and it is difficult for them to mobilize resources to experiment or develop new visions because they are too much concentrate on bargaining. They only enable to stay on a single-loop learning. In those formal networks, actors have to represent their standardised position preventing them from innovative talks and openness (Pahl-Wostl, 2009). Information is running top-down. In a complementary way, some informal networks (or shadow networks or adaptive networks) are built and they are crucial in such learning processes. They allow innovative and open discourses, to experiment and develop new visions while each actor can learn from the other without gates. The earliest they appear, the most efficient change preparation will be (Pahl-Wostl, 2009). The information runs in a bottom-up way. Shadow networks are self-organising groups

of policy makers that present two characteristics (Nooteboom, 2006 quoted by Pahl-Wostl, 2009): a) they are influential and they know the power networks and b) they try to escape from on-going policies developing a common understanding of more efficient new policies. To form a shadow network, and for it to initiate a learning process, actors have to meet regularly in an informal way and focus on a specific issue to deal a specific problem. Actors have to self-qualify as a community of practices that have an identity, a history and a shared knowledge corpus (Pahl-Wostl, 2009). Formal and informal networks have to live together in a complementary way. A crucial link between informal and formal networks has to be established in order to create new ideas and visions initiated by informal networks passing to formal ones and then in formal public policies.

Such a relevant issue for the implementation of adaptive governance, the constitution of networks asks for enhancing the understanding of nature and intensity of links within a network. This issue will be treated in § 2 but we can already precise that there are three kind of links : bonding tie, bridging ties and linking ties (Angeon, 2008).

In a second step, after having been prepared and matured, change has to insert and exploit a window of opportunity in order to influence in a formal way the public policies (Olsson et al , 2006). Others authors talk about political windows (Folke et al , 2005) that can be a problem-driven window (to search for a political solution to settle the problem) or a political-driven window (to search for a problem to explain the conduct of change and the propositions) (Folke et al., 2005). A window of opportunity exists when a) a problem is recognized, b) a solution is available, c) politically, time has come to change and d) constraints do not prevent action (Olsson et al., 2006). The designation of a problem and the identification of a solution are relative to each stakeholder. The understandings of this problem and of adequate solutions evolve with a different intensity from an actor to another. To identify the multiple possible combinations, we propose to use the frame produced by Cattan and Mermet (1992).

The policy entrepreneur plays a key role in the identification of favorable windows of opportunity. He can work in partnership with the leaders during the preparation step (Olsson et al , 2006). The necessity of links between formal and informal networks is then more obvious. The window of opportunity is the time in which innovations and experiments from the shadow networks pass to a formal and established frame to be translated into public policies. At this time of the change process, two screenplays can be considered. In a first option, change relates to a single adaptation of the routines - actual system structure is preserved - and so, only single-loop learning is taking place. In a second option, change is transformative and the double- and triple-loop learning are combined and the whole structure of the system is modified.

If that second screenplay occurs, the SES reaches the third step of change, i.e driving the transition. From adaptation to transformation, the SES needs to reach and pass over a tipping point (Olsson et al., 2006; Folke et al., 2005) which is determined by a special key actor, the tipping-point leader who works together with the policy entrepreneur to manage the window of opportunity.

The transition phase by itself has not been theorized, it “is not well understood because it is so unpredictable and turbulent. The transition to adaptive governance can only be navigated, not planned” (Olsson et al., 2006). On the other hand, to steer in such turbulent times several functions have to be implemented. We adopt these ones: mobilisation and translation of knowledge, to redirect outside forces into opportunities, to serve as catalysts and facilitators between different levels of governance, to bring in resources, knowledge and other incentives. They are all supported by midlevel entities known as bridging organisations (Olsson et al., 2006).

Fourth step is to build the resilience of the new system and we assume that we will not deal with it here. The dynamic and the processes of change (whatever their intensity, adaptation or transformation) are closely linked with individual capacities and to collective capacities.

Is this mechanical approach efficient with each human groups? An historical analysis showed that, related to change, the objective has been to modify individual practices rather than those of groups or communities (Pretty and Ward, 2001). Within human groups, or groups of actors, cognitive, relational and organisational investments mentioned above are thinkable under particular conditions.

Depending on Maturity of the Human Groups

Shadow networks and bridging organisations constitute social capital between state and society (Olsson et al., 2006). Capacity of human groups to drive transformative change depends on the maturity of the social capital.

Social capital is defined as “the structure of relations between actors and among actors that encourage productive activities.” (Coleman, 1988 quoted by Pretty and Ward, 2001). This definition contains the notions of social bonds and social norms. Social capital develops in local institutions that allow members to “carry on our daily lives with a minimum of repetition and costly negotiation.” (Bromley, 1993 quoted by Pretty and Ward, 2001).

Pretty and Ward (2001) quotes the components of social capital: relations of trust; reciprocity and exchange; common rules, norms and sanctions; connectedness of networks and groups. They propose a typology to describe the evolution of social capital within human groups through themes like worldviews and sense-making; internal norms and trust; external links and networks technologies and improvements; group life span. Related to these components, they product a three stages typology.

First stage is qualified of “reactive-dependence” because a group is created to reach a desired objective in reaction to a crisis or a threat or in response to the invitation of an external agency. At this stage, individual in groups tend to look back. The group may have its own values but generally, norms and rules are imposed from outside. Individuals are looking for solutions outside of the group and are depending on external

facilitators. There is a real fear of change and individuals want to go back to previous situation. Related to the development of technologies, the environmental aspects focuses on eco-efficiency by reducing cost and damage. In farming for instance, this will drive to the reduction of doses of pesticides.

The second stage is qualified of “realization-independence”; the groups carries out emergence of new capabilities and realise their growing independence. Individuals and groups tend to look inward focusing on their own resources, giving sense to their new reality. Members are more willing to give time to the group while trust rises. At this stage, groups are initiating the production of their own rules and norms. They start looking outside developing horizontal links. They realize that information flows can go upward and not only downward. Individuals are more and more willing to experiment and share the results due to the capabilities they have to develop new solutions to face problems.

Groups begin to develop their own characteristics, they are stronger and more resilient but still sensible to dissolution if their members feel initial objectives are reached. In agriculture, groups start incorporating regenerative technologies to make best use of natural capital.

The third and ultimate stage is called “awareness-interdependence”. The group is able to solve problems, individuals have new world views and ways of thinking that are not reversible. Groups built their own realities looking forward. Individual critical reflexive capabilities (how we came here?) combined with abstract conceptualization (how would we like things to be?) means that groups are waiting for change and are dynamics. Individuals are more and more conscious of the values of the group. They have abilities to promote new technologies to other groups and initiate new groups themselves. They want to be well linked to external agencies and are so strong and resilient they can resist to fears and external powers. Those groups are willing to join key organisations, federations and platforms to reach superior level objectives. In agriculture, systems are re-designed on the basis of ecological principles and do not adopt new technologies to fit the old system. In some words, we could say it is the end of the on-going artefacts.

According to the different components the dedicated literature to adaptive governance prescribes, each territory, or each community, can be able to solve an environmental problem which implies some social aspects.

Some Limits of Adaptive Management/Governance and Learning Theories

Through adaptive governance and management, the aim is to access new norms and values. So, the link with the notion of power is strong (Pahl-Wostl, 2009). The transformations resulting from these approaches imply a change of paradigm and finally a change of underlying norms and values. Structural change will lead to a transition during which new networks of actors and new groups of actors will integrate the game, boundaries and structures of power will be changed too and new general frames of regulations will be introduced.

Through this literature review, we noticed that strategic dimensions of actors or groups of actors are pervasive but rarely (or exceptionally) dealt. The strategic aspects are identified by some authors (Pahl-Wostl, 2009; Armitage et al., 2008) and the strategic prescriptions are not very visible in the dedicated literature.

This invites us to consider the strategic dimension of learning and collaborative processes, dimension rarely explicated (Armitage et al., 2008) but that we have started to point out in § 1.1. However, learning and knowledge are subject to asymmetry (in the way as power) between elites and fringes of the population (sometimes marginalized) that should participate (Berkes, 2009). Involved elites and authorities are able to influence a collaborative learning or an adaptive governance processes to discredit a problem; “it is harder to bring about an opinion shift if credible authorities are downplaying the problem or if it has to compete for attention with other problems at the same time” (Olsson et al., 2006).

Finally, in a more general view, adaptive management and governance, that have in itself a positive connotation relative to good governance and that reflects an absolute ethical tendency, is not necessary ethical by essence (Fennell et al., 2008). Adaptive management and collaborative learning processes could be mobilized to serve other political agendas (Olsson et al., 2006) ; they could be managed to serve other finalities than good governance.

To sum up adaptive governance and management are based on three pillars; enhancing the information flow cross-scales and cross-levels (forum-type prescriptions), improving social innovation for transformative processes (network-type prescriptions) and promoting learning (social capital approaches). This calls for two remarks. First, from this point a view, proximity could be seen as the lethal weapon to implement adaptive governance through those pillars. But does proximity ensure concrete results on biodiversity conservation? In other words, if proximity is able to guarantee the implementation of a system of management based on the adaptive management principles, is it able to ensure a priori concrete results on biodiversity conservation and the effectiveness of its adaptive management? Second, and referring to Mermet’s frame of interrelations (2009), adaptive governance assumes social relations characterised by cooperation, collaboration and coordination, and possibly negotiation. However, solutions and prescriptions to assume conflicting social relations are rare or weakly developed.

Islands: Some Idyllic Worlds? Downside of Proximity and Illeity

In an island such as Guadeloupe, are we sheltered from conflicts? Does the relational and geographical proximities ensure us only of a collaborative social environment? We will answer these questions by calling up the theory of proximity. Before going further, we can make some assumptions. Indeed, referring to Bierschenk and Olivier de Sardan (1997), a village is not a “community united by a tradition, cemented by consensus, organized by a widely-shared world view and controlled by a common culture”. They

understand it as “an arena, permeated by conflicts in which strategic groups confront each other” (Bierschenk and Olivier de Sardan, 1997). Others authors go the same way, “whatever geographical space inhabited by human society confronted to technical production acts (in this case agricultural production processes), some tensions between actors occur in rural spaces.” (Caron and Torre, 2005). How will it go in a big village of 1500 km² inhabited by more than 400 000 inhabitants such as Guadeloupe?

Empirical Observations from Previous Experience

This previous experience has been driven in Guadeloupe between 1995 and 2003. We used to work as a research analyst then development officer for defining and implementating the sustainable development plan of the peripheral area of the Guadeloupe National Park. The aim of the mission was to produce knowledge about the territory in a collaborative way and to propose some cooperative political arenas to move, in a coordinated way, towards a sustainable integrated development of a depressed area called the Leeward Coast.

During this experience, we implemented alternatively or simultaneously the three forum-type prescriptions. The Guadeloupe National Park (PNG) was a boundary organisation with four clear objectives defined in its “Management Guiding Scheme” or SDA (Parc National de la Guadeloupe, 1997). There, we have initiated and took part to a Grouped Operation for Improvement of Land (OGAF) which was joining in a collaborative process, the representatives of the French state, the representatives of the regional council, the representatives of the general council, elected representatives and technicians from the communes implied, the Chamber of Agriculture, the National Center for the Development of Farm Structures, the representatives of the farmers through several associations, unions, groups and cooperatives, the Society for Improvement of Land and Rural Development (SAFER). All those stakeholders agreed on a co-constructed project (Trival-Faulech, 2001) that was implemented by an officer specially dedicated to this project. Doing so, the OGAF aims at improving the institutional interplay among all those collective stakeholders.

Within the bridging organisation Guadeloupe National Park, we have run simultaneously the definition of the Sustainable Development Plan (PDD) of the Leeward Coast. This huge work constituted a co-management arena. Through various issues (agriculture, heritage, tourism, landscapes, public utilities, handicraft etc.) the aim was to study, to co-produce knowledge by melting scientific and local ones and to define some guidelines for the sustainable development of the Leeward Coast territory at different spatial scale levels (from the village called “section” in Guadeloupe, to the whole Leeward Coast territory - 4 communes). We started the process from the section level to upper levels until the territory one. At section level, we co-constituted, with authorities of the concerned town (melting some elected representative of the political majority with ones of the political minority), some Section Inquiry Committees (CES). This task at section level was co-driven with the members of the CES and PNG officers and approved at the end of a set of three sessions by the CES. When each CES approved their respective “Sustainable Development Section Plan” we aggregated all of them at

the commune level, melting this aggregation with the projects of the commune we have been informed by both some skilled workers and elected representatives. This synthesis at the “commune” level was validated by the town council (voting a communal deliberation which constitutes in French public law a binding tool) and gave some guidelines for its sustainable land improvement and development. At upper level, the territory one, we expected to aggregate all the “Sustainable Development Plans” at “commune” level, to melt this aggregation with some territory level projects to propose an integrated and sustainable development plan of the Leeward Coast. At the territory level, the whole project was oriented and validated by an “Orientation and Validation Committee” (COV). That way, we melted representatives of governments (national, regional and departmental ones), local authorities with local communities with a clear objective.

Considering the objective of proposing a general sustainable development plan for the Leeward Coast, we can analyze this previous experience as a social innovation that consisted in “ecologizing” (Latour, 1995) some productive and land management practices in a specific territory. This social innovation constituted a loud and clear agency. To reach this objective, we got together many social networks. We can try to quantify them. Through the OGAF and the PDD, there was something like fifty (individual as collective) actors involved in a formal way in those projects. Specifically to the PDD project, and due to its particular participatory methodology, more than two hundred inhabitants were involved constituting an important informal network on a territory of 194 km². Inside those different networks of actors, a lot of institutional entrepreneur were present.

Nevertheless, after about five years working that way, this political game drove to a sudden and abrupt deadlock. May it be due to a lack of knowledge before action?

By implementing some forum-types and social networks types prescriptions, we generated important knowledge about the Leeward Coast, we identified lots of local resources to value in order to fund an “integrated” development and we created numerous ways to organise new kind of governance at different levels of the legislative scale (Cash et al., 2006). So, we produced a lot of certainty but without “milling” new political life. The SES stayed rigid thanks to dominant technologies and artefacts that maintained the governance regime, preventing desirable social innovation (which needed to consider in a new way the relations between human and non-human elements of the SES, to consider nonhumanelements as means but as ends too). But, change of governance regime needed to reach this social innovation is very intense and relies on the notion of transformation rather than a simple adaptation (Gunderson et al., 2006). We can make an hypothesis. If the previous experience ended up in an deadlock, being a simple adaptation of the governance regime in place, was it because it stumbles across structural constraints that maintained the dominant frame? Using Pahl-Wostl (2009) terminology, we stayed in the second loop learning while the desirable social innovation was calling for a triple-loop learning, considering non-humans elements as means and ends as questioning the underlying values and believes.

As we have described it, but now regarding the theoretical process of change, the preparation/training phase had been filled in: the Guadeloupe National Park drove a leadership, we had generated knowledge in a collaborative way, we integrated and built adaptive networks as formal networks and those networks were linked each other in particular through the CES that contained most townnotables of each section of each commune. That process had been proposed to the elected representatives of the communes of the Leeward Coast to face a problem that stood out : the global functioning endowment (DGF) of the French state to its more than 36.000 “communes” was running to stagnation while the intermunicipal DGF was raising in order to favor the grouping of “communes”.

That way we were supposed to exploit a problem-driven window. At the end, the whole project should be paid by this intermunicipal DGF. So, according to Folke et al. (2005), the problem was identified, a solution was available (PNG proposed it, the solution had been agreed by the elective representatives of each communes by a formal and legal binding deliberation), politically the time had come to change (several political entrepreneurs identified the moment as relevant) but the last condition had not been fulfilled. We are able to note that there were still constraints to prevent action. Here is how we only generated a single temporary adaptation in the margin of the established routines; empirical observations that we can prove ten years after. Indeed, those established routines remained in their previous stability realm: land management and economical development are still implemented upon the same paradigm.

Referring to Pretty and Ward (2001), we propose to describe the maturity of groups we worked with and we were involved in between stage 1 and 2. Given the fact that before implementing the PDD we had worked for nine years in the Leeward Coast with some peasants, craftsmen, local tourist service providers and so on, helping them to formulate and finance projects, given the fact that we have worked with all formal and informal networks and all institutional actors for five years within the PDD, how many years to reach the third maturity stage of Pretty and Ward (2001)? They suggest that there is an important relationship between maturity of social capital and the willingness of the groups to implement a transformative change. Finally, they are questioning as we do: are groups endowed with social capital more likely to proceed to change and transformation, or are they able to become stopped because social capital is a form of embedness that prevents change?

At this stage, we are able to formulate two hypothesizes to explain this previous deadlock. Islands are territories defined by strong proximity, so the first one is that the links we have developed during this previous experience were not of “good” quality and/or of too low intensity. Or, second hypothesis (compatible with the first one), Friedberg (1992) should say we were working in a “field of action” and we left out and we did not tackle the asymmetry notion. According to this author, the interdependence is never nor symmetric nor in balance. The cooperation between actors is underpinned by dependence and power relationships. This hypothesis is coherent with some limits of the adaptive governance we had found in the dedicated literature and already

presented.

Through the previous experience in Guadeloupe National Park, which objective was to define and implement a territorial sustainable development plan (in other words to “ecologize” – Latour 1995 -the practices of land management and economic development) of the Leeward Coast of Guadeloupe we pointed out that: we had all the structural elements of an adaptive governance; we produced important knowledge, through collaborative learning within mature groups, needed; the desirable social innovation met a window of opportunity. And, at the end, we came into a deadlock. The understanding of the causes of this balance is at stake if we have in mind the task we have to study now in the same human context: the definition and the implementation of the TVBs in the agricultural Field of action: « interdependent actors, individual or collective ones, natural or institutional ones, that are in competition the ones with the others for the definition of the ‘problems’ to the solution of whom they have (they may) contribute as well as to the elaboration of the ‘solutions’ to settle those problems» (Friedberg, 1992) and rural areas of Guadeloupe. This objective requires to “ecologize” (Latour, 1995) the agricultural practices and plot management as the practices of others economical agents in those areas. In a more generic way, what is the human context in Guadeloupe?

The French West Indies, a More Generic Perspective – Guadeloupe Case

Guadeloupe Environmental Stakes

Guadeloupe is an archipelago from the insular Caribbean hotspot of biodiversity, one of the 34 worldwide hotspots (CCEE, 2011). Within the worldwide hotspots, the one of the insular Caribbean is one of the 4 most sensible (ONF, 2013). The insular Caribbean hotspot is constituted by 3 sets of islands between North and South Americas: the Bahamas, the Greater Antilles and the Lesser Antilles. Within the Lesser Antilles, the biggest islands (within which Guadeloupe) are the most precious (ONF, 2013).

As an archipelago, Guadeloupe is constituted by 6 inhabited islands : Terre de Haut, Terre de Bas, La Désirade, Marie Galante ; and the two major ones, Grande Terre and Basse Terre. For further convenience, we will speak about the “island” of Guadeloupe. There, the rate of endemic species is important in a tropical island of no more than 1700 km² . The Guadeloupe national park planning tool takes a census of 29 endemic species in different ecosystems (Parc National de la Guadeloupe, 2012). Some of those species constitute some relevant indicators of the quality of the environment (AEVA, 2010; Villard, 1999). Some others of those species are endangered in Guadeloupe and all over the world by human activities. For most of the people, this biological wealth is unknown and its preservation is seen nor as a priority for the species by themselves nor as a way to safeguard the environment services they point out nor at the end as an interesting capital to face global changes.

By the way, the quality of the environment and of the culture of Guadeloupe has been recognized since many years. The Guadeloupe national park has been created in 1989

and it had been enlarged in 2009 (decree n°2009-614, June 2009, 3rd) behind the new law relative to French national parks (law n°2006-436, April 2006, 14th, called law Giran). In November 1992, a large part of Guadeloupe has been designed as a biosphere reserve by UNESCO, the second in the Lesser Antilles after the American Virgin Islands one (Parc National de la Guadeloupe, 2012). Due to those environmental institutions and their culture of cooperation and consultation as ways of action, would we have been able to point out several relevant results in the management of the biodiversity, its conservation and its sustainable use, outside the central zone of the national park if these modes of action were really sufficient?

A Very Deep Naturalism Cosmology

The way people look at nature and make differences between social aspects and natural aspects of the world (their “cosmology”) is very deeply naturalist (Descola, 2011), so only human kind can give a value to the other entities (animals, vegetables, minerals). According to that cosmology, all living entities are made of and function on the same materials and life universal laws but they have a distinctive interiority (only humans have a spirit, a consciousness and a soul). As Descola says (2011), humans and others living entities have the same physicality but a different interiority. In other words, only humans are able to be moral subjects, not animals, nor vegetables. According to this cosmology, humans cannot have social links with other living entities (Descola, 2011). It is a dominant fact in our occidental societies but some of them develop more integrative approach towards other non-human entities.

We assume that people in Guadeloupe is deeply naturalist from our own previous experience as trainer in a center of vocational training in agriculture. In that center, we used to evaluate the initial level of the trainees by some tests on several subjects. The specific one for life and earth sciences contained that question “are human people animals?” More than 80% of the answers from the farm workers, skill workers and foremen were “no” and when we were discussing that point showing human people are not nor minerals, nor vegetables and so are inevitably animals, some violent reactions (in words and acts) used to occur. In the same way, we were recently talking about TVB subject with an executive manager of an agricultural and rural institution. Our presentation focused on the way TVB process could help maintaining the population of an endemic species of bird. Our speaker was very surprised that in those times of financial and general crisis our job was to deal with that kind of question, without making some logic links between this species, the quality of the environment serving the agricultural production in particular and quality of life in a more general way.

A cosmology is also characterized by a “mode of relation” which is defined by as a “disposition giving a form and a content to the practical link between I and some others” (Descola, 2011). The author describes different types of relations and proposes dominant relation types and those impossible or marginal within each cosmology. For the “naturalism” cosmology, the dominant types of relation are the production, the transmission and the protection ones. They are all one-to-one in a unique direction between hierarchic terms. Descola (2011) says that production is the determinant

element of the material conditions of social life, as the main way for humans to transform nature, doing so, to transform themselves. Through production, humans prove their capacity to behave as agents that force a form and a specific finality to a raw material independent of them. In other words, in naturalism cosmology, the production of objects influences the relations between subjects (humans). Transmission enables to death subjects to get a grip on the living ones. Things pass from one generation to the following one in that unique direction. Following Descola (2011), protection implies a control on biological functions by the mean of which the living entities distinguish themselves, the protected ones losing their independence. The protection link toward non-human entities becomes dominant when a set of plants and animals is conceived both as dependent to humans for its reproduction, its food supply and its survival and as so closely linked to them becoming an authentic and accepted component of the collective. Under what we have exposed in the paragraph above, we are able to make the assumption that guadeloupean society, as others occidental ones, are naturalist with a dominant mode of relation towards production and transmission. Some non-humans entities are accepted in the margin of the collective as “socialized segment of nature” (Descola, 2011). We have in mind pets, animals and plants of farms. But not savage species. And mainly, each non-human entity (pets, domesticated farm ones or savage ones) does not include the collective. So the second condition to speak about protective mode of relation is never (rarely) satisfied, it would call for a kind of consideration we could summarize as “non-humans as means and ends”.

In a general perspective, at individual scale, the probability of an integration of biodiversity elements (non-human entities) in decision making processes is not obvious in Guadeloupe. However, we still know some actors, individuals or collective ones able to carry the voice and represent non-human living entities interests be they very minority.

A Strong Family and Relational Proximity

Guadeloupe, as a French oversea territory that was producing sugar and other agricultural goods for his mother country, had known slavery. At this time, some important farms (called Habitations) were structuring the spatial planning. Those “habitations” used to live in a certain autonomy. People born, lived and died in the habitation that owns them. Indeed, in an habitation, most of workers were family. At the end of the slavery time (1848), the system collapsed but ancient slaves, when they ran out of the habitation, did not go far from it and nowadays geographical structure of rural territories is based upon this principle. The subdivisions of rural “communes” we call “sections” are more or less the heritage of the habitations. Till today, people living in the sections are relatives, more or less in a direct way. It is true in such an extent that we are often able to identify where a person (or his father) is from knowing only his last name 5. We could say that last names are geo-referenced.

The section is composed by some representative families and each individual is able to draw the web designed by the family links between each others. The politics of the “commune” fight over those representative families to get the more vote possible from

them and, frequently, politics know that such family historically votes for such candidate. To design a well-balanced municipal council, the mayor chooses some councilors from each section in a balanced quantity ; and so, relatives from representative families are chosen, all the more since they have studied and they graduated. Such people become local public figure acting in the governance of the “commune”.

An Exacerbated Political and Administrative System

To characterise the local political and administrative system in the French West Indies, in Guadeloupe in particular, we will describe it in France in general. To achieve this goal, we will focus on the description of the « crossed-regulation” from Crozier and Friedberg (1992).

Those authors assume on a territory between bureaucrats and public figures, the development of a bond based upon a shared common experience, some complementary interests and identical norms. This bond is known to be unailing and they describe the system that enables this crossed-regulation.

Before action, bureaucrats and public figures need to achieve a compromise which constitutes a decision. This compromise is indirectly negotiated between stakeholders. This compromise is found thanks to a coordinator whose activity and legitimacy are of another kind than those of the parties he coordinates or integrates. For instance, in a “commune”, the only coordinator/integrator is the mayor because he defines the general interest starting from several categories of interests in the commune. The mayor is a center of strong power in the “commune” but when he needs to act effectively, he depends on “good” technical forms and “good” budgets that, solely, local civil servant from the State administration can produce and deliver.

Those local civil servant from the State administration defend different sectorial interests that are integrated and coordinated by public figures from the General council (representing a division of local government called department). The same way, those departmental public actors are depending on the Prefect (local representative of the state interests) who depends on the political actor at national level (member of parliament) who depend on the ministers. In this kind of structure and operation, the local politic that is able to have a plurality of offices becomes an important center of integration, however depending on the Prefect and on his network in Paris. He will become very strong because he will be able to play several roles at the same time and will win every time in every game. Indeed, the information he could get in a game would be re-invested in another game to serve as a very relevant information to win this new game.

In such a description, Crozier and Friedberg (1992) showed a structure of administration and power based on two channels ; an elective one and a bureaucratic one within each vertical interplays are very low. Each unit within each channel has no interest in communicating with the neighboring ones in a sense that they are rivals or hierarchically superior. There is no cooperation and, moreover, avoidance between each unit which

acts lonely through the opened channels of action without being concerned with the others. All those units are interdependent through a center which is the coordinator.

This system produces a huge concentration of power and privileges and concentrates influence and initiatives in several hands. "The game is closed and secret. The system constantly produces some exclusion. Non-participation is so deeply anchored in the leaders' psychologies that it seems to be consubstantial to their game. The system operates in shadow. It results from this a low information flow. The information is always carried out by third parties. Those who decide only have transformed and impoverished information. Those who have the whole information have no access to the universe of decision." (Crozier and Friedberg, 1992).

Analyzing our previous experience, we can make the hypothesis that here is a plausible explanation of the permanence of the constraints that prevented the action, the desirable change. We have produced a lot of information, generated a lot of novelties but decision escaped to us magnificently. Now the question is to know from which channel this decision escaped us, the elective one or the bureaucratic one?

In the crossed-regulation system, the best local interest defender is the one who has the best access network near the department or Paris.

In this scheme, we can assume that a president of the Regional council who is a member of parliament and an ancient mayor of one of a rural "commune" concerned by the project, by the way, representative of the overseas territories within his political party (so having easily access to networks in Paris) is (and was at this period of the project) an important center of integration and coordination and has a lots of influence and power on the administration and politics in Guadeloupe and over. To such an extent he is the today minister of the Overseas French Territories.

In Guadeloupe, it is usual to observe that politics also have integrative and coordination functions. In most of the cases they work as civil servant, and for some, they may become some department public figures, and so, they are playing a role within the two "channels" (elective and bureaucratic ones).

Is it not the case on other rural territories in continental France? If yes, we assume that the main difference lies in the illeity of Guadeloupe. On continental France, if an actor B does not want to make what an actor A requests to him, B could go to another department or wherever else to find social resources he is depriving by not answering the A request. In Guadeloupe, private mean by position is more important because there are no possibilities for actors to by-pass those strong local powers. Private means by position offer some reduce abilities to compete social resources. It is a kind of monopolistic position from the local representatives.

Something Like a Monopolistic Economy ...

In the French West Indies, the economy relies on a structure historically monopolistic for

many economic sectors that benefit from exclusive rights to import. Since the end of 2012, it is no longer the case thanks to the Lurel Law (law n°2012-1270 of December 2012, 27th) that relates to the economic regulation in the overseas territories and identifying some dispositions against exclusive rights to import, corrections of failures of wholesale markets, routing markets, storage markets and distribution for goods and services.

From the colonialist period until today, firms developed and constituted important local or transislands economic groups that built up strong local economic powers. If they are able to integrate environment and sustainable development concerns in their management they will do it only reinforcing the very well established management practices serving their own strategies (Leroy and Lauriol, 2011).

We can expect from them low impact on concrete results such as those we are looking for by the implementation of the TVB pattern and relatively to extinction of species or preservation of the ecological functions of ecosystems. We are more willing to assume an hypothesis by the general context of economic turbulences and crisis that could give certain efficiency for a strategy based upon unemployment blackmail.

...In Coalition with Strong Local Powers

Closeness may facilitate coordination and collaboration but the downside effect is to lead to lock-in situations. In our case here, in Guadeloupe, closeness between key individuals and between public institutions and private firms or groups makes us assume that proximity could be counter-productive to introduce a deep change for an effective adaptive biodiversity management in non protected areas as in protected areas.

An archetypal illustration is described by Ibéné et al (2006) and is very enlightening. They describe the deforestation of a xeric forest in which a cave housed some endemic (at the Lesser Antilles scale) bats.

“The case of the deforestation of the Daube forest at Courcelles Saint François is symptomatic of the danger that presses on the species in Guadeloupe. In 2003, a great part of the 18 ha of a littoral forest – within which is the cave of Courcelles – had been erased by a developer to build a stud farm. This plot(ownership of the General council) was even so recognized as a littoral remarkable site [in bold in the text] under the Littoral law (law n°86-2 of 1986, January, the 3rd) and, as such, known by the Regional Land Management Scheme (SAR) of Guadeloupe as a “strong protection natural site”. Since this illegal deforestation, but authorized in a first time by the Prefect, no restoration measure has been taken and the plot is today colonized by coppices of acacia. ”

This incident is not surprising. As established by Monza (2009), the situation of commercial private mean, of crossing and coalitions with local powers and the length of this situation since the 2009 crisis are responsible for the lock-in situation in which the French West Indian territories are stuck.

Those days, a project of cable car to reach the top of the Soufrière volcano is arising, in full heart of the Guadeloupe national park what is more a UNESCO biosphere reserve. The Guadeloupe national park (as an institution) has the biggest difficulties to block this project. Managers within this institution did not pronounce themselves yet about this project, neither they rejected it, neither they accepted it (personal communications). Their strategy is to leave some institutions to pronounce themselves such as the Guadeloupe national park board, the regional scientist council for natural heritage and the national council for the protection of nature (the first one decides while the latter two are consultative).

Those different strokes allow us to ask if it is not necessary to conceive another management strategy? If yes, what strategy could we propose?

Strategic Management Approaches as a Necessity

The Need to Focus on Balance of Forces and Environmental Targets

Adaptive governance or management proposes a true voluntary perspective for change. So, it keeps in a blind spot the systemic aspect of change, i.e. the fact that change is contingent to the system of action that elaborates it and to whom it applies (Crozier and Friedberg, 1992). An effective change needs to be forerun by, on the one hand, change relative to the balance of forces and on the other hand, learning (Crozier and Friedberg, 1992). Learning is one of the two necessary conditions prior to change. Every change requires a break. Every deep change means a crisis for those who live it.

Initiatives and human leadership are necessary and as such mutual adjustment is not operative. But balances of forces can change only when a new capacity to solve collective organisation problems exists (Crozier and Friedberg, 1992). A change in the balance of forces is not necessarily followed by the development of a new capacity. Crozier and Friedberg (1992) conclude « to learn, we should act without knowing yet, so it demands to take a risk that a tight cost/benefits calculation should make impossible. »

Learning is a prior but non-sufficient condition for change. Adaptive governance and management assume this first prior condition but we need another approach to meet the second condition, change in force balances. “The resilience of a system is defined by three important characteristics: the capacity of the system to experience a disturbance or change and still retain its basic function, structure, and identity; the ability to self-organize; and the ability to increase its capacity to learn and adapt” (Moore et al, 2011).

Focusing collective action on a SES does not enable to guarantee environmental results a priori. It would always be possible to “press” on the social part of the SES for it to be adaptive or resilient to the cost of environmental components. Some economic or social artefacts could be implemented for that, all the more since we are in an insular environment characterized by economic conditions coming from colonial economy of plantations and of cash economy. Pursuing effective environmental results (on

biodiversity) commands to focus on environmental aspects and to determine some clear targets in that domain; in order to evaluate the governance and management system as having been adaptive ex post .

We assume that being not clear on what we expect in an environmental perspective could conduct the definition and the implementation of the TVB in Guadeloupe to an extra more wishful thinking, to an environmental management tool with a low ecological integration in the exploited areas or with a more important impact but only in the biodiversity tanks. At individual level, stakeholders have a deep “naturalism” cosmology, so the integration of nonhuman elements within their mind and acts is of another kind of philosophy.

At a collective level, when stakeholders act in an enterprise, agricultural one here, it had been established that the ecological criticism is got back and integrated in the concept of sustainable development, serving strategies that “reinforces the place of the enterprise as central institution in society at the detriment of democratic governance systems.” (Leroy and Lauriol, 2011). About agricultural enterprises, Houdart et al (2009) showed that in Guadeloupe, innovations proposed by public institutions in favor of the environment are either re-interpreted to serve other aims or non-mobilized to the benefit of spontaneous innovations.

The enterprise acts in a strategic way that serves its own interests. “It is not from the benevolence of the butcher, of the brewer or of the baker we expect our diner, but much more from the care they provide to their interests.” (Adam Smith, quoted by Latouche, 1994). What would happen in an SES characterized by tacit agreements between stakeholders (tourism operators, wilderness protection associations ...) on the fact that it is necessary to manage it in an adaptive way, in such an extent that this case is described as exemplary - if an heavy industry such as a coal mine decides to establish in- ?

Could we expect from this enterprise to refuse because the SES is not able to adapt or sure to lose its resilience through this exploitation and sure to collapse at the end ? Or anyway, we could be sure that the enterprise will establish, whatever the environment functions could support or not because this establishment will create some work and development right now?

At a societal level, in Guadeloupe, we are able to ask the question of the efficiency of only collaborative approaches in a context in which, first, it was necessary to pursue a forty-four consecutive days of general strike and a law to decrease the effects of market dominance, and, second, european directives and French law can be questioned to meet some heavy economic interests at public health cost ; in some other words, to deal with some interests of important economic groups linked with local powers (Monza, 2009) ?

So, to define and implement the TVB in an effective way (i.e to enable the adaptation capacity of the biodiversity to cope with global changes), the need is, on one hand, to

change the balance of forces, and, on the other hand, to integrate some ecological concerns in production practices (agricultural and rural ones here) and then to focus on very environmental objectives.

A Proposal : Strategic Environmental Management Approach

The current effective management should not be able to ensure an effectively adaptive management of biodiversity. So the need is to implement an intentional management that focuses on these questions.

To reach this aim, we will consider environmental problems as problems of change as a whole by the strategic action of one of its constitutive parties (Mermet et al , 2005). We will propose to base the management upon strategies able to overcome fears to change from the stakeholders of the effective management system in place.

First of all, is the strategic environmental management analysis relevant to deal with some issues of governance? Strategic environmental management analysis has an obvious management dimension as a governance one because social and ecological aspects of an environmental problem are viewed as a “concrete system of action”. Crozier and Friedberg defined a concrete system of action as “a structured human set that coordinates the actions of its participants by relatively stable mechanisms of games, and that maintains its structure, i.e the stability of its games and the links between those ones, by mechanisms of regulations that constitute other games” (1992, translation by us). This concept encompasses the notions of action and regulation between actors that produce action; so it has management as a governance dimension. The strategic environmental management analysis is based on four principles (Mermet et al., 2005).

First of all, the analysis of the system of action linked with an environmental problem must rely on the definition of the environmental object to take into account and of the aims pursued. Mermet et al. (2005) propose a formulation “goals in nature, means in society”.

The second principle is to take into account, in the diagnosis of the management of the environmental object, the whole human actions (conscious or not, intentionally or not) that influence in a relevant way qualities of the environmental object. This is what the authors call the “effective management”.

The third principle is to focus on the actors whose main concern is to initiate appropriate changes in the effective management of the ecological object; they are the “environmental strategic actors” who operate the “intentional management” (Mermet, 2011). Those actors play an effective role as agent of change in favor of the environmental goal took as a reference. And so, this management theory focuses on the environmental part of the SES. If this position focuses on environmental components to concentrate forces on its improvement, we are already able to foresee some limits in the social environment of Guadeloupe. The danger is for them to be

perceived and to be denounced as acting boarder line and to be classified as not taking part of the common humanity (Boltanski and Thévenot, 1991) giving too much sense to non-human entities.

The fourth and ultimate principle is to replace those analysis in a dynamic perspective of a system of management that changes over time through the structuring outcomes of conflicts in which the concerns of the environmental strategic actors end being partially integrated (Mermet et al., 2005). This theory of action assumes conflicts as creators and generators of change.

Strategic environmental management analysis does not propose all answers a priori , “The strategic environmental management analysis theoretical frame (...) organises an opened working space inwhich nothing is never preordained” (Mermet et al., 2005 – translation by us). It can be implemented where it is possible to meet some environmental strategic actors. Is it the case in Guadeloupe? We will have to identify them among some actors that have an environmental discourse. We assume they exist because we were said that some actors speaking of nature and biodiversity are invited in collaborative arenas. Some of them are qualified as “extremists” and “when they speak nobody listen to them; and then the collaborative process can be blocked” (personal communications). Ongoing news give us reason. Some civil associations (within which some environmental ones) are pursuing court actions to stop plant protection products aerial spraying on banana plantations. They are acting against banana producers and against the Prefect that takes some prefectural unilateral decisions to by-pass European and national legislations.

So, we can expect from them to be some environmental strategic actors. Related to the exceptional biological wealth and to its worldwide value, some external environmental strategic actors could be mobilised too.

Conclusion

The answer to our problematic « is an adaptive governance sufficient to accept the TVB challenge for the biodiversity in protected and non-protected areas in Guadeloupe?» is theoretically no. A State representative was right saying that “we will not attract all people with the same meals” meaning that it will not be possible to define and to improve TVB in Guadeloupe with only one management theory.

Adaptive governance and management require an important set of skills and technicality and so, a huge personal cognitive investment, generating the feeling of coming in a world in which the researcher could be able to see and to understand the whole SES as from a “latourian” panoptic (Latour, 2010) or to meet a cybernetic temptation of a perfect system (Morin, 2001). We should keep in mind that “the best organisation is not the perfect one, purely redundant, it is the imperfect organization, that contains shadows, deficiencies, fundamental disorder, but which knows how to live with disorder, parasitizing it back, which finally knows organising itself in uncertain relation and relativity, far from the absolute.” (Morin, 1981).

Adaptive governance can work in social contexts characterised by tacit adjustments between stakeholders (i.e. a peaceful context, by “accuracy” following Boltanski, 2011) but tends to be very insufficient in contexts characterised by “justice” (Boltanski, 2011) where there is a need to measure each other through a test, i.e. in a conflict context.

In our case, adaptive governance can be mobilized to define and implement TVB. It enables to hear all the ways to define each basic equipment of each common world (the metaphysics, Latour, 2010) but lead to a unity principle, and then to a truth principle (the ontology, Latour 2010), that we are more or less able to predict: giving biodiversity and non-human natural entities the role they already have, low value and utility in contrast to other non-human entities. The utility of a couple of endemic Ring Kingfisher will be much lower than a pound of bananas.

Moreover proximity, in our context, is more a lock-in factor than a facilitator for deep changes in the way to consider biodiversity and non-human natural entities with low economic value. Deep familial and relational proximity, coalitions of strong economic and political local powers with no means to by-pass them, and a very deep “naturalist” cosmology lead us to consider the very necessity to implement a strategic management approach.

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