

Complexity management and multi-scale governance: A case study in an Amazonian Indigenous Association¹

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ABSTRACT

Even if COR provides methodologies and tools to support community development, there aren't published works illustrating how we can support with COR tools, an assessment of self-governance in an indigenous community. Here we present exploratory research to provide such support to an indigenous association in the Amazon jungle. To address issues of multi-culturalism, we used a creative choice of methods, which included elements of boundary critique, the Viable System Model, rich pictures and social cartography research. We explore the possibilities that this mixed methods approach to COR would offer to clarify the core dilemmas and paradoxes of self-governance for sustainability that such communities are facing. The analysis is done through VSM mapping the community, at different levels and scales of organisation. It reveals key paradoxes and dilemmas of self-governance, which is helping them to collectively decide on action paths and their needs to (re) develop certain adaptive capabilities. Particularly, it shows that loss of power from traditional (spiritual) authorities, and loss of rituals and other cooperative practices have impacted negatively on the indigenous ways of implementing their life plans and respecting sustainability principles. This research contributes to COR, in presenting an innovative application of the VSM in an indigenous community, supported by expert facilitation, as the basis for reflecting on their self-governance challenges and acting upon them. It takes into account a more critical and ethnographic approach to research, capable of better dealing with the variety of a multi-cultural context.

Keywords: COR - (D) Community OR; (O) OR in developing countries ; (D) OR in societal problem analysis ; (B) distributed decision making; (D) OR for community development

¹ Espinosa, A., Duque, C. (2017). Complexity management and multi-scale governance: A case study in an Amazonian Indigenous Association. *European Journal of Operational Research*, In: Special Issue on Community Operational Research, Johnson, M. and Midgley, G. (Eds). Available online at: <http://www.sciencedirect.com/science/article/pii/S0377221717306768?via%3Dihub>; DOI: <https://doi.org/10.1016/j.ejor.2017.07.049>

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1. INTRODUCTION

Community Operational Research (COR) has regularly suggested the benefits of using OR methodologies and tools to address core issues for development of communities. Even if possibilities for community development are affected by their governance structures, we were unable to find any applications showing how COR could support an assessment of self-governance in communities aiming to develop in a sustainable way. In this paper, we present exploratory research to support such efforts in an indigenous association of communities in the Amazon jungle. We aimed at explaining how the challenges of inter-organisational governance in a multi-cultural context are clarified through a systemic intervention.

To design and conduct the systemic intervention, we adapted the self-transformation methodology - originally inspired in viability theory (VSM) (Espinosa & Walker, 2016, in press, through a creative choice of methods: it included elements of boundary critique, the VSM, and rich pictures combined with social cartography. All stages involving ethnographic and systemic data collection were highly participatory and provided extremely rich data and a fruitful context for discussion among the participants. They were followed by an expert mode V&S analysis of the main dilemmas and paradoxes of self-governance for sustainability that such communities are facing from a small community to the regional indigenous association, which we then validated with the communities. As a result of their enhanced understanding through the systemic workshops, and analyses, the participants have already begun to identify and implement some of the urgent changes to their governance structures. This research contributes to COR, with an innovative application of the adapted methodology in the context of an indigenous community, as the basis for reflecting on their self-governance challenges. The improved version of the self-transformation methodology, proved to be useful for dealing with the variety of a multi-cultural context, in this case supported by expert facilitation.

2. LITERATURE REVIEW

Mingers & White's (2010) review shows that the use of systemic approaches, within OR is an incredibly healthy research field, in terms of the quantity and variety of its applications. Community Operational Research (COR) has illustrated how systemic methodologies (e.g. SSM, SD, SODA, SAST, Idealised Planning, among others) contribute to support communities exploring their development options, strengthening

alliances for sustainable development and other issues (Carter et al, 1989; Ritchie et al, 1994; Rosenhead, & Mingers, 2001; Parry & Mingers, 1991; *Bandyopadhyay & Datta, 1990; Phahlamohlakaa, & Friend (2004)*). In particular, Johnson & Smilowitz (2008), consider that one of the OR ‘grand challenges’ that COR is studying is how to develop a sustainable society (e.g. regarding food and water security). White et al (2011) demonstrate that there is a considerable amount of interest in using OR in developing countries, mostly to support issues of poverty reduction and sustainability. We have shown elsewhere an increased interest in complex systems approaches to study sustainability in businesses and societies using (*Paucar-Caceres & Espinosa, 2011*). Tihanyi, Graffin, & George (2014, p. 1535) reveal that there is also a gap in the field of governance studies, regarding studies to explain the challenges that sustainability and environmental issues impose and the tensions they bring to hold on power.

In particular, COR researchers recognise the need to conduct new research on how systemic approaches may support democratic and participative decision making, and changes in the organisational structure that may enable coordination and cohesion within community organisations (Midgley and Ochoa-Arias, 1999; 2004; Tacket & White, 2000; *Blanc and Kledal, 2012; Cleveland et al, 2014*). Midgley (2011) suggests that social learning results from the interplay between competences and experiences that defines practice, and is generated through participation and reification mechanisms, where meaning is created and negotiated. Research about communities of practice (CoP) address these issues, as shown by *Barab et al (2003)*, Kling and Courtright (2003) and *Hara (2009)*.

However, apart from few exceptions (e.g. *Thunhurst et al, 1992, Flood, 2001, Bawden, 2005, Cuéllar-Padilla and Calle-Collado, 2011; Tavella and Hjortsø, 2012; Franco & Montibeller (2010); Franco (2013)*, Henao & Franco (2016), *Rubenstein et al, 2016*), there is still limited evidence of how participatory and facilitated approaches help actors to address complex and uncertain problem situations during COR interventions; and we were unable to find any COR intervention aiming to improve governance in communities in the Latin America region.

Within COR and systems approaches, and given one of the authors’ expertise, the Viable System Model is a clear choice for studying organisational and governance structures (Beer, 1979, 1981, 1983, 1985, 1989a, 1989b, 1994). Beer (1983) explained how the VSM theory could inspire innovative ways to support communities and societies in developing more democratic governance structures. There are nowadays multiple VSM inspired methodologies and applications in business, governments and NGOs (see for example *Espejo & Harnden, 1989, Hoverstadt, 2008; Espejo & Reyes, 2011; Hardwood, 2012; Perez-Rios, 2012, Preece et al, 2014*). His original proposal on using VSM to

address issues of societal viability and governance, has also been further developed: Turke (2008) explains in detail how the VSM can guide governance studies and offer examples of application in rural Germany and Switzerland. *Schwaninger (2006a, 2006b, 2012), Medina (2006), Espejo (2009), and Leonard (2015)* reflect on Beer's Cybersyn project aiming at redesigning the governance structures in Chile. *Schwaninger (2012; 2015)* presents theory and application of the VSM to analyse issues of governance, with an example in a Swiss county. *Espejo & Mendiweso (2011)* explain the effect of active citizenship in making more effective those organisational structures relevant to the policy issues of concern.

We have developed the V&S approach (theory on viability and sustainability) and a related toolkit to study issues of self-governance for sustainability (*Espinosa & Walker, 2011, 2016; Espinosa, 2015*). We have shown how these tools helped to enhance self-organisation in an eco-community (*Espinosa & Walker, 2013*); and in adapting strategy and structure of a large building enterprise (*Espinosa et al, 2015*). *Tavella & Papadopoulos (2014)* applied our methodology for organisational self-transformation within a member-driven food cooperative in Denmark, and demonstrate how the intervention helped members to tackle issues more effectively, enhance democratic and participative decision making, and co-design changes in the organisational structure that foster coordination and cohesion. A key learning from previous applications was that intentional communities have a very strong identity and clearly engrained ecological values in their individual and group decision making and actions: this is an issue we explore further in this new research context.

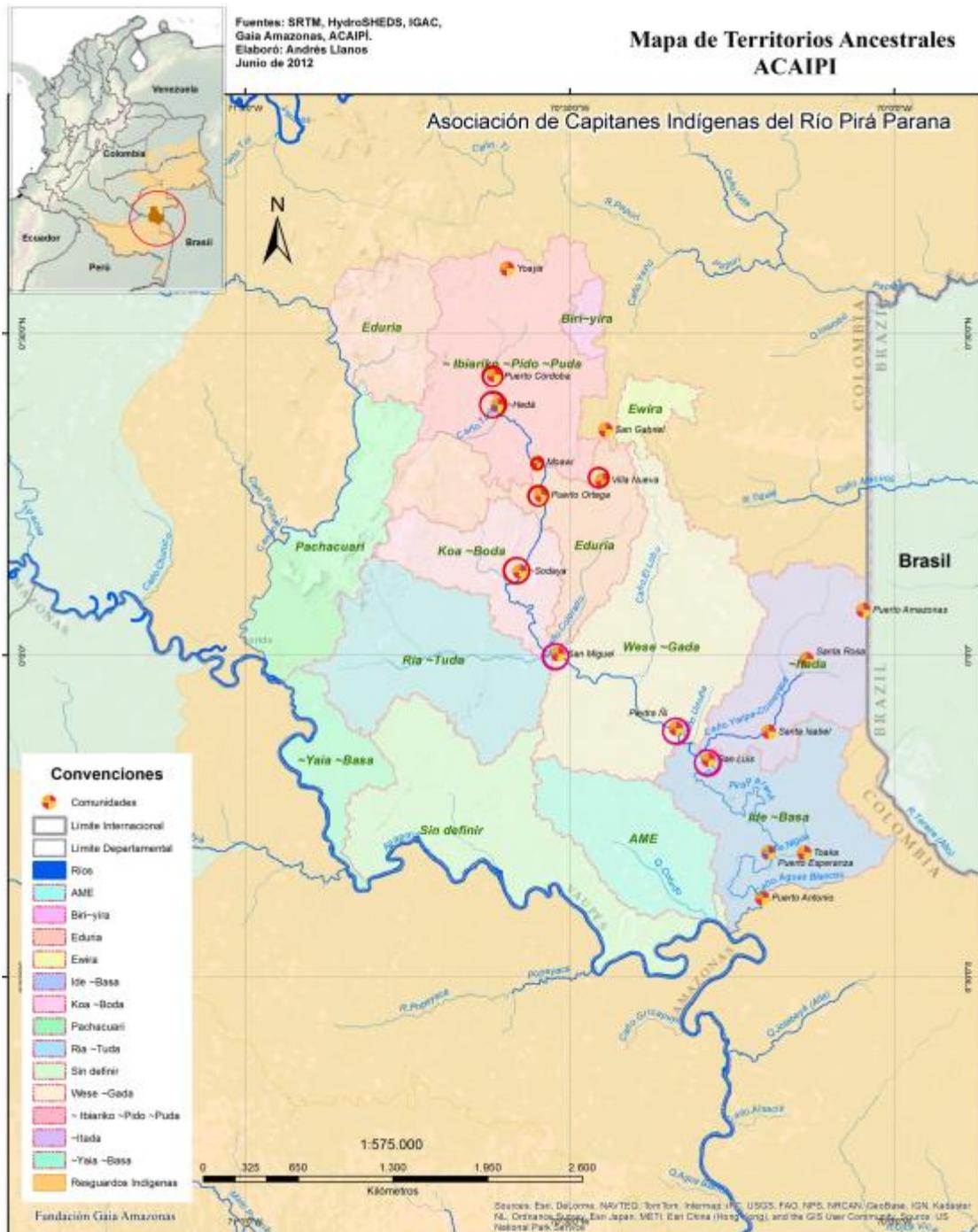
In this paper we present a systemic intervention aiming to generate a meaningful engagement of indigenous communities from a critical endangered eco-region, (the Amazon rain forest) in their self-assessment of their current and traditional governance structures. It does reveal major governance dilemmas and paradoxes (*Lozano et al, 2014*), some of which are new to them, and they find themselves unequipped to deal with them effectively.

3. ACAIPI: SELF- GOVERNANCE SYSTEM OF THE THE PIRA PARANA RIVER COMMUNITIES.

The work that follows involves the people and ecology of the Pirá Paraná river in Vaupés, a remote part of the Colombian Amazon rain forest which was only contacted by modern society in 1970, and still relies heavily on traditional ways of living and governing, dating

back to well before the Spanish invasion of South America. The map that follows illustrates the entire river basin: the red circles show the location of the 17 medium and large communities of indigenous people. There are 8 different ethnic groups living in this territory: Makuna, Barasano, Bara, Eduria, Tatuyo, Itano, Tuyuca and Carapana. For this paper, three (Barasano, Eduria and Tatuyo) have been chosen as they represent a cross section of the various communities. In all 14 communities were involved in our study: 6 large, 3 medium and 5 small.

Fig 1. The Pira Parana River eco-region (*Ortiz, 2015*)



Despite the size of the region and the variations in ethnicity, the people of the region have a strong common identity as they believe they are all descended from common ancestors: according to their tradition, all groups that inhabit the Pira Parana River come from four

Anacondas⁴. The region is known as ‘the territory of the Yuruparí Jaguars,’ and their sacred philosophy of life is called the ‘Hee Yaia Ketí Oka’ (ACAÍPI, 2010, 2015).

Each ethnic group has a place of origin, which, according to tradition, was given to them at the beginning of time, and their destiny is to manage the resources, original knowledge and spirituality of their territory, by sharing and nurturing its biodiversity. Their land is protected in law by the Colombian constitution of 1991, and they are now guaranteed the ability to govern themselves according to their own traditions. In their governance structures the wisest and oldest men, the World Orderers are the highest authority for each ethnic group. The Kubus are the highest authority in each community: they guide and protect all the communities’ activities and projects through their knowledge, expressed in ritual practices, prescriptions and advice. Their word is heard and respected, and younger leaders adapt their ideas in the light of the experience of the elderly. Their knowledge of the territory, their respect for the ‘ecological calendar’, and the maintenance and use of sacred sites allow natural resources to continue their cycle, and for the region to maintain its bio-diversity. This body of knowledge must, they believe, be used for the benefit of all nature and human beings, so that people can live well and develop spiritually, while taking care of their eco-systems. Over thousands of years these structures have demonstrated their ability to create a truly ecological society based upon a systemic self-governance structure.

In their traditions, the ceremonial house or “Maloka” represents the universe, and the “mambeadero” (inner sanctum of the Maloka) is the heart, from which the territory is managed, not only as a geographical space, but as a pattern of relationships between everything that exists. The Malokero (community leader) organises and leads the ceremonies in the Maloka. This is also where the Kubu guides the processes of growth, welfare and development, through traditional knowledge, known as the word of origin. Thus, the workings of the traditional health and governance systems focus on the Maloka, and have their own functions, according to hierarchies and biological cycles. The ‘Ecological Calendar’ and rituals are mirrors of the cycles of nature, and have evolved into a sophisticated spiritual management system which not only supply spiritual sustenance but also ensures the sustainability of the community. All of nature, visible and invisible, is seen as a community of social beings who are related by a system of rights and obligations and governed by the principles of partnership and reciprocity. According to this perspective, ethnic groups are only one component of the eco-system and the welfare of people is the result of good relationships, between the human collective and the other communities of living beings that make up the territory.

⁴ Anaconda is the biggest Amazonian Serpent, and is the most powerful spiritual symbol for these indigenous.

Many of the illnesses and ailments that afflict people are seen as the result of the destruction of this system of rights and obligations. Thus, the misuse of sacred sites, non-performance of rituals, ingestion of prohibited food, and curses, are all causes of illness and death. The Kubua are responsible for mediating the relationship between the human and non-human communities, through prayers and offerings that represent the domain of knowledge concerning the origin of everything that exists (Keti Oka). The most important of these are performed during rituals performed at specific times of the year that the Kubu is able to determine because of his detailed and thorough knowledge of the annual cycles. Each ritual has a function defined by the relationship that man establishes with the different entities within the territory, in each of the seasons of the annual cycle.

Cures depend on the time, connectivity of the rhythms of the cosmos, nature and human activities, everyday rituals, growth and development. These rhythms involve the four major annual periods: growing season, time of worms, time of wild fruits and ‘*Yurupari*’ time. The food is mainly based on the development of agricultural activities, gathering forest products, and subsistence hunting and fishing, all of which are governed by the cultural ecological calendar. Individual discipline plays a crucial role in maintaining the well-being of the human and non-human communities. This includes a rigorous observance of dietary restrictions, the proper use of sacred sites, performing simple prayers for purification of food and preventing accidents while performing activities considered dangerous.

In 1996, the Colombian government set up ACAIPI (local government of indigenous communities) as a public entity with its own legal and territorial jurisdiction, its own assets and administrative autonomy; they undertake processes for building local official policies and programs, in coordination with other competent state bodies from regional and national levels. ACAIPI provides coherence for the communities living around the Pira Parana river. Women, men and young adults from all communities and Malokas, participate in decision-making and elect a “Captain” to be their spokesman at the General Assembly, held every six months at ACAIPI. Decision are made with the approval of both Captains and traditional authorities. In some cases, the Captains are from the traditional authorities, in others they are young leaders who are fluent in Spanish and therefore ‘have the capacity to negotiate and dialog with the *white* world’. Nevertheless, the oldest and wisest always guide the community decisions and daily work from the Malokas. One of the most important institutions within ACAIPI is the Assembly of Traditional Authorities where traditional and intercultural decisions that develop across the territory are taken. *Appendix A* presents ACAIPI current organisational structure, and more details on their current governance challenges. Our (ongoing) research is the first stage of a broader project, *aiming to develop systemic intervention tools to support indigenous communities aiming to maintain their traditional way of living that protects and manages the environment where they live.*

4. DESIGNING THE RESEARCH PROJECT

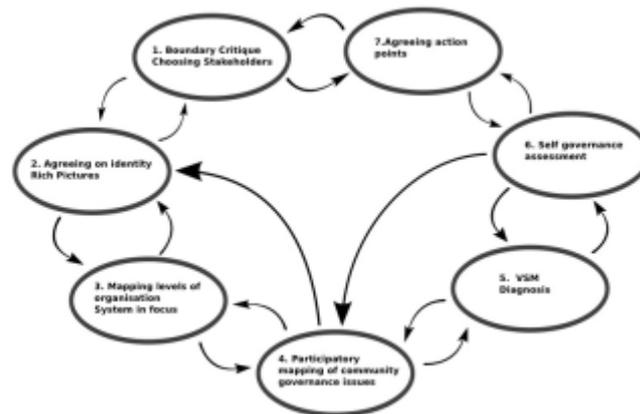
We designed the project as a community action research project, in order to provide the participants with an enhanced social learning context for better understanding and management of their governance challenges; and us with academic learning regarding ways to adapt and improve existing COR methodologies and tools in this context (Reason & Heron, 1986; Reason & Bradbury, 2006). We followed *Checkland & Holwell (1998)* F/M/A description of an Action Research project, to design the systemic intervention. There follow details on the choices of conceptual framework (F), methodologies (M) and action (A) of this systemic intervention.

5. THE V&S CONCEPTUAL FRAMEWORK (F)

The analysis of self-governance in the studied communities was supported by the viability and sustainability framework (V&S Framework) (*Espinosa et al, 2008; Espinosa & Walker, 2006, 2008, 2011; 2013; 2016*), inspired in Beer's VSM theory - Beer (1979; 1981, 1985).- We see sustainability as 'sustained viability', and as *Holling (2001)* suggests, the capacity to create, test, and maintain adaptive capability. To us, governance studies the organisational patterns of interaction (structure), emerging through developing joint tasks using specific strategies and mechanisms, to develop adaptive capabilities. We understand a community as a complex system, which co-evolve with its socio-ecological system, as a result of self-organised and formal interactions among its agents (Andrade et al, 2012). A societal governance system needs to cope with the complexity of recurrent interactions between the society and its niche. These patterns of recurrent interactions result from both formally established community governance structures, and from informal recurrent interactions among community members, over their shared history of co-development in their socio ecological systems. A viable and sustainable community is one that is able to keep a balanced (healthy) relationship with its socio economic and environmental niche, which allows the current generation of community members to survive, without impacting negatively either their environmental niche, or in the availability of eco-systems services for future generations to also survive in that niche. Beer, as does the ecosystems approach (Waltner-Toews et al, 2008) focused the analysis of complex systems i.e. societies, in the interaction of society vs its socio- ecological niche. Using Beer suggested methodology, : but we do it within Beer's suggested recursive analyses, and using the V&S theory for recognizing/analysing levels of organized complexity: at each level identified, we focus on analysing the interactions between the primary community systems and their niche (in terms of structure, process, strategy, and mechanisms) regarding self-governance capabilities. Fig. 3 below presents

the Pirá Paraná River as a complex system coevolving with its socio-ecological niche.

Fig. 3. The Socio Ecological System of the Pira Parana River (Author: Andres Spath Botero, 2015)



Although the eco-system approach offers some criteria for investigating the structures and processes of a particular societal system interacting with its environment, it lacks ways to provide a more in-depth analysis of recurrent interactions between key community roles, through their formal and informal governance structures, as the VSM

does. In this paper we explore this gap, by adapting the Self Transformation methodology to this multi-cultural, indigenous context, by including some complementary systemic tools for the analyses.

The V&S conceptual framework looks at a community as a network of self-organising agents responding for the primary community tasks required for its survival and sustainability, while self-organised teams co-evolve within themselves with the wider socio ecological system. As our intention is to model a community association, where each community aims to remain viable and to be sustainable, while together keeping harmony in their people and territories, we begin our analysis by agreeing in a generic definition of community identity, and then defining which are the core community tasks required to guarantee its viability and sustainability. Most of these are common to any human community around the world, as they refer to primary community activities to satisfy individual and group basic needs (food, shelter, water, etc). We are aware that each community find its own ways to satisfy these needs (see *Max Neef, 1991*) and that satisfiers may vary from one community to another; and also that they decide on individual and collective responsibilities to develop such tasks and to govern themselves as a community. The effectiveness of decision making spaces and mechanisms (their capability to exhibit requisite variety in Beer's terms), are at the core of their governance capabilities. We consider that the minimal condition for community viability is the individual and collective satisfaction of these basic needs, which require collective strategies and decisions. Some individuals may be able to develop themselves in ways in which they will satisfy other non-basic needs, such as having extra resources and time to specialise or to be innovative. In this research, we adapt the Self Transformation Methodology (Espinosa & Walker, 2013) as a group learning supporting system which provides opportunities for conversations, learning and reflection to emerge (see Rubenstein et al, 2016). We then choose complementary tools to be able to cope with the additional complexity of multi-cultural issues of governance characterizing this research context.

6. (ADAPTED) SELF TRANSFORMATION METHODOLOGY (M)

A major reason for re-designing the methodology for this particular systemic intervention was the need to take into account the cultural diversity (among both experts and participants) in the research, as it may result in communication problems due to the use of different languages and sociological traditions. We built up in the already successful

trajectory of ACAIPI, researching and documenting their cultural identity using truly systemic tools, with the help of GAIA (see Appendix 1). One of the authors (C. Duque), an experienced anthropologist with years of experience working with these Amazonian communities, through GAIA, and with postgraduate training in systemic approaches, led the field work research, supported by two other experts from GAIA Foundation⁵. To conduct a systemic assessment of the community's self-governance for sustainability, we adapted the "Methodology for self-transformation, (Espinosa & Walker, 2016, Ch. 2; Espinosa & Walker, 2013, *Espinosa et al*, 2015) , following Midgley (1990; 1997a, 1997b) suggestions on the creative design of methods - see Figure 4.

Figure 4. (Adapted) Self-Transformation Methodology

⁵ Nelson Ortiz and Jorge González

Chagra	UP (Tatuyo/Eduria)	m	D3	Lack of coordination among community members to undertake horticultural activities - clearing the soil (tumba) and 'secola': also for weeding and seeding activities.
	UP (Tatuyo/Eduria)	l	D10	lack of management and proper use of the soil, as some people don't have their own land and sometimes they still from those who have the land. They are all affected by climate change so traditional agricultural practices no longer work as effectively as they use to.
	MP (Barasano)	l	B12	There is weakness in the food productions in the chagra, which impact negatively the rituals, due to climate change impacts, it isn't possible to set fire to the chagra
	ACAPI		D20	Some people steal the coca leaves from other's chagras, damaging the seeds of this sacred plant.
Maloka	MP (Barasano)	m	D14	Lack of coordination among women responsible for clearing and preparing the 'chagras'. <ul style="list-style-type: none"> • There isn't a proper management of the chagra, as some owners are irresponsible • Some people don't have their own chagras and they steal cocaine and coca leaves from others' chagras, damaging the seeds and therefore affecting the future of the chagra. • Due to climate change the traditional agricultural practices are weak now, as it isn't possible to set the chagra in fire at the right times of the year, therefore resulting in lack of cocaine for the rituals. • There hasn't been continuity in government support programs: there hasn't been budget implemented for the system for indigenous communities support since 2011.
			B2	Community work to prepare 'Mogasa' <ul style="list-style-type: none"> o Because of difficulties coordinating, each family works independently since 2016 (Piedra N) o There are four neighbourhoods: the representative from each one coordinate the mingas for those families who request support to clean their 'chagras' (San Miguel)
			D1	People are not using the traditional building materials which affect their quality of living: there are not clear enough agreements regarding collective building tasks (e.g. food for the builders), or about responsibilities for maintenance later on
			B4	<i>Maloka's maintenance: In Piedra N, San Luis y Tani there isn't anyone responsible from improving the Maloka, and cleaning the common areas: the education sector pays someone to do these tasks. In San Miguel there isn't a Maloka but there is more collaboration</i>
Hunting & gathering Education	MP (Barasano)	l	B3	Not always there is a 'malokero' (the role of the indigenous responsible for all collective activities at the Maloka); sometimes the 'Captain' performs this role without previous training so he doesn't achieve the respect of the people of the community. This results in lack of legitimate leadership, lack of community activities for preparing rituals, lack of decision making spaces and therefore lack of confidence and trust from people
			B18	Fishermen are using 'carcas' and torches to fish, so fishes are hiding deep into the water. Instead of dealing with seeds in the traditional way, farmers are knocking down the trees so it damages productivity in the near future. People are hunting in sacred places affecting sacred animal species (i.e the lapa).
			B4	Most of their kids are now living most of the time in an internship educational scheme at the government schools: this is stopping the traditional education to happen as they are not longer in touch with the Kubus and therefore can not learn from them as it happened before. As a consequence new generations are privileging western criteria learn from government schools to traditional wisdom learn from their the Kubus
				lack of continuity in educational projects.
UP (Tatuyo/Eduria)	ACAPI	l	B7	Poor apprenticeship: Difficulty to educate new 'gabosus': the traditional culture is not been reproduced
			D10	Lack of involvement of young people: Instead of sharing at the chagra all the traditions and stories and working with the community, some youngsters consider themselves better than the traditional indigenous - as they are students in a white ruled school- and reject all involvement and commitment with community traditions and works.
			D2	environmental research (ASI). The agreed budget for this type of research hasn't been implemented since 2011 by the government.
			D5	Some parents not bringing their kids to the school; no traditional but 'imported' food offered in the schools. Kids are not learning to grow their own food so they can't help their parents in this task.
UP (Tatuyo/Eduria)	l	D3	lack of communication an participation among parents and teachers;	

As described in Figure 4, we started by clarifying the boundaries of the problem situation. Through preliminary conversations with the indigenous, we explored who should be involved in the project. By following *Midgley and Milne's (1995)*, idea of a 'rolling programme,' we aimed to include as many and as varied representatives as possible from

the different roles and levels of organisation. The chosen sample of stakeholders included indigenous from the Tatuyo, Eduria and Barasano tribes. As the larger communities face more complex social dynamic and self-governance challenges, we decided to interact with people from fourteen (out of twenty eight) communities: and choose the sample with communities of different sizes (5 small, 3 medium, and 6 large) across the sampled territories. At the Upper Parana River sub eco region – we included a sample of small, medium and large communities from the Tatuyo and Eduria ethnic groups. At the Middle Pira Parana (the Barasano territory), we included information from four large communities (San Miguel, Tatu, Piedra Ni, San Luis), one medium (Puerto Ortega), and one small (Moawi); as well as a local community from another ethnic group (San Luis). We also had representatives from the Rainforest Norway Foundation, the Colombian Home Office, and the Vaupes regional government, also sponsoring the project with ACAIPI. We even included in the sample, a few small communities of indigenous from other ethnic groups that had moved to ACAIPI territories (Malokas Octavio and Villa Nueva). The fieldwork coordinator trained other facilitators in the use of the data collection (interviews) and discussion tools (workshops).

Having clarified the boundaries (stage 1), we decided to combine the use of rich pictures and social cartography tools with our VSM inspired questions, for the data collection; and to work with them through participatory workshops, aiming to identify and discuss their core governance issues. To collect information from the participants, we designed a simple questionnaire in a language and style more understandable for the indigenous, inspired in the ‘Framework to assess sustainable governance’ (Espinosa & Walker, 2011, Ch. 3; Espinosa, 2015) see *Appendix B*. Aware that understanding the VSM language and tools may well create a communication barrier with the indigenous (linguistic barriers already existed as some of them did not speak Spanish,), we decided to do the VSM analysis in expert facilitation mode, using the complete data set collected through the field work.

There were two workshops: the first one was in *Sonaña* community (June 6th to 13th 2015), attended by 80 people. At that workshop, we asked the self-governance questions to the community members; we asked them to ‘speak’ their answers by making drawings following their self-research tradition and tools. Figure 5 presents an example of these drawings.⁶

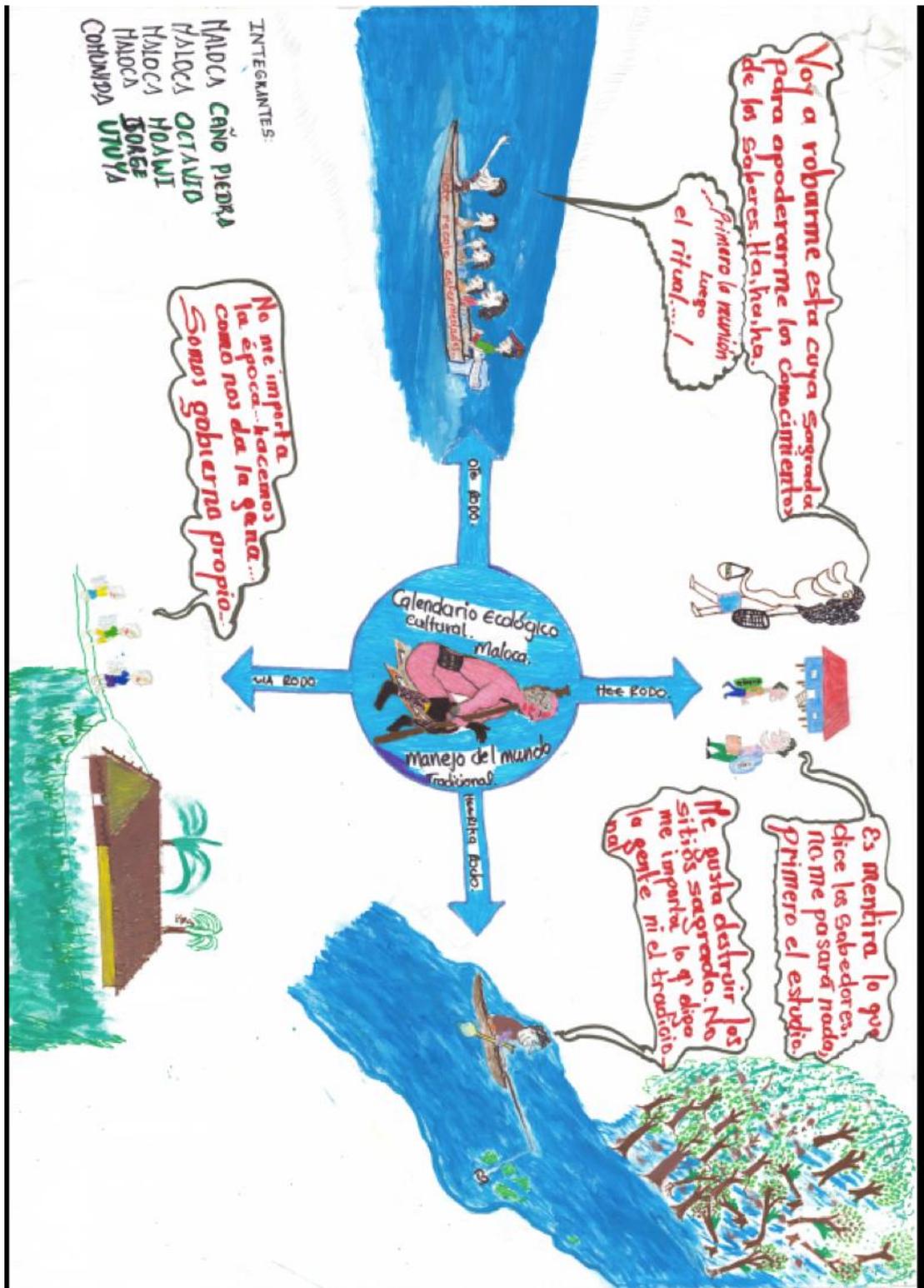
With the information collected, we implemented stages 2), 3) and 4) of the methodology: first we agreed on the first draft models of identity, and unfolding of complexity (boundaries). It took several discussions and further research to agree on a useful and

⁶ For a more detailed view of the participants’ paintings in the workshops, follow this link: <https://drive.google.com/open?id=0B2LxAwuUx0feMDJGTHlyU1dOVXM>

clear model of recursive organisation and boundaries. Once agreed we started stage 5) by first drawing a skeleton of the VSM of each one of the social systems, within the agreed boundaries. Then we began to map the participants described governance structure and issues - working in expert mode. Again, the initial analyses progressed through several iterations between the stages, visiting each stage again if needed, until we managed to complete a learning cycle: this is represented by double arrows between the stages, and the arrows connecting stages 6) and 4); and stages 4) and 2).

On the basis of the preliminary analyses, we designed the second workshop, in the *Santa Isabel* community (25th of February to 4th March 2016), with 73 indigenous participants. In that workshop, we discussed with them a first summary of the key the self-governance issues they identified, and asked them to value them and to agree on priorities to address them. Building on the learning and clarifications from this workshop, we revisited stages 4), and 6) and for concluding the VSM and self-governance analyses.

FIG 5. Examples of drawings from participants in the workshop



Given the amount of data gathered, we decided to use conceptual mapping to structure all the diagnostic points identified by the community members at three levels of recursive organisation:

1. Level 0 - the eco-regional level (the entire Pirá Paraná river basin) governed by ACAIPI (the indigenous association of the Pira River)
2. Level 1 - the sub eco-regional level composed of Upper Pirá Paraná and Middle Pirá Paraná) (The lower river was not part of the study)
3. Level 2 - the 14 chosen communities – categorised by size: large, medium, and small.

Having completed the transcription of diagnostic points to the VSM maps, we summarised the data in a Table, each row detailing the diagnostic issues, each classified by recursive level, community size and type of related VSM role – see Appendix C for a snapshot of the Table. The Table was finally reorganised per level of recursion and per level of community and per type of VSM distinctions (Systems 1 to 5) aiming at identifying generic concerns and patterns among the respondents. This summarised and filtered data enabled us to produce a generic VSM diagnosis of their governance issues. We then produced an assessment of their self-governance capabilities, which was finally used to explore their main dilemmas of multi-scale governance at both the community and the regional levels. A few months after finishing the workshops, we presented it to representatives of the communities for their assessment and valuation, regarding awareness and understanding of their main governance challenges as well as their collective decisions to act upon them.

Summarising, in order to analyse the information gathered through the interviews and workshops, we used the VSM as a meta-language, first to inspire the governance questions, secondly to classify the resulting diagnostic points from the participants; and finally we used the Self-Governance assessment framework (Espinosa, 2015) to assess the required organizational, strategy or process improvements to address the collectively identified governance issues; and validated these results with the participants. The planned 2nd stage of this systemic intervention⁷ will be to support them to further detail and implement their self- governance action plan and assess its impact.

7. THE METHODOLOGY IN ACTION (A)

In order to develop the systemic intervention, we followed the first stages of the Methodology to support self-organisation (identity, unfolding of complexity and VSM analysis of the system in focus). There follows a summary of the results obtained from

⁷ planned to start again in September 2016

this initial stage of the intervention (Stages 1 to 4), followed by a discussion of the preliminary findings.

7.1. The Pira Parana River SES: Identity definition

We have already provided background information on the Yurupari Jaguars' region, the Pira Parana River. We agreed on a definition of identity of this socio ecological system, as the association of ethnic communities living there since ancestral times, who have responsibly used their ecosystem services, guided by their clearly ecological life philosophy, their traditional authorities (World Orderer, Kubus, Maloqueros), and their 'cultural and ecological calendar'. Family units or small communities share the land where they live, feed, and develop other activities for their physical, social and spiritual survival. They interact with other communities of the Association – and/or external - through a system of bartering food and other supplies (i.e. music, dance, food and other supplies) and reciprocity.

7.1.1. Unfolding of complexity – The Pira Parana River SES

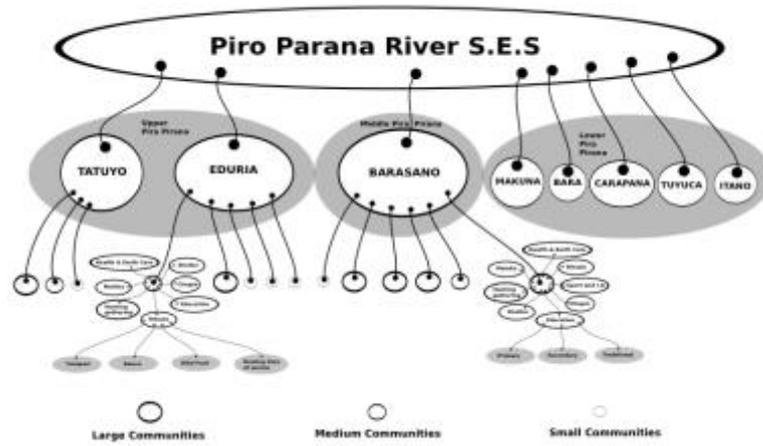
As mentioned before, it took us several iterations to first agreed on modelling the recursive levels of organised complexity in the PPR ecoregion and to clarify the boundaries of the research, that is, the system in focus: we finally agreed on the representation in Figure 6 that will allow us to model their traditional governance structures (before the Colombian government started to deal officially with indigenous communities in the 1990s), most of which are still preserved.

Figure 6 illustrates at level zero the entire PPR ecoregion: at level 1, we see the ethnic groups represented within in their embedding sub-eco-regions (this level of organisation exists only in rudimentary ways like meetings of traditional authorities from communities of the sub eco region). The sub ecoregions include: the Tatuyo and Eduria ethnic groups at the Upper Pira Parana River; the Barasanos at the Middle PPR; and other five ethnic groups at the Lower PPR – no in the system in focus-. At Level 2 - within each of these ethnic groups - we then identified the 14 communities for which we use a size coded convention (small, medium and large circles). At Level 3, it presents the primary activities within two communities (a medium community within the Eduria ethnia, and a large community with the Barasano ethnia), which are typical of these sizes of communities. Level 4 illustrates the Systems 1 within two of the community activities - education and ritual. A more complete recursive unfolding of these five levels would involve extending the study to include the lower PPR , and all the communities it

contains. The work undertaken so far provides, we believe, a thorough representation of the various communities and the activities which occur within them.

The next stage of the analysis was to agree on the ‘primary community activities for survival’: again, we interpreted, in VSM terms, the primary community activities described through the social cartography, which are key to the survival and sustainability of the Pira Parana people. They included food production (called ‘chagras’ or family allotments in the jungle); fishing, hunting and gathering wild materials; building, cleaning and maintaining their houses (shelter); community house ceremonies and activities (Maloka); education (traditional and mixed); individual and ecosystems health (which they see as one single activity); and sport and ‘intercultural’ activities. Later analyses would reveal that small communities do not develop all these activities (i.e. sports and sometimes Malokas are often missing). See Fig 6 for the complete recursive analysis, including all the embedded community systems: It does provide the basis for understanding how ACAIPI interacts with the traditional structures.

Figure 6. Levels of recursive organisation – Piro Parana SES.



As can be seen in Figure 2 the core activities ACAIPI develop are related to only a few of the community's primary activities: health, education, environmental, women, historical and cultural, and research: these are all supported by regional, national and international

sponsors to implement their agreed Life Plan. In ACAIPI there is also representation of the sub-eco-regional level in decisions regarding to these issues; but there is no clear representation from the “Ethnic Groups’ level of organisation, although traditionally, each ethnic group governs itself at this level. Comparing Fig 6. And *Fig. 1* in *Appendix A*, is clear that ACAIPI is self organised on the basis of receiving development resources for specific issues, which leaves unmanaged the complexity of other major areas, such as food, hunting and gathering, trading, and cultural and ritualistic activities, the analysis will reconfirm, are core to their cultures and self-governance.

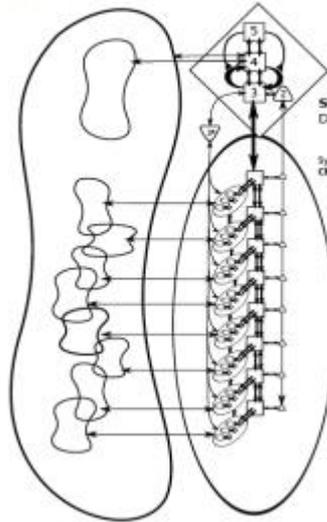
7.2. RECURSIVE VSM ANALYSIS

To do the VSM analysis, we used VSM distinctions to interpret and classify the information gathered from the indigenous of the different communities who participated in the project. On the basis of the previous mapping, we developed three sets of VSM analyses: a) VSM of the Pira Parana River social system with the three studied ethnic groups; b) VSM analyses for the Upper Parana River ethnic groups (Tatuyo and Eduria); and c) VSM of the Barasano people, the inhabitants of the Middle Parana River. Each VSM analysis included identifying the key roles participating in core decisions; and representing them in the VSM mapping with all the identified issues raised at the VSM workshops. In each mapping, the diagnostic points are labelled as Dx or Bx, where ‘x’ is the number given to the diagnostic point (we used Bx for the Barasano region). See Figure 7 for an example of the VSM analyses of the Barasano people; and *Figures D1 to D3* in *Appendix D*, for the other VSM mappings in the other communities analysed. Due to the volume of information collected, more detailed analysis from other communities in the sample from the Tatuyo and Eduria ethnic groups is not included here.

Based on all the detailed VSM analyses, and helped by conceptual mapping of the findings in the summary table illustrated in Appendix 3, we produced a summary of the self-governance dilemmas as currently experienced by the communities in the studied sub-eco- regions.

Figure 7. VSM diagnosis of a Barasano community

**System in Focus :
Piedra Ni
Large Community
in Barasano region.**



System 5 : Kubu. Eco-calendar. Life Philosophy
Diag. Points : B1 B3 B6 B17

System 4 : Kubu. Life plan
Diag. Points : B1 B4 B3 B14 B17

System 3 : Captain, Malakero, Malakera, Mingas.
Diag. Points : B4 B6 B16 B17

System 2 : Mingas. Community events, Values, Recorides
Diag. Points : B4 B6 B16 B17

System 1(a) Meta-system: Yabica "Seed Mother"
Chagra Diagnostic Points : B3 B12 B20

System 1(b) Meta-system: Men
Hunting/gathering Diagnostic Points : B18

System 1(c) Meta-system: Parents/ Grand-parents
Shelter Diagnostic Points : B2

System 1(d) Meta-system: Malokero/Malokera
Maloca Diagnostic Points : B1

System 1(e) Meta-system: Teachers / education leaders / Kubu
Education Diagnostic Points : B2 B5 B7

System 1(f) Meta-system: Kubu / Health leader
Health and Earth care Diagnostic Points : B2 B7 B3 B5 B10

System 1(g) Meta-system: Kubu / Malokero / Baya
Rituals Diagnostic Points :

System 1(h) Meta-system: Sports Resident
Sports and Intercultural Activities Diagnostic Points : B5 B22

As shown in Figure 7, and detailed in Appendices D, E and F, the nature of the main issues identified was:

- Traditional food production schemes should be strengthened (e.g. mingas), because in some communities there is lack of labour force to produce at the levels required by the community.
- Providing education on traditional food production in schools, could help minimize emerging food security problems and improve the diet.
- Need to re-establish respect for the Kubus, their traditions and rituals among the youth.
- Need to review the education budget and to ensure that activities such as cleaning are taken more back by the Community.
- Need to limit the use of the digital kiosk and Internet to moments of leisure and to ban them when there are other community activities need to be undertaken
- Need for more transparency in the management of community resources (eg. education budget) by the captains.
- In order to restore the social order, it's necessary to create collective spaces for Community decision-making, where captains and traditional authorities are equally represented and empowered.
- Community members should be educated in their Life Plan and cultural identity and invited to participate in a periodic review
- New and clear mechanisms for social coexistence need to be designed: i.e. punitive or social control mechanisms for theft, blackmail, violation, lack of values.

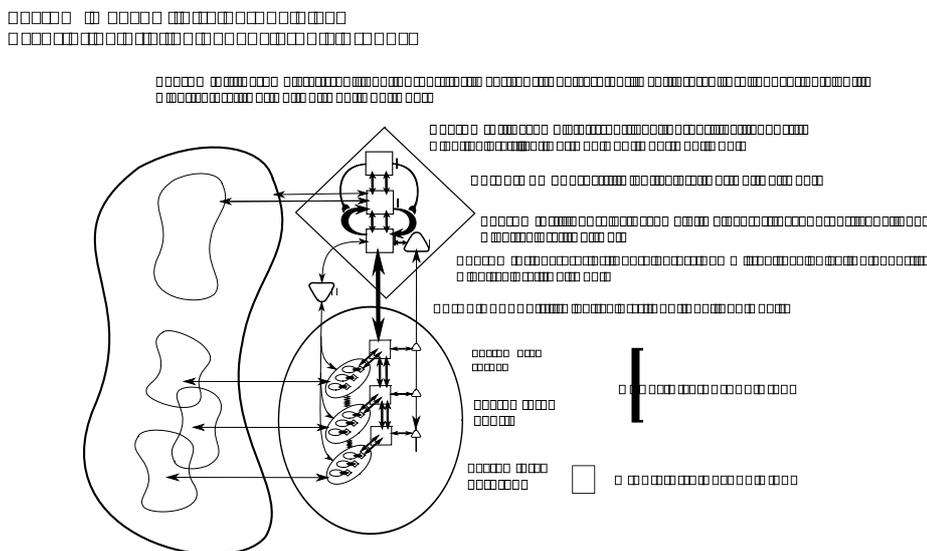
VSM analysis of Pira Parana River.

Fig. 8 summarizes the diagnostic points raised by the participants about self-governance in the entire PPR region. *Appendix F* presents details of the governance issues described by the participants at the regional level (PPR). In summary, the issues identified were about:

- In the current organization, ACAIPI effectively coordinates health issues, education environment, and women's research; but they do not have structures in place to coordinate debates and assessments on other important issues in their Life Plan, like: food production, hunting and fishing, trade and barter, rituals and sacred sites; and security.
- Managing the complexity of each of the communities in the Captains Assembly and the Assembly of Traditional Authorities take too long and decisions are too slow.
- A mechanism to articulate interests and decisions between the Assemblies of Captains and Assembly of Traditional Authorities is missing.

- Captains need to develop and coordinate teams involving community leaders, for implementing key community strategies
- It is necessary to design and develop a system of self-governance by ethnic group: There are no representatives of each ethnic group but from each community in the region.
- Need to generate mechanisms to review annually or biannually their Life Plan and to socialize and discuss it with people from each community
- Need to develop mechanisms of accountability on ACAIPI budget resources allocated to each community, and managed by the Captains
- Need to design a mechanism to pressure the government in the timely fulfilment of its commitments to ACAIPI (delivery of resources etc.)

Figure 8 VSM analysis of Pira Parana River.



7.3. GOVERNANCE FOR SUSTAINABILITY: SELF ASSESSMENT

For a typical community, as seen in *Appendix I, Table 1*, the weakest aspects revealed by the diagnosis level were about ‘lack of capability for closing the loops’, as well as

‘environments for decision making,’ and ‘enabling conditions for sustainable governance at each level’. Due to the lack of legitimacy of the Captains and conflict between them and the Kubus and Malokeros, as they are not always communicating well, some core issues for sustainability remain open and unresolved (e. g the cultural and economic shock that new education system is creating in the communities). They still do well on ‘working out what matters’, ‘real time information’, and ‘responding to changes in the environment,’ which in their traditional community governance structures used to be excellent. The analysis reveals that communities have lost adaptability as a consequence of limitations in ACAIPI governance structure: they are not responding effectively and rapidly to emerging sustainability challenges (e.g. climate changes affecting their food production system, youth not having traditional skills for food production and gathering), and therefore they have now less capabilities for adaptation and learning than they used to have. The paradox is that, at the same time, they have managed to preserve their identity and to keep the basic conditions to enable sustainable governance at the community level, so this is still marked as excellent.

As suggested in *Appendix I, Table 2*, ACAIPI in its current structure is failing to take collective decisions on those issues that are critical for their survival, but which are not sponsored by the Colombian government. Observing ACAIPI governance structure, it’s clear that most of the primary activities of the communities do not have a representation at the association level, so it’s less likely that they will be attended in a regular way by the ACAIPI members: there aren’t clear mechanisms or strategies so that actions in these fronts will be coordinated and synergies among regions enforced. This also relates to the score about synergies for S1s: opportunities for sharing resources and knowledge in anything different than education, health and women research are less likely.

The long delays in making decisions from Captains and also from traditional authorities explain the poor mark in ‘real time information’ and in ‘environments for decision making’. The evidence also suggested that many relevant conflicts among communities have not been properly addressed (e.g. disintegration of the ritualistic tradition, as the traditional roles continue disappearing because of lack of diet and transmitted knowledge; lack of transparency in the use of development funds), which explains the poor mark in ‘developing mechanisms to deal with conflicting interests’. It also reveals that some of the critical issues for sustainability like following the Ecological calendar or respecting the sacred places, are not always working: while in their traditional context the assessment at this level would had been excellent, we assess it as ‘good’ only, as it’s clear that the loss of this social control mechanisms is damaging their capability at this level.

The best marks were on ‘identity and closure’; and ‘enhancing individual autonomy’, as both issues are still central to their decentralised governance structure and still working very well.

7.4. Governance dilemmas and paradoxes

We have shown how the systemic intervention design chosen is helping the studied communities to clarify their self-governance paradoxes and dilemmas to remain sustainable; how their traditional values and roles permeate their self-governance decisions and institutions; and how these impact on their capabilities for self-governance in the multi-cultural context in which they are now embedded.

The analysis clarifies the nature of some of the core paradoxes and dilemmas that people of the PPR face in their relationships with the next organisational levels of recursion, that is, the Colombian Regional (Amazonian) Government and, above that, the regional Amazonian (Colombia, Peru, Bolivia, Brazil and Venezuela) structures. Some of the main paradoxes they face are:

1. New generations are more interested in learning about the white world and culture than in preserving the indigenous culture. Although there are constitutional, legal and financial mechanisms to protect the indigenous culture and habitat, some of these when implemented are producing the opposite effect, i.e. the unexpected result of developing their boarding schools.
2. The resources allocated by the Colombian government – which come with associated supportive roles for the community – bring about new power structures that are not aligned with the traditional ones, and thus are negatively affecting self-governance.
3. In Ashby and Beer’s terms the variety of the external environment, in which the communities operate (which now includes the “white” Colombian and international social systems) has increased dramatically, and the communities require, (for Requisite Variety or RV) an equivalent increase in the variety of the systems they use, to be viable in this new context. Digital Kiosk and mobile phones are excellent variety amplifiers for the community, but their impact hasn’t always been positive.
4. The regional governance structures lack requisite variety to make shared decisions on some of the primary community activities (chagras, hunting and gathering, traditional health and education); this is minimising the possibilities

of creating regional synergies and collaborative practices at these levels. Some of the newly agreed structures and processes are eroding the traditional culture and traditions.

5. The organisational systems, rituals and values which have existed for millennia, and which have resulted in a stable, sustainable society living in balance with its natural environment are still in place but are significantly weaker; their homeostatic mechanisms are fading away, and are being replaced by unbalanced roles and governance structures influenced by western values.
6. The leaders of the communities need to find effective ways of recovering and embedding in the new generations their original values and rituals, on which their knowledge and wisdom interacting with nature relies; the resources received for education could be better invested by learning again some of the traditional knowledge and skills.
7. The main dilemma they need to resolve involves the interplay of traditional and western values: they need to ensure the new generations are inspired by the traditional knowledge and made aware that their culture has evolved mechanisms far superior to western culture in terms of sustainability, while being exposed to the westernised knowledge they get through public schools.

With these analyses, we managed to make more visible the key limitations of the governance structures under study, at each level of embedded organisation: the recursive mapping clarified the boundaries of the systems in focus (associated communities), and allowed us to organise the levels of analysis. The VSM provided the analytical framework to identify and reflect upon structures, processes, strategies and mechanisms for the society's sustainability; and jointly with the complementary systemic and ethnographic tools and analyses, helped to visualise recurrent breakdowns in the homeostats between each system in focus and their niche. The discussions carried on with the participants has helped them to begin making collective decisions on central issues for their self governance, which when actioned, may enhance their viability and sustainability: Community leaders have continued the conversation and are already addressing identified shortcomings and challenges collectively. Evidence that the participants are aiming to act on the basis of their learning of this research (Reason & Bradbury, 2006) is that they a team of leaders are now travelling across communities to jointly discuss their Life Plan and actions to improve some of their identified governance failures.

For both, the community representatives and the technical team facilitating the workshops, the time spent in the workshops, was perceived as an educational process

where they gained knowledge about their own structures and processes; developed their skills to self-manage development projects in the community; and recognised the need to enhance specific capabilities for implementing their Life Plan and development strategies. In summary, we consider that these preliminary findings are helping the community to decide on ways to improve their self-governance challenges. These preliminary results are now being used to design a second stage of this systemic intervention which will include an in depth debate with the indigenous on action plans to collectively address the issues identified,' and to search for collectively designed solutions to progress towards sustainable self-governance.

8. DISCUSSION

Our study responds to Cuéllar-Padilla & Calle-Collado (2011); and Tavella & Hjortsø (2012), call for more evidence of how participatory, interactive and facilitated approaches help actors to address complex and uncertain problem situations during COR interventions. It provides empirical evidence on how participatory, interactive and facilitated approaches help actors in a multi-cultural context, to address complex problem situations regarding their own governance system, during a COR intervention. There follows a discussion on the contributions and new questions opened by this first stage of exploratory research.

8.1. On innovative applications of COR

Even if there have been many applications of the VSM in businesses and other institutions (see for example *Espejo & Harnden, 1989; Hoverstadt, 2008; Espejo & Reyes, 2011; Hardwood, 2012; Perez-Rios, 2012, Espinosa & Walker, 2016*), we haven't found many examples of VSM interventions to guide self-governance analyses in emerging economies, in the context of COR. Aiming to contribute to fill this gap, we offer here the first stage of exploratory research on using the VSM to support self-governance in Amazon indigenous communities. Our adapted methodology, enabled the participants to identify complex evolving governance issues in their self and intercultural governance: by using it, we created a context for meaningful and participatory engagement of the community to engage in a self-critical assessment of their governance structures. As a result, they enhanced their knowledge and understanding of their conflicting roles and values; by acknowledging them, they have already begun to generate agreements to begin acting upon their key weaknesses. The VSM inspired self-governance analyses helped visualizing and mapping at different levels and scales, the

core paradoxes and dilemmas that these endogenous communities are facing for self-governing to remain sustainable. It made evident that their core ethos, values and rituals traditionally permeated their self-governance decisions, but some of them are in decay due to intercultural exchanges (mostly from younger people). It also contributes to interdisciplinary research, by linking the eco-system, and anthropological approaches to research with the VSM approach: this complements *Gregory et al (2016)*'s example of innovative ways to learn from CAS to inform development of PSM in the context of a complex social ecological system (in their case, the marine environment).

8.2. On the use of systemic methodologies to support community development

This paper contributes to the literature on the use of COR within 'localist green communitarianism' (Midgley and Ochoa-Arias, 1999; 2004) and 'non-profit management' (Johnson and Smilowitz, 2012) by providing an example of how the systemic intervention supported actors in addressing their problem situation, which empower them for fostering changes to improve their governance structures. Core issues found in the V&S analyses showed that current community leadership conflicts are at the core of their self-governance weaknesses. Given the limited number of systemic interventions using VSM analyses combined with other systemic tools, to support community development - with exceptions as (Espinosa & Walker, 2013; Tavella, & Papadopoulos, 2014) this research contributes to an innovative application of the VSM in a complete new context. Its results suggest also a new and promising research path, to link VSM and leadership research, (e.g. by following *Breiger, (1979)* suggestions on community leadership styles and related tensions).

We contribute to this systemic research stream on community development in emerging economies, by creatively use methods to enhance the communities' social processes on learning about their own governance structures. Like suggested by Franco & Montibeller (2010), and illustrated by Henao and Franco (2016) facilitated modelling help the participants to progress their understanding (in our case of their governance structures and practices); and it is contributing to create a better context for their social learning process, in this case, about self-governance and sustainability

Our VSM analysis reveals the communities' weaknesses and challenges when dealing with the complexity of their main survival and development issues: it reveals that restoration of Requisite Variety for these communities in their interaction with their socio ecological niches, involves the preservation and recovery of their endogenous values,

knowledge and practices. Also it helped them to identify some missing roles and levels of governance that they are now aiming to develop jointly, for enhancing their current self-governance and for improving the skills they need, to better interact with the ‘white’⁸ civilisation they are now embedded in. Through the analysis we understood the need for further research to better understand and deal with the ethical and the magical dimensions of the community governance structures, which the study reveal that importantly impact the indigenous ways of implementing their life plans by respecting sustainability principles.

Similar to what Hjørsto (2004) suggests, the reported systemic intervention showed an alternative way to dialogue with the indigenous, having full involvement from them: and it resulted in people’s involvement with the VSM workshops, which inspired decisions about improvements in their governance structures. The VSM was particularly useful as a conceptual framework to inspire the questions to investigate; to filter and analyse massive amounts of generated data; to summarise and produce a valuable synthesis for each level of organization analysed. This ways it supported their social learning about the most obvious failures in their governance and their decisions on improvements. Like *Valqui Vidal (2009)*, this research offers another highly creative and innovative project, which in this case, may contribute to long-term and sustainable development in the Amazon Jungle. We contributed to their self-research approach of collectively learning about their social identity, through a systemic intervention which left them with clearer agreements and increased collective consciousness on key governance issues.

8.3. On COR Methodologies

Johnson & Smilowitz (2008) emphasize that for understanding community needs in particular neighbourhoods less descriptive and more prescriptive, research is desirable, hopefully considering long term modelling. Our research contributes to progress COR research in this direction, as it suggests an approach inspired in the VSM, aimed to jointly reflecting on the required capabilities to improve communities long term viability and sustainability. Following Midgley, Munlo, and Brown. (1987) we decided not to introduce our VSM expertise as a sacred knowledge to avoid some people feel like the ‘profane.’ Instead, we chose to summarise our understanding of the VSM regarding self governance for sustainability, in fewer and more appropriate questions; and to use systemic and social cartography (Restrepo & Velasco, 1998) for the self assessment on governance issues, following *Geurts and Joldersma (2001)* who demonstrate that

⁸ the indigenous call ‘white’ to all the non indigenous Colombians and foreigners who come to their lands

participatory methods which take into account the need for social interaction are more effective in complex policy making situations.

Following Bawden's (2005)'s suggestion that values, ethics, aesthetics, emotions, and passions are crucial dimensions to the process of judgment about what constitutes improvement, we decided to combine rich pictures and social cartography in the workshops, to make sure participants will be allowed to express their emotions and thoughts on their governance structures. With a similar intention than *Cronin, Midgley and Skuba-Jackson, (2014)* suggested for using 'Issues Mapping', our choices of mixing VSM with social cartography contributes to problem structuring methods as it enables dialogue by using new visual modelling techniques to clarify issues and develop mutual understanding between stakeholders. This proved to be fundamental for the success of the intervention in this indigenous research context. As explained in *Appendix A*, precious experiences in systemic participatory practice with GAIA helped participants to develop good skills for communicating through painting, as the available photographic evidence of their paintings demonstrates⁹.

As this exploratory starting stage of the project resulted in very creative joint conversations among experts and participants, it is more likely that the chosen systemic intervention approach may continue helping to ensure that analysts continue addressing significant problems for the communities, and that they are building up their capabilities for participation in self-governance and self-development initiatives.

8.4. On COR assistance to address power imbalances and related conflict

As revealed by the case study, each ethnic group had clear geographical, and cultural boundaries, but they share a common ethics, belief and mythology. These have a strong influence in the way they interact and co-exist in their multicultural and multi-ecological complex environment. It was clear at this case study: the rituals and ceremony varied sometimes between ethnic groups, but they all share the same 'sacred' knowledge (from the origin) and places. In such context it is not surprising that those bringing in any 'white' influences in their life, may be seen as 'profane'. Their decision making spaces are dominated by the new rather than traditional governance structures, and these structures are now conflictive, as the diagnosis made evident. Identifying and addressing issues of power imbalances and associated conflicts had been a key contribution from Critical Systems researchers as pioneered by pioneers on COR (Jackson, 1989, Carter et al, 1989). Following Jackson (1989; 50), this research contributes to demonstrate the relevance of COR to a wider range of problem situations (self governance analyses); and

⁹ For a more detailed view of the participants' paintings in the workshops, follow this link: <https://drive.google.com/open?id=0B2LxAwuUx0feMDJGTHlyU1dOVXM>

to enrich COR methodology (e.g. using the adapted and revitalise intellectual life through involvement in novel types of problems (the self governance traditions of Amazonian indigenous).

Further critical analyses of margins, ethics, profanity, ritual, and conflict, as described by *Midgley (2000, p. 144)* would be of great value, in the next stages of this research: for example in designing systemic tools for supporting the Assemblies when addressing the identified power related and conflictive governance issues. Also to explore the identities of the ethnic groups and the power struggles among their inter-cultural and traditional governance structures could be enriched by Midgley's , suggestions on ethical boundary judgements and conflict (Midgley's , Munlo, and Brown, 1988; Midgley & Ochoa-Arias, 2004). In further stages of this research, it'd be desirable to take Midgely et al (2013) suggestion to try their systemic evaluation framework: this will allow further comparison with similar or compatible systemic interventions and this way, strengthen its assessment.

8.5. Opening new research avenues

Considering *Barrios, Midgley and Pinzon's (2012)*, request for more research on analytical frameworks to study agent identities, we wanted to explore how identity impacts self- governance, as part of our self governance analyses. Our results revealed an open path for continuing studying the social process of learning of indigenous communities when deciding on their governance structures. Our research also complements Cohen (1994), who identified “magic” as an area of creativity that is essential to the life and maintenance of an organization, in particular, in volunteer organisations: he saw magic as the art of producing marvellous results by compelling the aid of spirits, or by using the secret forces of nature. We have illustrated in this study that the existence of coherent and consistent mechanisms, like organizational ethos of the indigenous –‘Hee Yaia Keti Oka’ (System 5); and values – like their Ecological calendar- (System 2), at embedded levels of social organisation, may contribute to the magic that maintains communities cohesive. And it seems to be the loss of this magic We aim, in forthcoming research to further explore how magic links to identity formation and therefore to self-governance, in the studied communities.

Summarising, this research contributes to widening the agenda of the operational research community by suggesting a structured way to supporting the analysis of multi-governance issues in an extremely diverse (and divergent) multi-cultural context using an improved systemic methodology; by exploring the usefulness of such systemic methodology to facilitate group learning about their governance structures with engaged communities in a multi-cultural context; and by offering a systemic toolkit for structuring

a reflection on the paradoxes and dilemmas found at each level of governance in a community organisation. It also complements ongoing VSM and governance research, by improving an existing approach (V&S) and the Self Transformation methodology to be used in this new context; and by providing an innovative application of managing complexity in another fast-paced and changing environment, see (Preece, Shaw & Hayashi (2014). In our case the VSM demonstrated being useful to ease the analysis of structural and governance improvements to adapt to the studied communities' changing socio ecological niche.

9. CONCLUSIONS

This paper contributes with an innovative application of COR, which explain how the adapted self transformation methodology creatively combined with critical and ethnographic tools have inspired a rich data collection and analyses; and how such way of asking core questions of governance for sustainability in a participatory and creative environment, revealed undiscovered issues and improved people's understanding of key governance issues, intimately related to ongoing conflicts between their traditional and modern ethos and values. It evidences the need for a more *ecocentric* approach to COR research and for further research on systemic methodologies to support governance for sustainability. In particular the indigenous' truly systemic view of nature and spirituality needs to be taken more seriously into consideration, as they have their own traditional system of knowledge and wisdom to govern themselves in harmony with their socio ecological systems. They believe in the science of knowledge of their territory, the ecological calendar and the sacred sites, all of which, has allowed their societies and natural resources to continue their cycle and keep diversity for long-term sustainability. Most modern societies haven't learnt (or perhaps have been forgotten) these lessons, which should to be at the root of any sustainability program. They use their ecological knowledge for the benefit of nature and human beings (they do not distinguish between the two): so that people and other beings can live well and develop physically and spiritually. This innovative type of research is relevant as many other surviving indigenous communities are facing similar challenges to their way of life as a consequence of their multi-cultural interactions with their national governments, and the wider global society; and also as a consequence of the changes to their natural environment resulting from climate change. We consider that the fact that they have

already learned other systemic practices is not a coincidence, as they feel more identified with systemic thinking than more traditional western rationalistic tradition.

The kind of governance paradoxes identified here gives us food for deeper thought regarding the nature of the very meaning of the COR research and the urgency to broaden traditional boundaries to address fundamental issues that have to do with spiritual and ethical norms, and the evolving social governance structures. In particular, how sustainability is enforced or deterred, as a result of the social embodiment of these norms in a culture which (unlike our western culture) can be seen to have a long term, sustainable and symbiotic relationship with the eco-systems in which it is embedded.

Acknowledgements: We want to acknowledge Dr. J Walker for his continuous insights and questions for developing this research; and for his help drawing all of the VSM Figures; to Andres Spath Botero for his drawing on the Pira Parana socio ecological system; to Nelson Ortiz and Jorge González from GAIA who supported C Duque in the fieldwork with the communities.

Supplementary data: Appendices A to I can be found in the online version.

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¹⁰ see more references in Appendix 'I'

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