A FRAMEWORK FOR COMMUNITY-BASED GOVERNANCE IN GRASSLANDS AND SAVANNAHS OF SOUTH AMERICA

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A Framework for Community-Based Governance in Grasslands and Savannahs of South America

Ph.D. Thesis submitted by Luca Eufemia, M.Sc.

Contents

SUMMARY

As grasslands and savannahs cover approximately half of the ice-free land area of the world, making up about 70 percent of the world's agricultural and livestock area, they are important agricultural resources, especially in areas where people lack food security. These ecosystems play a crucial role for sustainability issues, incorporating social-cultural, economic, and environmental values. They provide habitat for numerous plants and animals that are adapted to the unique hydrologic regimes and soil conditions. They also provide important ecosystem services, including climate regulation and water purification. Furthermore, there are cultural values in the form of knowledge about nature conservation and the sustainability of traditional subsistence systems embedded in local communities and indigenous peoples. Although there is a substantial literature covering biophysical, economic, natural science valuations, interdisciplinary, and socio-economic approaches, those including discourses on governance in developing countries are especially scarce. Hence, grasslands and savannahs likely represent the least understood biome in the world in terms of their true value for sustainable economic uses and the provision of sociocultural services that contribute to human health and well-being.

This dissertation tries to fill this gap by investigating local and environmental governance models embedded in grasslands and savannahs ecosystems, developing a novel framework that enhances community approaches. The rapid expansion of the agricultural and extractive frontier is driving the conversion of South American grasslands and savannas into a key source of food supplies with enormous consequences for social-cultural, economic and environmental values. In particular, this applies to rural contexts where strong economic pressures favor the accelerated incorporation of natural resources for immediate productive use. Governance models offer valid tools to solve a number of

conflicts, including the use and management of natural resources. They also help to promote the community perspective, where trust, inclusion, and commitment are key factors. In particular, Community-Based Governance (CBG), as a bottom-up organizational model, can increase the participation of local groups in the planning, research, development, management, and formulation of policies and strategies for the wider community. Decentralization of management tactics allows for addressing the territory's unique political, economic, and social problems. The attention and inclusion of local perspectives lead to a synthesis of collective problems and the development of joint solutions to solve them. Undoubtedly, CBG addresses socio-political-economic development in relation to the use and management of natural resources (e.g. grasslands and savannahs). Local cultures and traditional institutions are a key ingredient in prosperous and sustainable development, thus incorporating local and ancestral knowledge. Therefore, integrating traditional institutions in the use and management of natural resources is necessary to ensure sustainable development.

The following work follows a comparative approach of two selected areas of South America in order structure the complexity of governance processes. It focuses on the Colombian Llanos and the Paraguayan Pantanal, correlating the spatial relation of natural resource-dependent communities with socio-economic and environmental changes, along with power and hierarchical structure at all scales, political dynamics, and stakeholder engagement schemes. The hypothesis behind this work is that using a clarified, non-normative governance perspective in socio-economic and policy research can contribute to an improved understanding of socio-economic and political processes, including formal and informal ones, those embedded in larger and smaller social systems, as well as both vertical and horizontal socio-economic and political arrangements. Beyond the development of a specific framework for CBG, two practical and methodological tools are

generated. The Community-Based Governance Manual (CBGM), including a case study of the Colombian Llanos, and the Guidelines to Strengthen CBG in the Paraguayan Pantanal (CBGG) seek to promote the political, economic, and social analysis of community actors as well as scenarios addressing the socio-environmental and socio-economic problems that affect them. CBGM and CBGG may be regarded as concrete and tangible impacts on the field, as well as valid outlooks on expected future development of local and environmental governance models.

ZUSAMMENFASSUNG

Da Grasland und Savannen etwa die Hälfte der eisfreien Landfläche der Welt bedecken und etwa 70 Prozent der weltweiten Agrar- und Viehzuchtfläche ausmachen, sind sie wichtige landwirtschaftliche Ressourcen, insbesondere in Gebieten, in denen die Menschen keine Ernährungssicherheit haben. Diese Ökosysteme spielen eine entscheidende Rolle für Nachhaltigkeitsfragen, die sozio-kulturelle, wirtschaftliche und ökologische Werte darstellen. Sie bieten Lebensraum für zahlreiche Pflanzen und Tiere, die an die einzigartigen hydrologischen Regime und Bodenbedingungen angepasst sind. Sie bieten auch wichtige Ökosystemleistungen, wie z.B. Klimaregulierung und Wasserreinigung. Darüber hinaus gibt es kulturelle Werte in Form von Wissen über den Naturschutz und die Nachhaltigkeit traditioneller Subsistenzsysteme, die in lokalen Gemeinschaften und indigenen Völkern eingebettet sind. Obwohl es eine umfangreiche Literatur zu biophysikalischen, ökonomischen und naturwissenschaftlichen Bewertungen gibt, sind interdisziplinäre und sozio-ökonomische Ansätze, insbesondere solche, die Diskurse über die Regierungsführung in Entwicklungsländern beinhalten, Mangelware. Daher stellen Grasland und Savannen wahrscheinlich das am wenigsten verstandene Biom in der Welt dar, was ihren wahren Wert für eine nachhaltige wirtschaftliche Nutzung und die Bereitstellung sozio-kultureller Dienstleistungen, die zur Gesundheit und zum Wohlbefinden der Menschen beitragen, betrifft.

Die vorliegende Dissertation versucht, diese Lücke zu schließen, indem sie lokale und ökologische Governance-Modelle untersucht, die in Grasland- und Savannen-Ökosysteme eingebettet sind, und einen neuartigen Rahmen entwickelt, der in der Lage ist, gemeinschaftliche Ansätze zu fördern. Die rasche Ausdehnung der Agrar- und Rohstoffgrenze treibt die Umwandlung von südamerikanischem Grasland und Savannen

in eine Schlüsselgrenze für die Nahrungsmittelversorgung mit enormen Folgen für die sozio-kulturellen, wirtschaftlichen und ökologischen Werte. Dies gilt insbesondere für den ländlichen Raum, wo der starke wirtschaftliche Druck die beschleunigte Eingliederung natürlicher Ressourcen zur unmittelbaren produktiven Nutzung begünstigt. Governance-Modelle bieten gültige Instrumente zur Lösung einer Reihe von Konflikten, einschließlich der Nutzung und Bewirtschaftung natürlicher Ressourcen. Sie tragen auch zur Förderung der Gemeinschaftsperspektive bei, bei der Vertrauen, Einbeziehung und Engagement Schlüsselfaktoren sind. Insbesondere kann Community-based Governance (CBG) als Bottom-up-Organisationsmodell die Beteiligung lokaler Gruppen an der Planung, Forschung, Entwicklung, Verwaltung und Formulierung von Politiken und Strategien für eine breitere Gemeinschaft erhöhen. Die Dezentralisierung der Verwaltungstaktiken ermöglicht die Bewältigung der einzigartigen politischen, wirtschaftlichen und sozialen Probleme des Gebiets. Die Aufmerksamkeit und die Einbeziehung lokaler Perspektiven führen zu einer Synthese kollektiver Probleme und der Entwicklung gemeinsamer Lösungen zu deren Lösung. Zweifellos sollte sich die CBG mit der sozio-politisch-ökonomischen Entwicklung in Bezug auf die Nutzung und das Management der natürlichen Ressourcen (z.B. Grasland und Savannen) befassen. Lokale Kulturen und traditionelle Institutionen sind ein Schlüsselfaktor für eine prosperierende und nachhaltige Entwicklung und beziehen auch lokales und angestammtes Wissen mit ein. Daher ist die Integration traditioneller Institutionen in die Nutzung und das Management natürlicher Ressourcen notwendig, um eine nachhaltige Entwicklung zu gewährleisten.

Die folgenden Arbeiten folgen einem vergleichenden Ansatz zweier ausgewählter Gebiete Südamerikas, um die Komplexität der Governance-Prozesse zu strukturieren. Sie konzentriert sich auf das kolumbianische Llanos- und das paraguayische Pantanal-Gebiet und korreliert die räumliche Beziehung der von natürlichen Ressourcen abhängigen

Gemeinden mit sozioökonomischen und ökologischen Veränderungen, Macht und hierarchischer Struktur auf allen Ebenen, politischer Dynamik und Programmen zur Einbindung von Stakeholdern. Die Hypothese hinter dieser Arbeit ist, dass die Verwendung einer geklärten, nicht-normativen Governance-Perspektive in der sozio-ökonomischen und politischen Forschung zu einem besseren Verständnis sozio-ökonomischer und politischer Prozesse beitragen kann, einschließlich formaler und informeller Prozesse, die in größere und kleinere soziale Systeme eingebettet sind, sowie sowohl vertikale als auch horizontale sozio-ökonomische und politische Arrangements. Über die Entwicklung eines spezifischen Rahmens für die CBG hinaus werden zwei praktische und methodische Instrumente generiert. Das Community-Based Governance Manual (CBGM), einschließlich einer Fallstudie über das kolumbianische Llanos, und die Guidelines to Strengthen CBGG in the Paraguayan Pantanal (CBGG) versuchen, die politische, wirtschaftliche und soziale Analyse von Gemeindeakteuren sowie Szenarien zur Bewältigung der sie betreffenden sozio-ökologischen und sozio-ökonomischen Probleme zu fördern. Der CBGM und der CBGG können als konkrete und greifbare Auswirkungen auf Feldebene sowie als gültige Prognosen für die erwartete zukünftige Entwicklung von lokalen und ökologischen Governance-Modellen angesehen werden.

I LIST OF FEATURED PUBLICATIONS

1. **Eufemia, L.**, Morales, H., Bonatti, M., Graser, M., Lana, M., & Sieber, S. (2019). Collective Perception of Anthropic and Extractive Interventions in the Colombian Llanos. *Social Sciences*, *8*(9), 259. (Article 1.)
2. **Eufemia, L.**, Schlindwein, I., Bonatti, M., Bayer, S. T., & Sieber, S. (2019). Community-Based Governance and Sustainability in the Paraguayan Pantanal. *Sustainability*, *11*(19), 5158. (Article 2.)
3. **Eufemia, L.**, Bonatti, M., Sieber, S., Schröter, B., & Lana, M. A. (2020). Mechanisms of Weak Governance in Grasslands and Wetlands of South America. *Sustainability*, *12*(17), 7214. (Article 3.)

II PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC

1. Bonatti, M., Lana, M. A., D'Agostini, L. R., de Vasconcelos, A. C. F., Sieber, S., **Eufemia, L.**, da Silva-Rosa, T., Schlindwein, S. L. (2019) Social representations of climate change and climate adaptation plans in southern Brazil: challenges of genuine participation. *Urban Climate 29*, Article 100496.
2. **Eufemia, L.**, Bonatti, M., & Sieber, S. (2018) Synthesis of Environmental Research Knowledge: The Case of Paraguayan Pantanal Tropical Wetlands. *Sustainable Agriculture Research, SAR, 7*(4), 125-133.
3. Bonatti, M., Bayer S., **Eufemia, L.**, & Sieber, S. (2019) Pathways to improve PAG in a Challenging institutional setting: The case of the Río Negro National Park in Paraguay. *Journal for Nature Conservation* (under revision)
4. Graser, M., Bonatti, M., Eufemia, L., Morales, H., Lana, M., Löhr, K., & Sieber, S. (2020). Peacebuilding in Rural Colombia—A Collective Perception of the Integrated Rural Reform (IRR) in the Department of Caquetá (Amazon). *Land*, *9*(2), 36.

III NON-PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC

1. **Eufemia, L.**, Bonatti, M., & Lana, M. A. (2018). Colombia's rural development must honour peace agreement. *Nature*, *560*(7716), 29.
2. **Eufemia, L.**, Bonatti, M., Castro-Nunez, A., Lana, M., Morales, H., & Sieber, S. (2019). Colombia's inadequate environmental goals. *Science (New York, NY)*, *364*(6439), 444.
3. **Eufemia L.**, Bonatti, M. & Sieber, S. Community-Based Governance Manual. Case Study: Municipality of Paz de Ariporo, Casanare (Colombia) (English/Spanish). Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) SusLAND: Sustainable Land Use in Developing Countries, Leibniz Centre for Agricultural Landscape Research (ZALF e. V). Müncheberg, Germany (2019)
4. **Eufemia L.**, Bonatti, M. & Sieber, S. Fortalecimiento de La Gobernanza Comunitaria en el Pantanal Paraguayo (Distrito de Bahía Negra, Alto Paraguay, Paraguay). Reporte WWF Paraguay. Asunción, Paraguay (2019)

IV LIST OF FIGURES AND TABLES

V LIST OF PHOTOS

VI ABBREVIATIONS AND ACRONYMS

BMU: German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety

CBG: Community-Based Governance

CBGG: Guidelines to Strengthen CBG in the Paraguayan Pantanal

CBGM: Community-Based Governance Manual

CBNRM: Community-based natural resource management

CPR: Common-Pool Resources

FAO: Food and Agriculture Organization

GAF: Governance Analytical Framework

HU: Humboldt University of Berlin

IAD: Institutional and Development Framework

IKI: International Climate Initiative

LPP: Bolivian Popular Participation Act

NIE: New Institutional Economics

Ph.: Photo

Sulu2: Land Use Change in Savannahs and Grasslands

SusLAND: Sustainable Land Use in Developing Countries (ZALF e. V).

TEK: Traditional Ecological Knowledge

UCINY: Unión de las Comunidades Indígenas de la Nación Yshiro

UN: United Nations

UNESCO: United Nations Educational, Scientific and Cultural Organization

WWF: World Wildlife Fund for Nature

ZALF: Leibniz-Zentrum für Agrarlandschaftsforschung

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To conclude, this dissertation is dedicated to those struggling with learning disorders.

Chapter 1: Introduction

The concept of governance is gaining momentum and a broader meaning. While it may have started as a product of academic debate on the transformations of State, as well as the analytical and perspective discourse of various international agencies, it now also transcends collective systems, including nations, political/economic regimes, and good government. In addition to being an instrument for handling public affairs or a gage of political development, governance is an increasingly valuable tool for improving the credibility and inclusion of the public sphere (Ansell and Torfing 2016; Doornbos 2011). Alongside numerous characterizations, its manifestation reflects changes occurring at the level of theoretical conception of empirical reality about how organizational networks (e.g. civil society, the private sector, and the public sector) function (Fosci 2013; Halsall et al. 2013; Hempel 1996; Iribarnegaray and Seghezzo 2012; Larson and Soto 2008; Lockwood et al. 2010; Provan and Kenis 2008; Raco and Flint 2001; Shah 2006; Williamson 1996).

Within the socio-economic and political context of state reforms in South America, initiated in the 1980s, governance practices play an important role in decision-making processes, becoming increasingly permeable to the influence of international, national, regional, and local actors. In complex extractive development models, resource-dependent economies struggle to balance democratization processes of political regimes with the transition from state-centric development to a global market-centered one (Brand 2016; De Castro et al. 2016; Hempel 1996; Zurbriggen 2011). Above all, neo-extractivism, as a strategy of capital investment often incentivized by national states, fails to account for environmental costs; rather it only tracks the productive growth of intensive resource exploitation. This negatively impacts biophysical processes, vulnerable ecosystems, and

territorial populations, especially indigenous ones (Acosta 2011; Bárcena 2013; Brand 2016; Eufemia et al. 2019; Gudynas 2009; Hempel 1996; Llambí 2016).

For instance, the rapid expansion of agricultural and extractive activities is driving the conversion of South American grasslands and savannahs into a key source of food supplies with enormous consequences for the environment, as well as local communities, identities, and cultures (Eufemia et al. 2019; Heidenreich 2009; Hoogesteijn and Hoogestein 2010). This applies especially to rural contexts, where strong economic pressures favor the accelerated incorporation of natural resources for immediate productive use, often generating socio-ecological conflicts (Abe et al. 2016; Acuña 2016; Clement 2010; Fosci 2013; Hoogesteijn and Hoogestein 2010; Raco and Flint 2001). Additionally, since a holistic understanding, as well as wide-ranging and interdisciplinary knowledge about South American grasslands and savannahs is still scarce, there is virtually no socio-economic research (Eufemia et al. 2018). As a result, the quality of policy decisions and implementations may be negatively affected.

Novel academic approaches to governance stress the importance of increasing and diversifying, from both qualitative and quantitative perspectives, science-based research in these ecosystems. This academic contribution presents a bottom up analytical framework for Community-Based Governance (CBG), which is thought to enhance community-approaches in the grasslands and savannahs of South America. The main reason for this lies beyond the diversity of the biological ecosystem biological and communal culture (Blydenstein 1967; Heidenreich 2009; O'Mara 2012; Suttie et al. 2005). It may have the ability to create, develop, improve, and re-shape local projects and programs on governance and sustainability (Acuña 2016; De Castro et al. 2016; Eufemia et al. 2018). Within the complexity of sustainable development, broadening academic approaches to account for socio-economic and cultural perspectives is required. From this perspective,

this dissertation addresses the concept of development with regard to problem framing, which focuses on the interconnectedness of socio-ecological-cultural issues and their impact on the use and management of natural resources (Fabricius et al. 2007; Vandenberghe 1999).

1.1 Decentralization and local governance

The historic process of decentralization of government is one of the most significant trends of state transformation in South America. This development produced a broad literature on the pros and cons of decentralization, as well as subnational politics and political economy, but few attempts to explain the challenges of local and environmental governance, especially with regard to the use and management of natural resources (Dahal et al. 2002; Iribarnegaray and Seghezzo 2012; Willis et al. 1999; Zurbriggen 2011). The initial proposals for reforms, inspired by the neoliberal paradigm,[1] intended to develop decentralization measures as a way to improve local public services, in terms of efficiency, effectiveness, and community inclusion. This challenge was twofold. On the one hand, it aimed to improve the extension and strengthening of democratic institutions. On the other hand, it sought to create incentives for local economic development. Based on this proposal, local governance appeared as a relevant management model to achieve those purposes.

Under this scenario,[2] an important process of political, fiscal, and administrative decentralization took place in South America starting in the 1980s (Zurbriggen 2011).

[1] It focuses on identifying the unregulated free-market capitalist order as the central ground for all efficient resource allocation (Vincent 2009).

[2] In the context of South America, other proposals for decentralization also arise from a more neo-structuralist to a more radical vision, for which decentralization is considered a progressive measure to combat inequities and undemocratic behaviours. This is often regarded as the basis of alternative forms of power, from the perspective of a broad democratic reconstruction of the State. Participation

Although there are substantial differences between the States in the region, a common overview may be assumed in three main parts. The first was the so-called political decentralization, expressed through the introduction of direct elections by municipal governments, as well as the creation and strengthening of sub-national entities and institutional consultation mechanisms. The second regarded transferring financial and economic resources from the central government to the sub-national institutions. The third part focused on administrative decentralization processes, including the decentralization of basic services (e.g. infrastructures) and social structures (e.g. education, health, housing etc.) (Daughters and Harper 2007). Hence, diverse and heterogeneous management experiences of local governance exist. Some examples include participatory budgeting in Brazil since 1989 (case of Porto Alegre), the Bolivian Popular Participation Act (LPP) of 1994, the Colombian Constitutional reform of 1991 (decentralization of public finances), and the Paraguayan Constitution on the Statute of the Indigenous Communities (Acosta and Bird 2005; Daughters and Harper 2007; Eufemia et al. 2009; Garcia and Bodin 201; Iribarnegaray and Seghezzo 2012; Zurbriggen 2011).

Notwithstanding this development, over the last decade, both public debates and the scientific literature are increasingly questioning if decentralization inherently leads to the better provision of services to locals, to the better use and management of natural resources, as well as to greater transparency and better democracy (Ángel Lara 2002; Bardhan 2002; Clement 2010; Dahal et al. 2002; Soto and Gómez 2012). A large number of studies show that the quality of public services at the local level is less related to the effective exercise of governance and more to factors like the institutional capacities of the public sector. The latter includes the transparency of decision-making processes, such as

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is not understood as an instrument that improves the effectiveness of the State and the acceptance of policies, instead it is seen as an instrument for transforming power relations (Assies 2003).

elements of control, access to information, the stability of institutions (e.g. political and economic, formal and informal), and the independence of the judicial system (Acosta 2011; Alston et al. 1996; Brand 2016; Gudynas 2009; Hempel 1996; Larson and Ribot 2004; Llambí 2016; Soto and Gómez 2013). Often, relations among the State and civil society, especially in rural contexts, appears filled with forms of authoritarianism, patronage, as well as resistance to citizen control and transparency over the use and management of public affairs and natural resources (Abe et al. 2016; Ángel Lara 2002; Dahal et al. 2002; Kay 2016). It may be argued that decentralization processes under the predominance of the neoliberal paradigm have created an institutional framework that does not really facilitate democratic strengthening, territorial development, and sustainable development.

To address these challenges, a new debate on governance models, able to guide State policies and sustainable projects, is required. In addition, the active inclusion of a growing number of actors (e.g. NGOs, international agencies, private actors etc.) and their corresponding interests is now critical. The dilemma of local governance should not be reduced to defining the agenda and the objective of a policy, but rather incorporating the political, economic, cultural, and institutional context within which it is situated. In this light, environmental governance approaches may produce principles, along with methodological or analytical tools (e.g. Framework for CBG), suitable for addressing social relations and practices, as well as influencing how societies relate to the use and management of natural resources (Abe et al. 2016; Dahal et al. 2002; De Castro et al. 2016; Eufemia et a. 2019; Hare et al. 2018; Raco and Flint 2001).

Chapter 2: Structure

2.1 Research objectives

The overall objective of this dissertation is to develop a framework for Community-Based Governance (CBG) in the grasslands and savannahs of South America, thus enhancing community approaches. Drawing upon the theory of political ecology, developmental theories, as well as participation and representation studies, this analysis contributes to the broader scholarship on local and environmental governance. Its main objectives are:

- To investigate the relation between governance processes and sustainability in the study areas;
- To analyze the determining factors of success for governance models; and
- To develop empirical insights on the complexity of governance processes, addressing socio-economic and environmental changes, as well as power and hierarchical structure at all scales, political dynamics, and stakeholder engagement schemes.

2.2 Synopsis of this work

This cumulative dissertation addresses its research objectives through a three-step research approach. For two selected case studies of grasslands and savannahs of South America (the Colombian Llanos and the Paraguayan Pantanal), a comparative analysis suggests practical insights on local and environmental governance. Accordingly, three peer-reviewed publications provide empirical evidence on the political economic and social perspectives embedded in the use and management of natural resources.

In this dissertation, Chapter 3 provides the theoretical framework that guided the research analysis. First, the chapter outlines political ecology as the main foundation, not only

concerning conflicts of ecological distribution, but also with exploring power relations that are interwoven between sustainable development and the globalized world in a new light (Section 3.1). To reinforce this, two theories of socio economics and participatory development are presented and discussed (Section 3.2 and Section 3.3). Each approach describes the impacts of intensive exploitations of resources on the environment, local communities, identities, and cultures.

Chapter 4 provides the research design and the methods applied. The whole comparative structured follows a three-step data analysis procedure.

The results section (Chapter 5) comprises three peer-reviewed publications. For each research objective, one academic study presents empirical evidence on environmental governance insights and discusses respective limitations.

Chapter 6 synthesizes the results, identifies shortcomings of existing governance models, acknowledges research limitations, identifies remaining open questions, and draws conclusions for future methodological and practical development of CBG models.

Chapter 7 concludes the dissertation by presenting two practical tools for practitioners and local communities in the grasslands and savannahs of South America: the Community-Based Governance Manual (CBGM), including a case study on the Colombian Llanos, and the Guidelines to Strengthen CBG in the Paraguayan Pantanal (CBGG). Both documents seek to promote the political, economic, and social analysis of community actors as well as scenarios to address the socio-environmental and socio-economic problems that affect them. The CBGM and the CBGG may be regarded as concrete and tangible impacts on the field, as well as valid outlooks on expected future development of local and environmental governance models. Figure 1 presents the overarching research framework, visualizing

the whole PhD process from problem identification to solution framings, as well as planning, execution, and the framework developed.

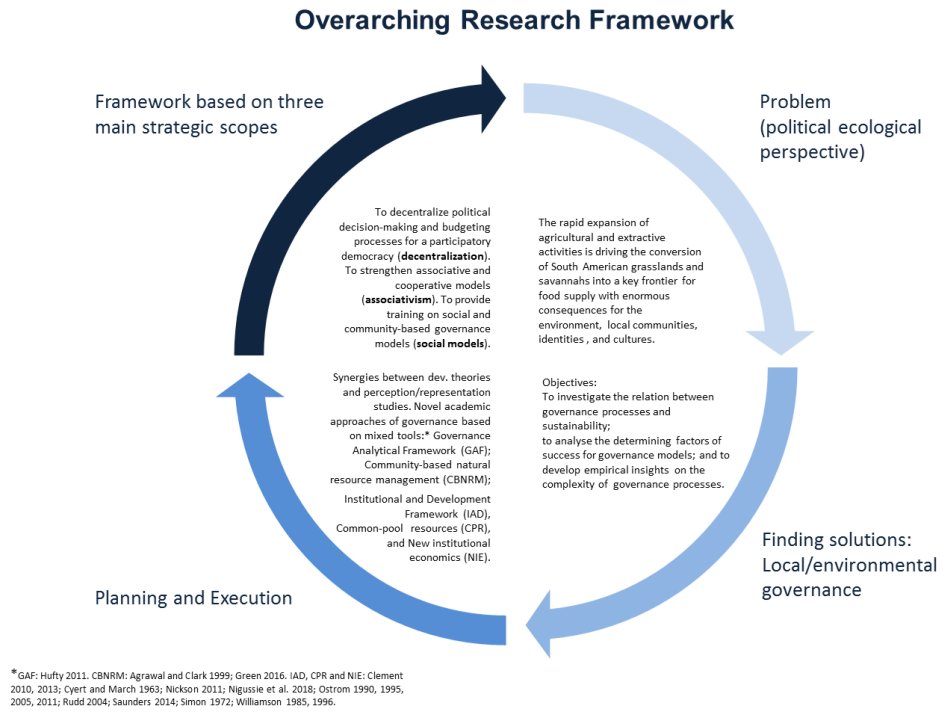

Figure 1: Overarching Research Framework

(Source: Luca Eufemia)

Chapter 3: Theoretical framework

In this chapter, the theoretical concepts, apropos governance processes and sustainable development, are situated in the socio-political and economic literatures. For each key publication, Figure 2 visualizes the logic and links between theories, theoretical frameworks, applied approaches, and results (see Chapter 5). The following subchapters discuss the main theoretical approaches: political ecology, including its relevance to the theoretical tools applied in this dissertation, development theories, and perception/representation studies.

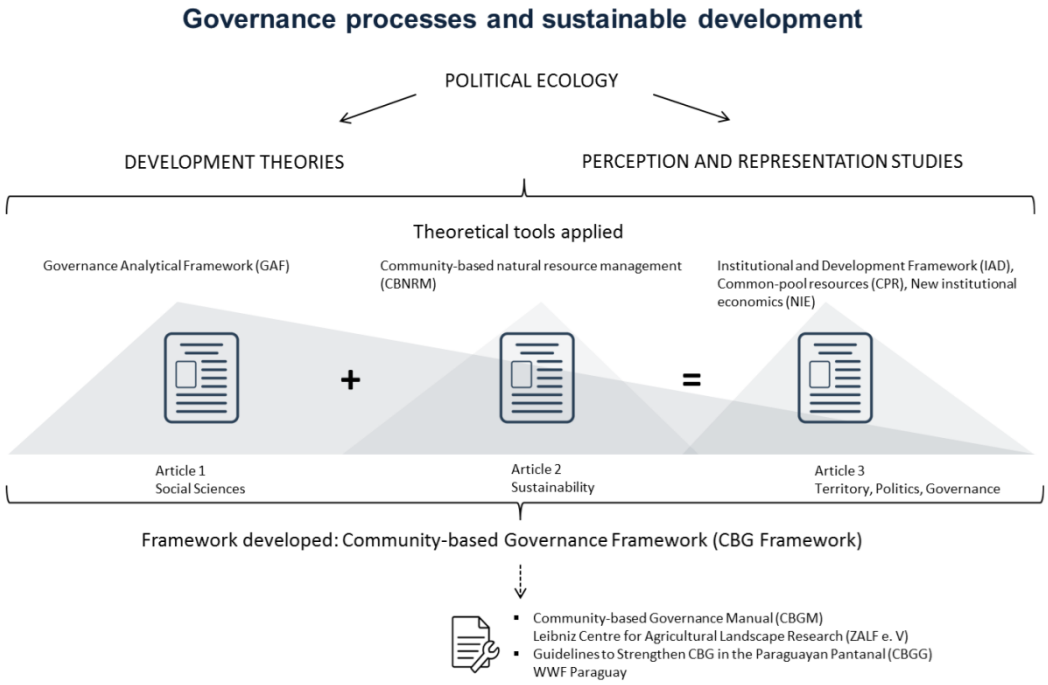

Figure 2: Theoretical design concerning governance processes and sustainable development

(Source: Luca Eufemia)

3.1 Political Ecology

From the late 1970s, investigating the relationships between political, economic, and social issues, along with their ties to ecology, resulted in the politicization of environmental phenomena. The wide scope and the interdisciplinary nature of political ecology lead to multiple interpretations (De Castro et al. 2016; Escobar 1999; Forsyth 2004; Goldman et al. 2011; M'Gonigle 1999; Martinez-Alier 2002; Peet et al. 2010; Robbins 2011; Watts 2000). Yet, three common assumptions about the theoretical practice and use are generally agreed upon among academics and political ecologists (Bryant and Bailey 1997):

- Environmental changes do not affect society homogeneously. Political, social, and economic differences determine the uneven distribution of costs and benefits;
- Any environmental change must affect the political and economic status quo; and
- The inequitable distribution of costs and benefits, along with its impact on pre-existing inequalities, have political implications in terms of altering power relations deriving from them.

Decision making procedures over the use and management of natural resources, land use changes, biodiversity loss, and the erosion of traditional cultures are the central focus of political ecology (De Castro et al. 2016; Martinez-Alier 2002; Olivos 2013; Ostrom 1995, 2005; Robbins 2011). In light of environmental governance processes, academic studies on theories of social movements and cooperation movements use political ecology to describe current situations and their causal variables (Blaikie 2008; Goldman et al. 2011; Ostrom 1990). Environmental destruction and over-exploitation are caused by the excessive use of natural resources, corresponding to the (often unregulated) increase of production and economic output. Conflicts arising from this are related to the political economic scenario and the social context in which there is a constant dialectic of transition and change

between natural resources and social groups (Agrawal and Clark 1999; Blaikie 2008; Blaikie and Brookfield 1987; Eufemia 2019; Leff 2003). Typically, these derive from various understandings/knowledge, often antagonistic, about the meaning of nature and its resources, where political and cultural values overflow the field of politics and economics, including political economy of environmental goods and services (Avery and Boadu 1998; Walker 2007). Therefore, political ecology is built upon the interaction, confrontation, and hybridization of these unlike and heterogeneous rationalities.

In the socio-economic context of South America, beyond exploring these rationalities as dialectical opposites, political ecological research is able to contextualize the regional environmental and political history. Its roots go back to a context of post-colonial and anti-imperialist resistance, where cultural identities shape the meaning of nature and its resources, including developing strategies of sustainable development (De Castro et al. 2016; Leff 2003). For instance, effective practices of political ecology include the development of black communities of the Pacific in Colombia, the representation of social movements, like La Vía Campesina, across the region, as well as the self-governance and popular participation of indigenous communities in Southern Bolivia (De la Cadena 2010; Grueso et al. 2003; Humphreys Bebbington 2010; Massicotte 2010; Offen 2003; Rosset and Martinez-Torres 2013). These identities were shaped, and often transformed, through struggles of resistance, affirmation, and reconstruction of cultural identities against environmental changes (e.g. land use change, deforestation, degradation etc.) driven by economic globalization (e.g. growing global demand for commodities) (Leff 2003).

While rethinking human-nature relations and interdependences, political ecology suggests the analysis of processes in and about the value and exploitation of natural resources that are neither resolved by economic valuations of natural assets nor by environmental/ecological policies/norms for economic development (Anderson and

Rockel 1991; Barbier et al. 1997; Brander et al. 2006; Leff 2003; Peet et al. 2010). However, the existing literature rarely integrates conceptual theories of socio economics and participatory development into the narrative of governance processes and sustainable development (Canto Chac 2008; Forsyth 2004; Holsworth 1979; Walker 2007). By addressing this gap, this dissertation aims to contribute significantly to the socio-economic literature.

The political ecological approach of this dissertation is supported by development theories (e.g. neo-extractivism) as well as perception and representation studies (Section 3.2 and Section 3.3). From these, four tools are applied in order to benefit the entire theoretical framing (Figure 2), as well as to sustain our methodological procedures (Section 4.2). These are: the Governance Analytical Framework (GAF) (Articles 1, 2, and 3) (Hufty 2011), Community-based natural resource management (CBNRM) (Article 2) (Agrawal and Clark 1999; Green 2016; Sattler et al. 2016), the Institutional and Development Framework (IAD) (Clement 2010, Clement 2013, Nigussie et al. 2018; Ostrom 2005; Rudd 2004), Common-Pool Resources (CPR) (Nickson 2016; Ostrom 1990, 1995, 2011; Saunders 2014) and New Institutional Economics (NIE) (Barzel 1997; Cyert and March, 1963; Ollila 2009; Simon 1972; Williamson 1985, 1996) (Article 3). The Community-Based Governance Manual (CBGM) and the Guidelines to Strengthen CBG in the Paraguayan Pantanal (CBGG) are the practical outcomes of this empirical research, both developed under the focus of development theories as well as perception and representation studies.

3.2 Development theories

Over the past century, the notion of development is one of the most elaborated, studied, and analyzed topics to account for positive changes in society. Most theories draw on socio-economic and political science disciplines, frames, and approaches (Chang 2011; Lewellen 2006; Oman and Ganeshan 1991; Pieterse 2010; Reynolds 1969; Vandenberghe

1999; Verdum 2010). They associate development with national economic growth, describing the centrality of the state and its roles. As a result, one of the core concerns of development theories is to investigate the nature and ties between national/regional governments and the market (Halperin 2013). Although many differences and conceptualizations on the ways to achieve growth exist, development theories are driven by the definition of growth and the development it produces (Halperin 2013). Alongside the neoliberal aim to reduce or dismantle state planning, public ownership, and government regulation of economic activities, one perspective advocates for a larger role of the state in development. These competing viewpoints produce political and ideological debates about growth and governance as well as, in particular, what constitutes good governance in the global context of development (Chang 2011; Halperin 2013; Ramos 2013).

In South America, because of the peculiarities of emerging and resource-dependent economies, an increasing body of literature and policies, as well as public debates, focus on the ties between development and how natural resources are used and managed. This perspective is strictly related to the concept/problem framing of sustainable development versus that of extracting natural resources (De Castro et al. 2016). A growing number of regional studies on political ecology, environmental economics, and political science theorize on the developmental model of extractivism or neo-extractivism,[3] raising questions about the close relationship between intensive exploitation of natural resources, democracy, violence, and human rights violations (Acosta et al. 2012; Brand 2016;

[3] Difference between the two concepts/definitions: Extractivism represents technical systems/ processes of extracting natural resources, and it may be present in pre-capitalist, capitalist, or communitarian societies; Neo-extractivism is an evolution of extractivism, situated in the context of a new global pattern of interconnected markets and capital accumulation that include fundamental geopolitical networks (e.g. China as main investor and importer of global commodities) (Lander 2014)

Gudynas, 2009; Alimonda, 2011; Escobar, 2011; Ramos 2013; Verdum 2010). The common idea across these diverse perspectives is the importance of sustainability for ecosystems and society, in contrast with "the rational utilitarianism" inherent in mainstream neoliberal economic thought (Nelson 1995).

Based on the aforementioned arguments, in this dissertation, neo-extractivism is the main development theory used to describe the economic and political model based on the commodification and exploitation of natural resources, specifically in the context of grasslands and savannahs (Acosta 2011; Brand 2016; Carvajal 2016; De Castro et al. 2016; Eufemia et al. 2019; Gudynas 2009; Hempel 1996; Llambí 2016; Ramos 2013).

In light of neoliberalism and globalization, the extractive frontier in both case studies (the Colombian Llanos and the Paraguayan Pantanal) has expanded rapidly, generating pressure on natural ecosystems, as well as local communities, identities, and cultures (Acosta et al. 2012; Eufemia et al. 2019; Heidenreich 2009; Hoogesteijn and Hoogestein 2010; Swarts 2000). According to Carvajal (2016, p.10), the current extractive developmental model promotes a narrative that can be summarized in three simple arguments:

- Neo-extractivism positions economic growth as the ultimate asset, prevailing over human rights and the right of people to self-determination;
- Neo-extractivism underestimates indigenous communities, denying the existence/relevance (either cultural or economic) of ancestral territories and local-knowledge; and
- Neo-extractivism rejects any forms of opposition (e.g. organized local group etc.).

3.3 Perception and representation studies

The development of perception and representation studies contribute to a better understanding of human realities, where collective voices (e.g., the understanding and reactions to risks and problems) depend on different characteristics and relations (cultural, historical, political, etc.) (Bonatti, 2011; Carterette and Friedman 1982; Castilla 2006; Eufemia et al. 2019; Jodelet 2000; Geertz 1973; Piña Osorio and Cuevas Cajiga 2004). Perception is associated with judgments, assignments, memories, emotion, motivation, representations of the environment, and meanings of social structure reproduction (Bonatti 2011; Carterette and Friedman 1982; Castilla 2006; Eufemia et al. 2019; Heft 1997; Merleau-Ponty 1996; Moscovici 1988; Steelman and Carmin 1998). It is an essential part of consciousness. It is the part that consists of intractable facts and, therefore, constitutes reality as it is experienced. The process of knowledge of objects, facts, or truths, whether through sensory experience or through thought, forms a spatial awareness of objects and knowledge of the physical world (Carterette and Friedman 1982; Castilla 2006; Merleau-Ponty 1996). Therefore, perception is both a way of thinking and an immediate behavior.

Space is not an abstract element in which things are suspended, but rather the universal power of their connections (Eufemia et al. 2019). From the intimate subjectivity to a broader group of the collective perception of the issues at stake, representation studies serve to relate the world of everyday life to the spaces/objects with which the actors represent themselves (Jodelet 2000; Piña Osorio and Cuevas Cajiga 2004). They are a means to interpret reality and determine the behavior of the members of a group towards their social and physical environment with the object represented. A number of scholars, exploring social constructions of community-shared concepts with respect to the role played by environmental, socio-historical, and economic processes, argue that representation not only determines the action but can also change the actions and produce

new behaviors (Bonatti 2011; Floriani 2003; Heft 1997; Jodelet 1986; Moscovici 1988; Steelman and Carmin 1998). In addition, it contains images that condense meanings (Jodelet, 1986), which make it an important reference to interpret what happens in everyday reality. For instance, the place-related social and cultural identity, expressed in both the collective and individual relationship with geophysical and geographical space, may form an important dimension of environmental attitudes and development.

In this dissertation, perception and representation studies manifest themselves in a cognitive dynamic of the spatial relation of natural resource-dependent communities with socio-economic and environmental changes, as well as an understanding of the processes of social interaction. In the perception and representation of social reality, the subject does not act as a reproducer, instead as a creator from his cognitive systems (Jodelet 2000; Piña Osorio and Cuevas Cajiga 2004). From this, the means by which communities perceive and represent the issues at stake affects the way they relate to new environments, both physical and intimate (Eufemia 2019; Heft 1997). This implication may affect the development and alterations of traditional knowledge and local culture. When this concept entails cultural identity and the relation with space, the role of collective perception and representation can help shape new paradigms for environmental governance and sustainable development (Bonatti 2011; Lander 2014; Peñuela et al. 2014; Peñuela and Fernández 2010; Steelman and Carmin 1998). This work contributes to the body of knowledge on the social constructions of community-shared concepts with respect to the role played by environmental, socio-historical, and economic processes.

Chapter 4: Research design

In this section, the research design underlying the overall objective of this work is built (Figure 3). It is composed of three main research phases. Phases 1 and 2 address specific research objectives, generating corresponding publications (Articles 1, 2 and 3). Phase 3 represents the outreach approach of this work.

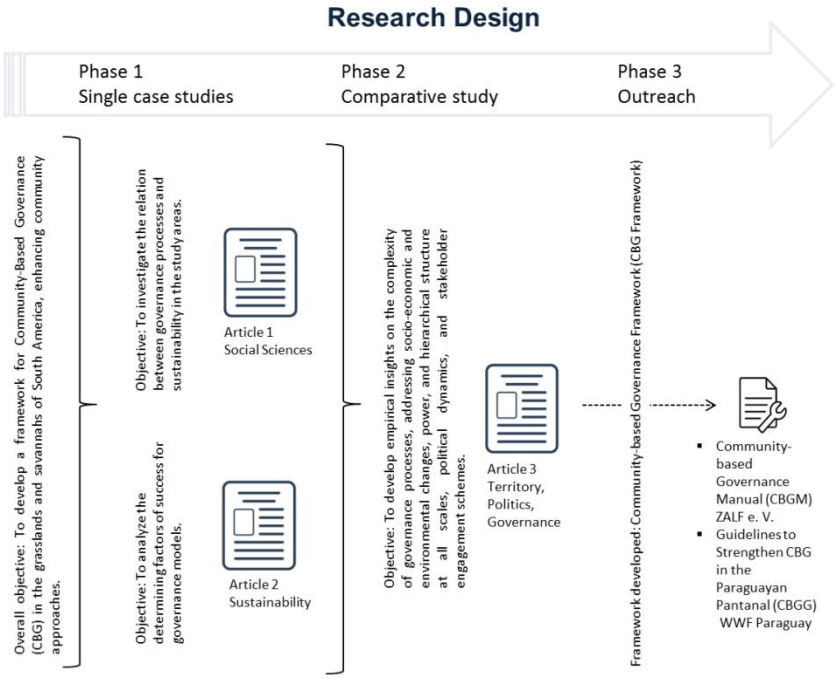

Figure 3: Research design

(Source: Luca Eufemia)

4.1 Research questions

The logic of the research design is to logically and rigorously investigate governance processes and sustainable development, contributing to the broader scholarship on environmental governance. Based on the three specific research objectives (Section 2.1), this dissertation addresses and answers three research questions.

Research question 1:

How relevant is local culture to sustainable development?

(Related objective: to investigate the relation between governance processes and sustainability in the study areas – Article 1)

To understand the realities of resource-dependent communities in rural context, culture is a key aspect as it unifies and reinforces collective perceptions, representation, and action. In the Colombian Llanos, the local culture of the Cultura Llanaera (CL), including, in particular, traditional livestock practices in flooded savannahs, is a key element for the sustainable development of the region. In addition, agricultural and extractive activities, primarily rice and oil, are considered by locals as the main threats to both the ecosystem and the protection of the CL.

Research question 2:

What governance model stands for sustainability in the region?

(Related objective: to analyze the determining factors of success for governance models – Article 2)

In the context of Paraguayan Pantanal, the main focus is on the struggle for recognition of indigenous peoples (e.g., identity, land, and rights), which involves many sectors of society within a complex arena, crossing boundaries among state, markets, and civil society. After observing problems, such as marginalization through the impact of land grabbing and inequitable access to land, from the Yshiro indigenous community leaders' discourses, a second step is to encourage the strong governance that self-determination requires. The findings of this publication suggest that community-based governance is constructed by the Yshiro's relation to land (e.g., Traditional Ecological Knowledge, TEK)

and their self-organized institution, the Unión de las Comunidades Indígenas de la Nación Yshiro, (UCINY), as well as highly threatened by the impact of the national neo-extractive economy.

Research question 3:

What are the shortcomings of existing governance models?

(Related objective: to develop empirical insights on the complexity of governance processes, addressing socio-economic and environmental changes, as well as power and hierarchical structure at all scales, political dynamics, and stakeholder engagement schemes – Article 3).

The grasslands and savannahs of Colombia and Paraguay face weak governance in both its institutional and community-based contexts. Hierarchical and market-based forms of community and natural resource management appear to rule in both regions under study. The findings of this comparative work suggest that there are three mechanisms causing weak governance. First is centralized power, both economic and political, that directly impacts law enforcement and monitoring at the local level. Second is the role of central and local governments, often linked to weak property regimes of land-tenure, land distribution, and land planning. Finally, the third mechanism is social exclusion, impacting the marginalization of rural and indigenous communities with respect to the use and management of natural resources.

4.2 Research activities: case studies and methods

This dissertation focuses on the Department of Casanare in the Colombian Llanos and the Department of Alto Paraguay in the Paraguayan Pantanal (Figure 4). Agricultural production and extractive interventions are the main threats to the

grasslands and savannahs in both areas, while land use planning and management rarely includes ecological and social criteria that safeguard natural ecosystems, biodiversity, and carbon stocks. The ongoing transformation of natural ecosystems negatively affects local and community-based governance structures.

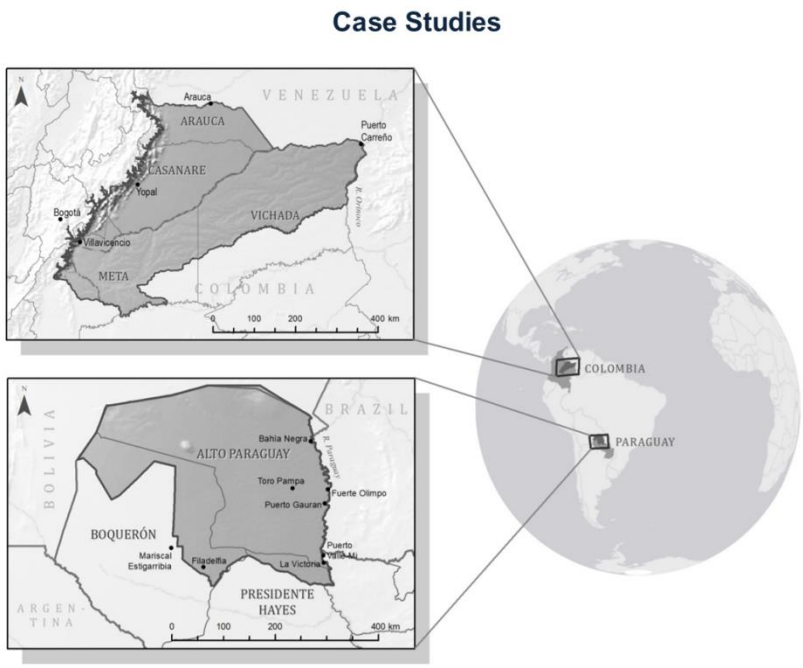

Figure 4: Base-map Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia ©, OpenStreeMap contributors and the GIS User Community.
(Source: WWF Paraguay)

The field activities were embedded in an environmental project of the World Wide Fund for Nature (WWF) (Section 4.3), concerning information gathering and sharing for land use planning in the selected regions, as well as filling knowledge gaps. Because of its intrinsic aim to build local governments capacity, support multi-stake holder platforms, and promote better management practices, this project offered a fertile environment within which to investigate the research

questions of this dissertation (Section 4.1). Methodological approaches and tools used to address each research question are summarized in Table 1. Further details about the description of case studies, methods, and techniques applied with which data were treated can be found in each publication (Chapter 4). The subsequent subsection briefly describes the specific objectives of WWF project.

Research question	Case study	Methods and tools	Article
1) How relevant is local culture to sustainable development?	WWF Colombia Colombian Llanos	Literature review (exploratory research), stakeholder mapping, semi-structured interviews and survey (n= 50), participant observation. *Governance Analytical Framework (GAF)*	1
2) What governance model stands for sustainability in the region?	WWF Paraguay Paraguayan Pantanal	Literature review (exploratory research), stakeholder mapping, semi-structured interviews and survey (n=52), focus group (n= 10), participant observation. *Governance Analytical Framework (GAF)* *Community-based natural resource management (CBNRM)*	2
3) What are the shortcomings of existing governance models?	WWF Germany Comparative analysis	Literature review (exploratory research), non-structured interviews (n=10), online expert survey (=32), semi-structured interviews (=102), participant observation. *Governance Analytical Framework (GAF)* *Institutional and Development Framework (IAD)* *Common-Pool resources (CPR)* *New institutional economics (NIE)*	3

Table 1: Research questions, methods and publications.

4.3 WWF project

Land Use Change in Savannahs and Grasslands – approaches by Policy Engagement, Land Use Planning and Best Management Practices (Sulu2) is a WWF project funded by the German Federal Ministry for the Environment, Nature Conservation, Building, and Nuclear Safety (BMU), under the International Climate Initiative (IKI).[4] The project builds capacity for climate smart land use planning and practices in the project areas and develops knowledge on grassland and savannah ecosystems. The project raises the level of ambition concerning climate mitigation by maintaining the carbon reservoirs of grasslands and savannahs. Adopting climate smart production practices in cattle, soy, and palm oil production substantially increases soil organic matter, while also improving water holding capacity, reducing soil erosion, and improving water quality. The inclusion of local communities and producers, as well as the financial sector and the scientific community, supports the transformative shift to low-emission development in both Colombia and Paraguay.

[4] More information can be found here: https://globallandusechange.org/en/projects/land-use-change-in-savannas-and-grasslands/why-sulu2/. Alternatively, please contact WWF Deutschland Reinhardtstr. 18 - 10117; Berlin. Tel.: +49 (0)30 311777-700. Fax: +49 (0)30 311777-199.

Chapter 5: Results

In this section, three peer-reviewed publications represent the empirical results of the dissertation. They are presented in the official format of the respective academic journals: Social Sciences, Sustainability, and Society & Natural Resources. All three journal scopes benefit from this work as they publish international and cutting-edge socio-economic science research that advances understanding of the interaction between society and natural resources, providing an advanced forum for studies related to sustainability and sustainable development. In addition, full experimental and methodical details of the publications are cohesively in line with the broad and interdisciplinary scholarship of each respective journal.

5.1 Collective Perception of Anthropic and Extractive Interventions in the Colombian Llanos (Article 1)

Eufemia, L., Morales, H., Bonatti, M., Graser, M., Lana, M., & Sieber, S. (2019). Collective Perception of Anthropic and Extractive Interventions in the Colombian Llanos. *Social Sciences*, *8*(9), 259.

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social sciences

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Article

Collective Perception of Anthropic and Extractive Interventions in the Colombian Llanos

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Abstract: Increasingly, the developmental model of anthropic and extractive interventions is a global concern. Its impacts are challenging not only the precarious equilibrium of natural resources but also the one of local communities and identities. The case of the Colombian Llanos shows how the local culture of the Cultura Llanera (CL) is deep-rooted with natural resources, their use and their management. Throughout the use of a survey based on the Governance Analytical Framework (GAF), this paper presents and discusses shared problems and social norms. The collective perception of local groups shows that the CL, in particular traditional livestock practices in flooded savannahs, is a key element for the sustainable development of the region. Furthermore, it reveals that agricultural and extractive activities, primarily rice and oil, are considered the main threats to both the ecosystem and the protection of the CL.

Keywords: governance models; Colombian Llanos; Cultura Llanera; extractivism

1. Introduction

Increasingly, the developmental model of anthropic and extractive interventions is a global concern. Its impacts are challenging not only the precarious equilibrium of natural resources but also those of local communities and identities. Within the complexity of sustainable development, broadening academic approaches in order to account for socio-economic and cultural perspectives is required. This work addresses the concept of development with regard to problem framing, which focuses on the interconnectedness of socio-ecological-cultural issues and their impact on the use and management of natural resources (Vandenberghe 1999). In the flooded savannahs of the Colombian Llanos, located in the east of Colombia, next to the border with Venezuela, we focus on the collective perception of anthropic and extractive interventions (e.g., the agricultural expansion and exploitation of hydrocarbons, including oil) and the link between natural resources and the local culture, known as Cultura Llanera (CL). There is a lack of literature about the role and impacts of such interventions on local societal and cultural dynamics, as well as the understanding of the intrinsic relation between the depletion of natural resources and the erosion of local cultures in Colombia. However, many cases worldwide demonstrate that local cultures and functioning traditional institutions are important for sustainable development (Azamar Alonso and Ponce Sánchez 2015; Leff 2006; Ostrom 1990; Steelman and Carmin 1998). Considering the characteristics of the group that is dealing with the natural resource (e.g., the exploitation of wetlands for livestock farming), common shared norms and joint successful experiences are key aspects of a fruitful management of the resource (Frey 2018). The significance of

local cultures and traditional institutions as ingredients for a prosperous and conserving development is also incorporated in the theories of local and indigenous knowledge. Therefore, the integration of social and cultural institutions into resource exploitation and use is needed to ensure a sustainable development (DeWalt 1994; Escobar 1999). As for our case study, previous studies demonstrate that traditional livestock practices based local knowledge in the flooded savannahs of the Colombian Llanos can be an opportunity for conservation (Peñuela et al. 2014; Peñuela and Fernández 2010; Uzzell and Badenas 2002).

From this, the way communities perceive the impact of anthropic and extractive interventions shapes the way they relate to new environments, both physical and intimate (Heft 1997). This implication may affect traditional knowledge and local culture. In the context of this research, when this concept entails cultural identity and the relation with the space or environment (e.g., the flooded savannahs ecosystem), the role of collective perception (e.g., of anthropic and extractive interventions) can help shape new paradigms for sustainable governance models and development (Bonatti 2011; Lander 2014; Peñuela et al. 2014; Peñuela and Fernández 2010; Steelman and Carmin 1998). For this reason, we choose to apply the tools of the Governance Analytical Framework (GAF), as they address collective perception in socio-ecological research. This paper contributes to the body of knowledge on the social constructions of community-shared concepts with respect to the role played by environmental, socio-historical, and economic processes. With this research, we expect a better understanding of the community roles, norms and rules regarding internal and external actors.

Therefore, we focus on perception and representation studies, where collective voices (e.g., the understanding and reactions to risks and problems) depend on different characteristics and relations (cultural, historical, political, etc.) (Bonatti 2011). The notion of perception is here associated with judgments, assignments, memories, emotion, motivation, representations of the environment, and meanings of social structure reproduction (Bonatti 2011; Heft 1997; Merleau-Ponty 1996; Steelman and Carmin 1998). The concept of spatial awareness and consciousness helps us to understand how space is not the real or logical place within which things are located, but the environment in which the position of things is possible (Merleau-Ponty 1996). From this point of view, space is not an abstract element in which things are suspended, but the universal power of their connections. One can stand between objects and consider space as their natural environment or, simply, as their common attribute. Apart from that, one can capture the nature of space as a subject and its interiority. Even before one's individual existence, space existed only in relation to a subject that one perceives.

From the intimate subjectivity to a broader group or sectorial representation of the collective perception of the issues at stake, we aim to understand how the identity of the CL is threatened, affected, and challenged by structural changes/anthropic and extractive interventions (e.g., extractive patterns of development vs. traditional ones). The place-related social and cultural identity, expressed in both the collective and individual relationship with geophysical and geographical space, may form an important dimension of environmental attitudes. Anthropic and extractive interventions are multiscale and multidimensional, as are the organizational practices that emerge around the territory (Duarte Ospina 2018; Uzzell and Badenas 2002). A number of scholars and authors look into the social constructions of community-shared concepts with respect to the role played by environmental, socio-historical, and economic processes (Bonatti 2011; Floriani 2003; Heft 1997; Jodelet 1986; Moscovici 1988; Steelman and Carmin 1998). In this paper, our research questions seek to observe the role of the CL as a key element for sustainable development in the Colombian Llanos. Likewise, we investigate if, according to groups' perceptions, agricultural and extractive activities are perceived as threats to the ecosystem and the erosion of the CL. A consistent literature, except for specific cases on Colombia, supports both hypotheses and provides empirical data on similar cases in different regions (Acosta 2013; Acuña 2015; Arsel et al. 2016; Avcı 2017; Chiasson-LeBel 2016; Gudynas 2009; Hempel 1996; Ostrom 1990; Salazar Ramírez 2017; Van Teijlingen 2016). From this, the objective of this paper is to fill this knowledge gap and to explore local group's perceptions of anthropic and extractive interventions, and their impact on the region and on the CL. Such a contribution includes

the understanding of the local values and respective perception that constitute a basic condition of sustainable development (Vandenberghe 1999).

2. Materials and Methods

2.1. Case Study Description

Los Llanos is a region of South America divided between Colombia and Venezuela in the Orinoco basin. The biome is characterized by a vegetation of floodplain steppes, gallery forests, and a myriad of subunits, such as the sub-Andean jungle, wind plains, etc. (Ostrom 1990). It has two distinct seasons, the rainy season and the dry season, and it is characterized by its extensive, diverse, and heterogeneous savannahs (WWF 2017). Its climate is intertropical savannah (Fajardo and Urbina 1998). The economy in Los Llanos is mainly based on extensive livestock farming and oil extraction (Huertas 2014). During the 1970s, just 2% of the eastern plains of the Orinoco basin had been affected by significant land use changes. However, due to anthropic and extractive interventions, by 2012 the transformation of the region already reached 15.5%, resulting in a drastic decrease of natural flooded savannahs from 11,401 km^2 to 9283 km^2 (18.5%) (WWF 2017). These severe changes have negative impacts on the biological and cultural diversity in the Llanos, including the loss of habitat due to the expansion of extractive interventions, intensive agriculture, water and soil contamination, the introduction of non-native species, and the growing threat of climate change (Lander 2014; Peñuela et al. 2014). Casanare is one of the departments of the Colombian Llanos and is our focus, since the results of this work were extrapolated in two towns of the department, Yopal and Paz de Ariporo. Since 1990, the strengthening of extractive models not only configured a specific form of development that responds to the demands of capitalism, but also negatively affected the relationship between the local culture and the use and management of natural resources (Duarte Ospina 2018). Also as a result of the oil crisis, the socio-territorial and environmental effects in the territory have started to come to light only in 2008. Unclear land rights and speculation caused negative impacts on the ecosystems, generating social conflicts between extractive firms and locals, including peasants. The defense of organized communities has always incorporated the preservation of the CL, as well as its factors of identity and land-use management. In the past decade, local movements mobilized for water provision, biodiversity conservation and better land-use practices. The role of the state was exercised at several scales: from its local institutions up to the framework of legislations that facilitate the actions and investments of the transnational companies in the territory. The role of the state in the territorial configuration and the implementation of a development model based on extractive activities have generated the gradual erosion of elements of the CL, confining it to its elements of folklore (Duarte Ospina 2018; Hincapié 2017). Within this context, the role of traditional and extensive livestock farming is an important element of identity of the CL (Caro-Caro et al. 2015). The low impact on natural resources, together with the conservation of the biodiversity, is part of a process lasting almost 500 years, developed in a historical context of territorial occupation, in coexistence with the seasonal dynamics of the savannah landscape and with the native flora and fauna (DNP 2014; Huertas 2014; Molano 1998; Peñuela et al. 2014).

Traditional productive models, including livestock farming, have contributed to the construction and reinforcement of the CL, and they are key to understanding the development processes of the extractive industries and their impacts in the region. In the past years, external economic and extractive forces have prevailed over clear guidelines for sustainable development (local knowledge, resources, biodiversity, policies, etc.) (Duarte Ospina 2018). Likewise, issues of ambiguous land tenure regulations and the lack of infrastructure have contributed to the low productivity rate of local meat activities and production (Peñuela et al. 2014; Ruiz 2014). In Casanare in particular, there are few studies and alternatives that exist to contribute to the improvement of the productivity of local livestock farming in the flooded savannah. From the perspective of community identity related to traditional livestock, cultural practices such as local dances (e.g., joropo) and, in particular, work songs are also challenged

by land-use changes and management. The melodies, transmitted orally through generations, resemble topics related to cattle ranching and grazing. Collective stories tune with the natural environments and their dynamics (Cobos 1966). Anthropic and extractive interventions are weakening these practices as the traditional way of life of communities embedded in the CL is changing (UNESCO 2017).

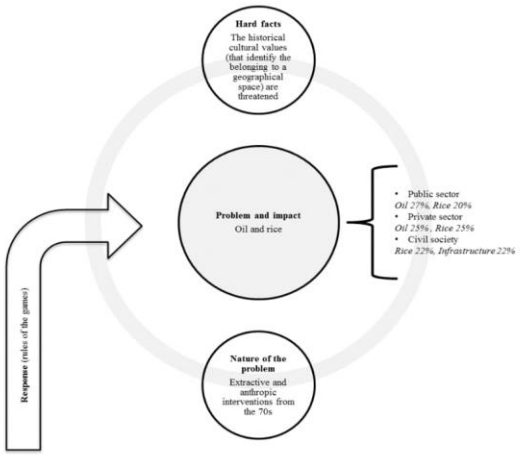
2.2. Methodological Procedures

To explore what local groups perceive about anthropic and extractive interventions as well as how these interventions challenge the identity of the CL, we follow the methodological approach of GAF (Hufty 2011). This instrument helps us to describe the relations between human interactions and the ecosystem. Because of its broad adaptability and applicability on the ground, the GAF allows researchers to describe socio-ecological processes within specific and unique contexts. It is used in qualitative research, and it comprises five analytical tools: problems, actors, social norms, processes, and nodal points. Due to time constraints for our field study, we only used two: problems and social norms. We created a survey to analyze social interactions in which the actors identify **collective problems** and **social norms** as a system of formal and informal norms and duties (e.g., actions and sanctions). The questions in the survey were clustered into three main blocks: the clear expression of perceived current problems, a condition to be improved upon (collective problems); the historical and cultural values that identify the belonging to the geographical space (hard facts); and the historical patterns of socio-economical changes and development in the region (nature of the problem). In addition, we asked actors a clear action regarding what should be implemented to alleviate the impacts of those issues (response). Regarding social norms, we structured questions into two main clusters. One focused on formal and informal norms that ought to be appropriate and that are not (actions). The second focused on elements that reinforce and constrain local behavior in relation to the CL and the land use and management (positive and negative sanctions). As a result, the involvement of different actors and institutions in responding to shared problems is what defines a non-normative concept of governance (Hufty 2011). From this perspective, therefore, we aim to comprehend the role of groups' perceptions of collective problems and social norms in relation to the CL. All questions were formulated in the form of lists. This provided the respondents with the opportunity to rank suggested categories, from most to least relevant. To select participants, we applied a snowball networking sampling and selected local groups based on shared similar traits (e.g., work and involvement in the area of study), the inclusion of different sectors (e.g., civil society, public and private sectors) and expertise about the CL (Biernacki and Waldorf 1981). In the department of Casanare (Yopal and Paz de Ariporo), we interviewed 17 local groups (involving a total of 50 participants), representing the civil society, the public sector, and the private sector (see Appendix A). Each interview was authorized and transcribed, lasting between one and three hours.

3. Results

3.1. Collective Problems

Figure 1 presents the group's perception of problems. The results show that the agricultural expansion (mainly for rice cultivation) and the exploitation of fossil hydrocarbons (oil) are the two key problems perceived by the 50 participants who were interviewed. The hard facts behind such problems are linked to the erosion of the local sense of belonging to the land. The nature of the problem is perceived to be aligned with the historical entrance of extractive interventions in the area. As a response to these issues, the representatives of the public sector would strengthen eco-tourism, while the private sector would invest in better management practices, especially for livestock. Civil society would respond by raising awareness about sustainable land use practices, the role of ecosystem services, and biodiversity. The logic of Figure 1 is to visualize the centrality of the collective problem and its impact, while connecting it to the suggested solutions or responses.



The suggested response of the three sectors involved	
Public sector	Eco-tourism
Private sector	Better management practices (BMPs)
Civil society	Raise awareness

Figure 1. The perceived problems of the 50 participants and their responses.

Table 1 presents the complete set of perceived problems in a ranking. By providing rates and rankings, this information aims to deliver a valid assessment of the results.

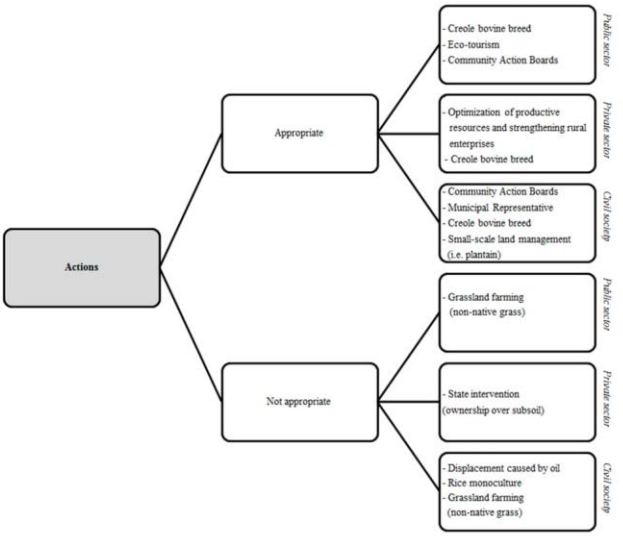
Table 1. The perceived problems (ranking).

Actors	Collective Problems
Public Sector	Oil 27% Rice 20% Uncontrolled fires 14% The shift in cultural values 13% Illegal immigration 12% Drug abuse 7% Prostitution 7%
Private Sector	Oil 25% Rice 25% Lack of environmental knowledge 13% Uncontrolled fires 13% Lack of infrastructure 14% The political situation 10%
Civil Society	Rice 22% Infrastructure 22% Oil 19% Unsustainable livestock farming 11% Uncontrolled fires 7% The shift in cultural values 7% Oil palm plantations 4% The political situation 4% Hydrocarbon (other than oil) 4%
	Total 100%

3.2. Social Norms

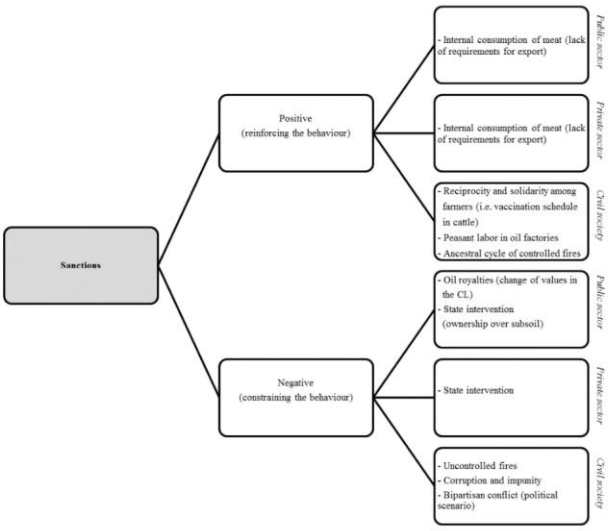
The results of social norms are divided into two key aspects: (1) actions, what ought to be appropriate and what is not; and (2) sanctions, both positive and negative. Both are based on tradition as well as formal, informal and customary rules. The results presented in Figure 2a,b, suggest that the most appropriate actions embedded in the CL are to maintain and preserve the creole bovine breed of the Llanos region and to rely on Community Action Boards, CAB (also known as *juntas de acción comunal*). The least appropriate actions to take are the grassland farming activities to replace native grass for an improved productivity. Regarding the role of positive sanctions, what emerges is that the lack of requirement and infrastructures to export meat abroad favors the relevance of regional and national markets. Nonetheless, the role of central and regional institutions (e.g., corruption) is perceived as a constraint for the protection of the CL. The logic of Figure 2 is to present the connection of appropriate actions versus non appropriate actions. Correspondingly, we wanted to visualize the connection of positive and negative sanctions.

Table 2 presents the complete set of perceived social norms in a ranking. By providing rates and rankings, this information aims to deliver a valid assessment of the results.



(a) Actions

Figure 2. *Cont.*



(**b**) **Sanctions**

Figure 2. The perceived social norms of local groups in relation to (**a**) actions and (**b**) sanctions.

Table 2. The perceived social norms (ranking).

Actors	Social Norms			
	Actions		Sanctions	
	Appropriate	Not appropriate	Positive	Negative
Public Sector	• Creole bovine breed 41% • Eco-tourism 39% • Community Action Boards CAB 20%	• Grassland farming (non-native grass) 78% • Others 22%	• Internal consumption of meat (lack of requirements for export) 80% • Others 20%	• Oil royalties (change of values in the CL) 69% • State intervention (ownership over subsoil) 22% • Others 9%
Private Sector	• Optimization of productive resources and strengthening rural enterprises 66% • Creole bovine breed 29% • Others 5%	• State intervention (ownership over subsoil) 81% • Land-tenure speculation 15% • Others 4%	• Internal consumption of meat (lack of requirements for export) 69% • Others 31%	• State intervention (ownership over subsoil) 88% • Others 22%
Civil Society	• CAB 50% • Municipal Representative 22% • Creole bovine breed 20 • Small-scale land management (i.e., plantain) 6%	• Displacement caused by oil 42% • Rice monoculture 33% • Grassland farming (non-native grass) 25%	• Reciprocity and solidarity among farmers (i.e., vaccination schedule in cattle) 60% • Peasant labour in oil factories 26% • Ancestral cycle of controlled fires 14%	• Uncontrolled fires 47% • Corruption and impunity 39% • Bipartisan conflict (political scenario) 14%
Total 100%				

4. Discussion

The analysis of the collective perception of anthropic and extractive interventions presents the key perspective of collective issues at stake for the sample groups of the CL. Here, we discuss and compare the significance of the results of this research, underlining the core elements of the collective problems and social norms represented by the local groups. Under the lenses of perception approaches, we focus on the groups' individual experience of the world (e.g., CL) and its aspects (Heft 1997; Watts 2000). Reflections that societies make to identify opportunities to improve risk situations are built upon socio-economic, cultural historical and political characteristics, as well as on the nature of the problems causing risk situations (Bonatti 2011). The main limitation of the study regards the composition of the sample. Within the private and productive sectors, those who participated belong to the subsistence and livestock agricultural sector. None of the participants represented the agro or extractive industry (e.g., monoculture, hydrocarbons, etc.). This may cause some bias and heterogeneity of the results.

4.1. Collective Problems

The groups' perception of the collective problems is related to the increasing extractive developmental model, mostly relying on **agricultural expansion** (**rice**) and the **exploitation of hydrocarbons** (**oil**). These are perceived to be the main threats to the protection of the CL. The socio-economics of Casanare risk shifting into a complete reliance on activities such as rice and oil. The dependency on sole extractive interventions increases the environmental, domestic, and cultural vulnerability to fluctuations in the price of commodities on the world market (Azamar Alonso and Ponce Sánchez 2015). This is particularly problematic in the region of study as it becomes highly dependent on a few items or commodities. As such, the territorial space of Casanare is organized in a functional way, establishing practices, organizational processes, planning production, circulation and consumption, as well as specific and unequal power relationships that 'naturalize' and even legalize the dispossession of natural resources, intensifying the negative impacts on flooded savannahs (Díaz and Hilda 1998). This is causing the erosion of a local sense of belonging to the land in relation to its economic activities, especially with regard to traditional livestock. Cultural identity and traditional livestock practices in flooded savannahs have co-evolved with local flora and fauna, without a high anthropic impact of ecosystems (Reyes 2014). The fundamental criticism of the appropriation, privatization, and dispossession of natural resources, land and labor, is intimately related to the denaturalization of socio-spatial relationships that are established for the accumulation of capital (Delgado 2011). Land dispossession not only consists in the accumulation of land, but also in the loss of identity of local communities (Duarte Ospina 2018). In terms of the relation between the CL and environmentally sustainable economic development, all participants of this study agree upon the relevance of the environment and of physical space. The visualization of groups' collective problems, in the economic arrangements of rice and oil, goes parallel to the understanding of a speculative logic, not only in its extractive developmental model but also in its cultural and identity aspects (Azamar Alonso and Ponce Sánchez 2015). This homogeneity of perception may help in generating joint actions based on the understanding of the economic, cultural, political and historical processes of the collective problems, thus leveraging community participation (Heft 1997).

From these perspectives, public and private sectors share a similar perception on how to react to the main problems, while civil society aims at constructing a new perception and raising awareness. Nevertheless, the responses of the sample to collective problems aim both to reduce the negative impacts of extractivism and to find alternatives to it. All sectors relate their identity with the CL and recognize the threats of rice and oil. These can be justified by governmental planning in the region (e.g., the Policy for the Integral Development of the Orinoquia: Altillanura and the resolution on the new National Agricultural Frontier) that supports major changes of agricultural models (Caro-Caro et al. 2015; Eufemia et al. 2018; Peñuela et al. 2014). Governmental planning has promoted land-use changes since the 1990s with the construction of the first oil wells and, since the early 2000s, the expansion of agroindustry during the administration of President Uribe. Uribe's mandate

portrayed the Orinoquia region as a blank canvas to be painted ("lienzo en blanco") (DNP 2007), a territory open to colonization, filled with opportunities for private investments. Furthermore, Orinoquia was presented as a territory that, in comparison to the Amazon region, does not have major environmental restrictions (Rodríguez et al. 2009). This vision of development included a major intervention of highways and infrastructure consigned as the "Programme for the Development of Highway Concessions 2006–2014" (DNP 2007), giving clear guidelines for land use (agroindustry, bio-fuel and hydrocarbons) and a predominant role to the international and national private sector at the detriment of local actors (Rodríguez et al. 2009). Academic experts from the region claim that there is a global financial strategy that determines a series of political, legal, regulatory, and economic instruments aimed primarily at land acquisition in order to carry out investments in biofuels and the development of hydrocarbon mining. Large-scale agro-industrial projects displaced small and medium scale peasants by pressuring them to sell as a consequence of land-market price speculation. The model provides advances in infrastructure and a temporary growth of the services economy with no productive transformation, which does not favor the diversification of economic activity in the region. In addition, it gives rise to migration phenomena that increase urban dynamics through the influx of transient, floating migrant populations (Caro-Caro et al. 2015; Franco 2015; Pardo 2015).

To provide tangible compensations, local groups would strengthen eco-tourism, improve better management practices in traditional livestock, and raise awareness about the importance of the ecosystem and its services. These are perceived to function as tools that value the CL in all its forms. The result may be forms of payment of socio-environmental costs and replacing what today is invested in subsidies with agricultural and extractive sectors (tax exemptions, cheap energy and royalties), possibly redirecting the workforce to traditional sectors (Aguilar 2013). For instance, voluntary schemes of private conservation that include those elements are in place in the region. The Natural Reserves of the Civil Society (RNSC) is the private category of conservation of the National System of Protected Areas (SINAP). It offers land owners, who are willing to conserve part of their land, the implementation of sustainable production projects that value the protection of the cultural heritage thorough eco-tourism and the inclusion of local knowledge (e.g., the incorporating of CL elements in better management practices for livestock farming, etc.). Moreover, depending on the financial capacity of each municipality, the owners could receive the exemption or reduction of property taxes. Besides, they can receive capacity building and technical support from environmental authorities or private organizations (Quintero López and Arbeláez 2016).

Local movements (including land owners, peasants, etc.) are carrier of the CL, generating the link between local knowledge and strategies of resistance for the defense or protection of their territory. These strategies promote forms of social and territorial relationships against extractive models. The resilience of local communities brings with it proposals aimed at strengthening the collective identity of the CL. Despite this, these are in constant tension with the state and extractive companies (Duarte Ospina 2018). Hence, alternatives and tendencies for a transition toward a post-extractivist scenario remain scarce, both in terms of land extension and financial incentives. While it is necessary to apply governance, as well as ecological and social improvements, which in some way reverse the damages that have been systematically caused by anthropic and extractive interventions, what groups are facing today is a lack of private and public will and investments in sustainable alternatives (Acosta 2013; Gudynas 2012).

4.2. Social Norms

Social norms integrated in the CL are both formal and informal. They form elements of social representation that function as a reaction to perceived problems. From the perspective of land use and the management of flooded savannahs, the critical importance of maintaining and preserving the **creole bovine breed** is perceived by the respondents as the most appropriate action for the protection of the CL because of its identity factor in the region. Due to the low productivity and economic profitability of such an action (e.g., continuous decreasing indicators of animal breeding

and the economic incentives for extractive activities) within the regional ecosystem, its preservation is under threat. In this regard, approaches with the private category of conservation can be a viable opportunity for maintaining and preserving this social norm (e.g., The Natural Reserves of the Civil Society, RNSC). There are a few successful cases where cattle ranchers have optimized creole bovine breeding, economic and productive indicators in flooded savannahs, while favouring the conservation of biodiversity. As an example, by adding multi-nutritional energy block supplementation during the dry season, applying pasture rotation using electric fences and maintaining an optimal nutrient and water supply, farmers increase the forage biomass production, improving and maintaining traditional livestock farming on native pastures while reducing the risks of environmental degradation and biodiversity losses (by overgrazing and selective foraging) and maintaining acceptable profit levels (Peñuela and Fernández 2010; Sastre et al. 2010; Pava Vargas and Valencia 2018; Wilken 1990). This strategy is not only positive in relation to its creole bovine element, embedded in the culture and folklore of the CL, but also in terms of the improvement of the traditional system for a sustainable model of development. This approach goes hand-in-hand with the importance of the conservation and protection of native pastures, as their replacement for an improved productivity is perceived to be the least appropriate action to take.

From the standpoint of the existing legal system that could leverage the discourse on land use and management, the role played by the **Community Action Boards** (**CAB**) (also known as *juntas de acción communal*) represents an important form of legal norm-related action. These mechanisms are civic and non-profit, community-based organizations for social management. CAB are voluntarily integrated by the residents of a place, who join efforts and resources to seek a better life and sustainable development based on the principles of the exercise of participatory democracy.[1] This effort should be encouraged by, among other things, the use of traditional concepts such as instruments of historical memory, the transformation of education to allow a dialogue of knowledge in a true intercultural exercise, solidarity and dignity in power relations, and, in this sense, a generalization of democracy beyond the electoral aspect (Aguilar 2013). Furthermore, institutional actors, such as the Municipal Procurement Office (also known as *Personería Municipal*), which are the representatives of the National Procurement Office (Ministerio Público–Procuraduría General de La Nación), are very important in encouraging, defending, protecting, and taking into account the public and collective interest, especially regarding environmental protection, human rights violations, and the conservation of public patrimony (cultural heritage)[2] from a formal/legal perspective. Nevertheless, the increasing focus on extractive resources since the early 2000s, such as oil, is generating a negative impact on the development of Casanare, lowering the institutional role of the CAB (Pava Vargas and Valencia 2018). The misconduct of the public sector in managing natural resources has generated a situation in which 15 governors have been replaced in only 12 years (Pava Vargas and Valencia 2018). Through the legal instruments of oil royalties, weak institutions have influenced the indexes of low competitiveness of the region, compared to others in Colombia with much less availability of natural resources and related royalties. In the past decade, oil royalties in Casanare have only contributed to 10% of the development of the region. This means an unprofitable deal and investment compared to the high amount of oil royalties per capita in Casanare (Pava Vargas and Valencia 2018).

From this context of norms to the context related to sanctions that are both positive and negative, what emerges is twofold. First, the opportunity of local and regional markets for traditional livestock production (also due to the lack of infrastructure) constitutes a valid alternative to the preponderance of extractivist activities. To regain the sovereignty of local territories and knowledge (e.g., traditional cattle ranching in flooded savannahs), the role of the experiences of local cultures should be better recognized by central and local governments and institutions (Gonçalves 2001; Hoogesteijn and

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[1] República de Colombia. Ley 743 de 2002. Art. 8. Available online: https://www.mininterior.gov.co/sites/default/files/36_ley_743_de_2002.pdf (retrieved 6 November 2018).
[2] Constitución Política de Colombia. 1991. Art. 178.

Hoogestein 2010; Martínez-Alier 2004). For instance, approaches to preserve the creole bovine breed and traditional know-how activities of cattle ranchers, such as small-scale polyculture farming (known as *conuco*), ancestral cycles of controlled fires, solidarity rounds of animal vaccinations, and manure and water dispenser application methods (known as *tópochera* and *tapas*), may be an initial basis of expertise and knowledge exchange and valorization. Besides, these approaches foster the concepts of both place-related socio-cultural identity and the understanding of local values (Peñuela et al. 2014; Uzzell and Badenas 2002; Vandenberghe 1999). This could lead to the construction of a new paradigm of development that is collective and in a balanced social dynamic among people, genders, and social groups (Aguilar 2013). Second, the negative impact of corruption at all levels feels like a negative sanction that is coercing the CL. Thus, the territory becomes an element of dispute between the actors who live in it; likewise, the territory is also an axis that configures identities around it.

In this sense, the extractive model consolidates scenarios of inequality based on the development of extractive activity and its effects. Instead, territorial proposals that the communities make should reinforce local knowledge in the face of the complex interaction between nature and culture (Duarte Ospina 2018). Likewise, the response to sanctions should aim at the collective and inclusive understanding of governments and institutions (national, regional and local), in which one seeks to strengthen the institutionalism and governability of the region. In this way, the formulation of alternative forms of diversifying the economy of the region may come into place, favoring not only the management of natural resources but also the protection of the CL (Pava Vargas and Valencia 2018).

5. Conclusions

This study focused on the collective perception of anthropic and extractive interventions in the flooded savannahs of the Colombian Llanos. The results confirm our initial assumptions that practices of the CL in the forms of traditional livestock in flooded savannahs, which includes strategies to optimize creole bovine breeding, economic and productive indicators for cattle ranchers, are key elements for the sustainable development of the region. Agricultural and extractive activities (rice and oil) are considered the main threats to both the ecosystem and the protection of the CL. Both results reveal that the spatial relation of local groups rooted in the CL is being increasingly threatened by decades of land-dispossessions, state-corruption, and the tendency to solely rely on one or two economic activities. Plans for future relevant research include an in-depth analysis of land-use change in the region and a comparison between the environmental impacts of traditional land use versus the ones of extractive activities. Similarly, social representation studies could leverage the relevance of our results and include the collective problems and social norms presented.

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Appendix A

Table A1. Interviews in situ with 17 institutions/groups (50 participants).

Public Sector	N. Participants
Medio Ambiente-Gobernación de Casanare (Yopal)	2
Municipality of Paz de Ariporo, Consejo de Cultura (Paz de Ariporo)	2
Municipality of Paz de Ariporo, "Familias en Acción" (Paz de Ariporo)	7
Secretaría de Agricultura, Ganadería y Medio Ambiente (Paz de Ariporo)	1
Ministry of Culture and Tourism (Paz de Ariporo)	3
Total	**15**
Private sector	
Comité Municipal de Ganaderos de Paz de Ariporo (Paz de Ariporo)	3
Fundación Salvaterra (Paz de Ariporo)	6
Centro Eco-Turistico Golconda (Paz de Ariporo)	5
Total	**14**
Civil society	
ABC Asociación becarios del Casanare (Yopal)	3
WWF Colombia (Yopal)	1
Fundación Reserva Natural La Palmita—Centro de Investigación (Yopal)	1
Bicentenario Presidente Moreno (Paz de Ariporo)	4
Unitrópico (Yopal)	1
Fundación Cunaguaro (Yopal)	4
Los Tautacos Caminantes del Llano (Paz de Ariporo)	2
Comunidad de la vereda Centro Gaitán del municipio de Paz de Ariporo (Paz de Ariporo)	4
Fundación Horizonte Verde (Yopal-Villavicencio)	1
Total	**21**

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5.2 Community-Based Governance and Sustainability in the Paraguayan Pantanal (Article 2)

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Article

Community-Based Governance and Sustainability in the Paraguayan Pantanal

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Abstract: The megadiverse biome of the Paraguayan Pantanal is in danger due to the expansion of cattle ranching and agricultural frontiers that threaten not only the fragile equilibrium of natural resources, but also that of local governance and cultural identities. As a consequence, weak governance stresses the relations between natural resource-dependent communities, generating socio-environmental conflicts. This perception study seeks to find community-based governance models for sustainability in the context of Paraguayan wetlands. According to the organizational principles of community-based natural resource management (CBNRM), we applied qualitative approaches with the use of the Governance Analytical Framework (GAF) to identify problems and social norms. Our findings suggest that the Yshiro indigenous self-organized group (Unión de las Comunidades Indígenas de la Nación Yshiro (UCINY)) can be considered as a model for community-based governance. Besides, we discovered that this specific governance model is highly threatened by the impact of the national neo-extractive economy.

Keywords: community-based governance; indigenous rights; Paraguayan Pantanal; identity; community-based natural resources management

1. Introduction

The Pantanal is one of the largest freshwater wetlands in the world, covering approximately 150,000 km^2 in the upper basin of the Paraguay River. It occupies part of the territory of three countries: Bolivia, Brazil, and Paraguay. Within Paraguayan territory, the typical vegetation forms a complex of landscapes of alternate flooded savannas or swamps, lagoons, dams, beaches, sandbanks, palm groves of Karanda'y (*Copernicia alba*), and forests, mainly of *red quebracho*. It is internationally recognized for its great wealth of wildlife, particularly birds, fish, amphibians, reptiles, and mammals [1–4], containing the highest concentration of aquatic species in the world [5].

The Pantanal biome is in danger due to the expansion of cattle ranching and the agricultural frontier, with periodic burnings and uncontrolled fires [6,7]. Furthermore, poor land use planning, reflected in major deforestation processes, causes a constant increase in the levels of soil erosion and, therefore, the volume of sediments reaching the river, thus affecting the water quality, with negative consequences for the aquatic communities and natural resource-dependent communities [7]. Besides, the lack of socio-economic research in the area is limiting knowledge about the area, as well as negatively affecting the quality of policy decision and implementation [8].

Given the remoteness of the biome, combined with the lack of infrastructure, most of the Paraguayan Pantanal remains wild and well preserved. However, a few urban and populated areas are functioning as a trampoline for an extractive natural resource-driven developmental push,

putting at risk not only the fragile equilibrium of natural resources, but also the local governance and cultural identities. Weak governance further stresses the relations between natural resource-dependent communities, generating socio-environmental conflicts [9].

Since the role of strong governance favors the mechanism of social inclusion, here, governance is understood as the processes of interaction among the actors involved in collective problems that lead to the creation of social norms and institutions [10]. Whereas community-based governance models can strengthen the self-awareness of populations in the face of natural or man-made impacts, they can also leverage processes of good public policies and applications of Traditional Ecological Knowledge (TEK).

Based on this, our research question seeks to find a community-based governance model for sustainability in the context of threatened Paraguayan wetlands. Therefore, by analyzing local groups perceptions, knowledge and practices (e.g., TEK) in a scenario of conflict over land distribution and use, our aim is to understand the relevance of the relation to land, the interests, power relations, and influences of community identity, as well as to describe what are perceived to be collective problems and social norms. From this, our objective is to understand and investigate governance processes in the area of study.

Political Ecology and Community-Based Natural Resource Management (CBNRM)

Empirical analyses on environmental changes and the interdependence and relations among groups of people are often correlated with the socio-political consequences of environmental changes [11]. Political ecology helps us to better comprehend the dichotomy between natural resources and humans. In light of environmental and governance processes, academic studies on theories of social and cooperation movements use political ecology to describe current situations and their causal variables [12–15]. Environmental destruction and over exploitation are caused by the irrational use of natural resources, meaning the increase in their productivity and economic output. In this regard, conflicts arising from it are linked to socio and political economy, where a constant dialectic of change between natural resources and social groups exists [12,16,17].

In this paper, our political ecological approach focuses on community-based natural resource management (CBNRM) as a useful theoretical tool to address both the community empowerment overuse and the management of natural resources, including the relevance of TEK and the complexity of governance models. A key aspect of CBNRM regards the role of power given to local communities to use and manage natural resources [18]. Likewise, frameworks bridging policy, economic, social, environmental and legal concepts to sustainably managing both landscapes/ecosystems and the livelihoods of local communities are embedded in the theory of CBNRM [16,19–23]. We chose this approach to better understand and investigate community-based governance models for sustainability in the context of wetlands.

2. Materials and Methods

2.1. Case Study Description

The history of Bahía Negra is strongly influenced by its location in the strategic tri-border area at the junction of Paraguay, Bolivia, and Brazil, where the Paraguay River and the Rio Negro flow. The territorial annexation and control of the port of Bahía Negra was a trigger for the Chaco War between Bolivia and Paraguay, fought from 1932 to 1935. The conflict was over the control of the northern region of the South American's Gran Chaco. The conclusion gave Paraguay definitive sovereignty over Bahía Negra.

Only in April 2005, through Law 2.563/05, was the municipality of Bahía Negra formally established. The estimated population for 2017 is approximately 2500, based on 2015 census data [24]. Its inhabitants engage in fishing, cattle ranching, farming, small-scale tourism, and trade. The cultural diversity found in Bahía Negra shapes its governance patterns [8,25].

Since the 19th century, the banks of the Paraguay River are the ancestral territory of the Yshiro indigenous group. Approximately 54,300 hectares of land are registered as their property [26]. The Yshiro is the largest human community in the area and most of their population lives in colonies around the municipality of Bahía Negra. They are part of the so-called "Yshiro Nation". (Figure 1).

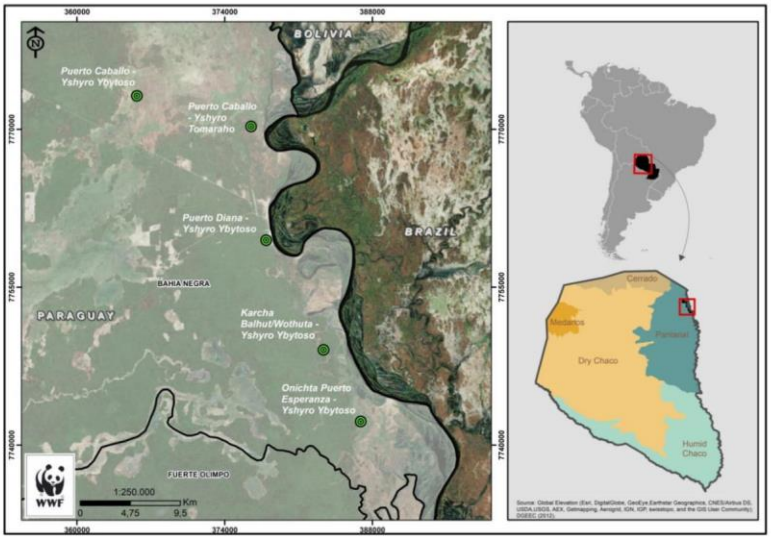


Figure 1. Source: Global Elevation (Esri, DigitalGlobe, GeoEye, Earthstar Geographics, the French Space Agency (CNES)/Airbus Defense and Space, U.S. Geological Survey (USGS), Adapter Engine Extended (AEX), Getmapping, Aerogrid, Institut Geographique National (IGN), Zonificación Sísmica - Geotécnica (IGP), swisstopo, and the Geographic Information Systems (GIS) User Community); Dirección General de Estadística, Encuestas y Censos (DGEEC) (2012).

2.2. Procedures

Our methodological procedure is partially based on the Governance Analytical Framework (GAF). We chose this for its set of non-normative approaches that guide exploring the role of governance for the analysis of collective problems and actions. As described by Hufty [10], the GAF "is a realistic methodology for investigating governance processes, meaning the social interactions in which actors make decisions regarding collective problems and issues, thereby creating, reinforcing, or changing social norms and institutions (p. 418)."

To extrapolate practices of community-based governance and within the borders of the GAF, we included two methodological tools: problems and social norms. The first includes the analysis of problems, given their plurality, the perceived degree of threat, and the socio-economic context where they fit. The second explores the "rules of the game" in terms of governance and how rules are established within a hierarchical frame. Problems and social norms are investigated in the light of not just perceiving interviewers' behavior and specific issues, but also within the socio-economic context of such insights.

Our research is divided into three main steps. First, we carried out a preliminary overlook of the available literature and conducted a stakeholder mapping of the area, with specific regard to the state of the Yshiro. Secondly, we performed semi-structured interviews with 15 different institutions or groups in the field, representing three sectors of society (public, private, and civil society) and involving 52 participants. From the public sector, we engaged representatives of environmental and tourist secretaries and ministries, as well as of local, regional and central authorities. The private sector is represented by national and foreign companies committed to agro-pastoral expansion in the area, mostly cattle ranching. Civil society is represented by international and national environmental and human rights NGOs, local universities, rural and indigenous communities, as well as national and local media. Interviews took place in both the capital city of Asunción and the Municipality of Bahía Negra. Finally, we conducted a focus group with 10 community leaders of the Yshiro in order to better examine environments, behaviors and interactions [27,28].

Data analysis was performed according to Gruber's framework of 12 organizational principles of CBNRM. They focus on strategic and inclusive planning for sustainable land use and management of natural resources [29]. The corresponding list is presented in Table 1.

Table 1. The Organizational Principles of community-based natural resource management (CBNRM).

1. Public Participation and Mobilization
2. Social Capital and Collaborative Partnerships
3. Resources and Equity
4. Communication and Information Dissemination
5. Research and Information Development
6. Devolution and Empowerment Including Establishing Rules and Procedures
7. Public Trust and Legitimacy
8. Monitoring, Feedback, and Accountability
9. Adaptive Leadership and Co-Management
10. Participatory Decision Making
11. Enabling Environment: Optimal Pre or Early Conditions
12. Conflict Resolution and Cooperation

Source: Gruber 2010.

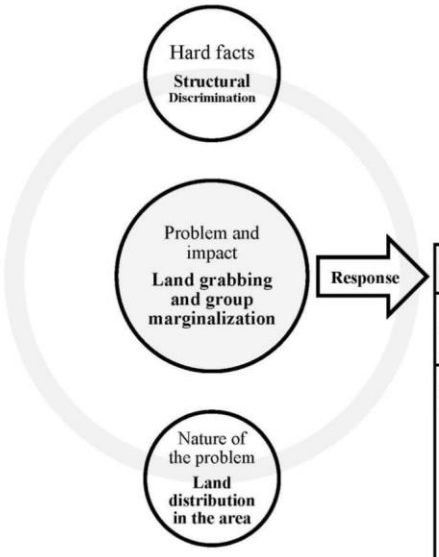
3. Results

The results are framed according to the two tools of the GAF: problems and social norms. We found that the Yshiro can represent a community-based governance model, by including TEK, for sustainability in the context of threatened Paraguayan wetlands. For this reason, the emphasis of the description below focuses on the Yshiro community (represented by 10 community leaders) and its relation to natural resource use and management. The outcomes of the interviews with the other 15 groups (involving 52 participants) helped us to interpret and better understand the indigenous experience.

3.1. Problems

Land claims are a major problem for the Yshiro community as they define their historic and present identity. To deconstruct this problem, we discuss the perceived degree to which land use rights affect the group's societal and economic development. Within the many perceived problems by both the Yshiro community leaders and the 15 institutions, the one perceived by the indigenous community is regarded as the most relevant, not only because they represent the largest portion of the society, but also because of the impact it has on their survival as a group.

Figure 2 shows the indigenous group's perceived problems, with categories designed according to the structure of the GAF as well as the questionnaire used for the interviews. We asked respondents to define and rank the contextual factors behind the perceived problems (hard facts), the problems themselves (problem and impact), the causes of them (nature of the problem), and the system of formal and informal laws that exist (response), whether or not it is implemented and respected.



System of formal and informal laws that exist (rules of the game)	
National level* (see APPENDIX)	Constitution and national law and regulations.
International level	Convention no. 169 of the International Labour Organization on indigenous peoples and prior consultation of indigenous peoples on projects (free and informed prior consultation) (234 / 91, 92).
Community level	Institutionalization of the Unión de Comunidades Indígenas de la Nación Yshiro (UCINY).

Figure 2. Perceived problems of the Yshiro and their response at the national, international and community level.

3.2. *Social Norms*

Formal and informal norms serve to guide the behavior of community members, facilitating collective actions that make an impact, regardless of whether it is perceived to be right or wrong. The *cosmovision* of the Yshiro community [30] is part of a myriad of social norms observed in the area and, therefore, is part of what is understood as normative pluralism [10,31]. In this context, we categorize social norms within the meaning of (**a**) values and beliefs, (**b**) the perception of development and (**c**) the forms of community representation (Table 2). By adding some of the most representative quotes of community leaders (QCL) of the Unión de las Comunidades Indígenas de la Nación Yshiro (UCINY), we try to give a voice to the Yshiro in order to account for their status of social invisibility. Established in 2000, the UCINY represents the Yshiro communities. It has its own legal board, coordinator, secretary, and advisers. The main goal is to rebuild the ancestral territory of the Yshiro. Below each quote, we include a line of reasoning that aims to interpret the perceptions presented [Interpretation].

Table 2. Connection between (a) values and beliefs, (b) the perception of development and (c) the forms of community representation with the Organizational Principles of CBNRM.

1. Public Participation and Mobilization	(c)
2. Social Capital and Collaborative Partnerships	(b)
3. Resources and Equity	(c)
4. Communication and Information Dissemination	(c)
5. Research and Information Development	(b)
6. Devolution and Empowerment Including Establishing Rules and Procedures	(a)
7. Public Trust and Legitimacy	(c)
8. Monitoring, Feedback, and Accountability	(c)
9. Adaptive Leadership and Co-Management	(a)
10. Participatory Decision Making	(b)
11. Enabling Environment: Optimal Pre or Early Conditions	(a)
12. N/A	

Source: Author's own elaboration.

About **values and beliefs (a)**, the Yshiro present two major concepts. First, their connection with the land defines both their identity and indigeneity. Second, the understanding of the group's vulnerability shapes the path for future generations.

[QCL1] "We (the Yshiro) are like plants, we grow up here, we stay here, and we die here"

[Interpretation] For the Yshiro, the land is the center of the universe, the heart of their culture, and the origin of their identity as a people. As for many other indigenous communities, human and land (or earth) is one unit. It connects the community with their past (as the home of their ancestors), with the present (as a provider of their material needs) and with the future (as the legacy they keep for their children and grandchildren). This is how the Yshiro entail a sense of belonging to a place.

[QCL2] "Our ancestors fought for this land, we need to fight (peacefully) so that our sons and grandsons can stay (and not migrate to the cities)."

[Interpretation] The Yshiro understand their place in the (modern) world as well as their legacy from the past, what they live with today and pass on to future. A perception of vulnerability comes along with the need to maintain those legacies. Conceiving the possibility of development in the modern world implies the inclusion of core values and beliefs (e.g., the concept of reciprocity).

The importance of the Yshiro **local perception of development (b)** includes two main considerations. First, the need to improve networking and find new connections. Second, the impact of marginalization and the related new forms of development.

[QCL3] "We shall cross the river on the other side and seek support from other indigenous group from Brazil."

[Interpretation] Although ancestral territories may be divided by the borders between countries, and by administrative political boundaries, those are fictitious or artificial divisions for the Yshiro. This idea may be seen as a form of indigenous diplomacy, where improving supporting networking with indigenous and non-indigenous communities is perceived as an element of development.

[QCL4] "We use axe and machete to work the land. We need to cultivate and (quite often) go and sell the manioc in the streets of the little town. It is labor intensive (to walk 7 km each way). That's one of the main reasons people are slowly leaving our indigenous colonies to bigger urban areas (destined to begging, etc.). We need (instead) tractors for the field."

[Interpretation] The Yshiro understand the impact of marginalization on their labor, thus having an impact on the present and future progress of the community. Alongside the need to strengthen their network, they also understand the need to increase their knowledge of (modern) farm practices in order to improve their economic development.

[QCL5] "The indigenous people cannot only live out of nature (or not anymore). Resources are decreasing with the destruction and depletion of the environment. We need to act and live differently from the past. Our daily hard work on land is merely subsistence. The indigenous should turn from hunters to small producers. We have already started the process but we lack capacity and means."

[Interpretation] Similar to the interpretation above, the Yshiro need and want to improve their farm practices. This can be seen as a call for support and capacity building from external actors.

[QCL6] "Cattle ranchers and landowners, who are our neighbors, are using tractors, they deforest with chainsaw ... They don't need much human labor. All is mechanized. Cattle ranchers use workforce that comes from other part of the country. They don't use local workforce."

[Interpretation] On the one hand, the Yshiro tend to be open to learning and increasing their own productivity, on the other hand, they criticize the lack of labor inclusion in industrialized farming. Once more, this quote shows the openness of the indigenous group to take part in the (modern) local development, although when agriculture and livestock production exclude indigenous labor force, a sense of frustration arises.

Community representation (c) is shaped by three core elements. First, by the group's acknowledgment of a status of exclusion and the corresponding lack of recognition. Second, by the relations between human/territorial rights and the vision of the State. Third, by the hierarchical structure of the group.

[QCL7] "We need to reconstruct our power."

[Interpretation] To reconstruct the power of the Yshiro means to find new spaces to reaffirm the right to self-determination, as well as to increase their distinct political, legal, economic, social and cultural institutions.

[QCL8] "We need to fight for our land and territory within a new world (not the one like our ancestors). We shall use a lot of what is offered by the Westernized world; but focus on preserving our (language) and land. We want people and the State to understand that its national constitution talks about a multiethnic and multicultural Paraguay. We are it."

[Interpretation] Here, the Yshiro advocate for a truly intercultural democracy. The same is based on the complementary exercise and on equal terms of three concepts: direct, participatory, and representative. Alongside the right to self-determination, the Yshiro understanding of democracy implies transforming a condition of exclusion to one of inclusion (e.g., political, economic, etc.).

[QCL9] "Images of indigenous people on publications and reports are good advertising. Not more than that. Real participation and representation of the Yshiro in decision making does not exist. We don't have any benefit in it even if we are invited to round tables, etc."

[Interpretation] Once more, community representation includes effective participation in the exercise of decision-making processes. The Yshiro criticize the way in which their image is most commonly used by civil society (e.g., NGOs and development agencies) and by the

state. This call to change external approaches to indigenous group shows how imagery representations can foster forms of discrimination (e.g., gender, ethnicity, etc.), resulting in marginalization and exclusion.

[QCL10] "Politics sell the rights of indigenous people."

[Interpretation] This critique regards the political discourse and propaganda (especially out of election period) that turn the images of the indigenous people into mere ´products´. This idea reinforces the link between political and economic strategies of development (e.g., neo-extractivism), thus causing a negative impact on the community representation of the Yshiro.

[QCL11] "Foreigners come and buy (our) ancestral land."

[Interpretation] This quote resumes the critique against neo-extractive policies of the state, often forcing indigenous people to leave their ancestral land in order to make way for (foreign) land speculation. Similar to the above, the way in which development is imposed is perceived as a threat to the indigenous land, thus to their identity and survival.

4. Discussion

This discussion is framed according to the two tools of the GAF: problems and social norms. These key elements guide us to explore community-based governance models for sustainability in the area. Besides, by de-constructing them, we are able to better describe and assess the performance and configurations of governance under the umbrella of the 12 principles of CBNRM.

4.1. Problems

The findings about perceived problems by the Yshiro show that land grabbing and group marginalization represent their main tangible concerns, while structural discrimination and land distribution are regarded as side problematic concepts, yet tangible and existent. The instruments the community sees at its disposal are in the legal system as well as in their own form of institutionalization as an instrument to deal with conflict resolution and cooperation (point 12 in Table 1).

Structural discrimination is found to be grounded into historical and socially constructed values and stigmas against the indigenous communities. In 2008, the Truth and Justice Commission (Comisión de Verdad y Justicia (CVJ)) sought to officially establish the truth and historical justice about the acts of violation of human rights that occurred in Paraguay, essentially during the Stroessner dictatorship (1954–1989). The act established a broad historical period of study and pointed out serious violations. We use it consistently because it reaffirms the validity of the results in this section. In the chapter on the rights of indigenous peoples (article 157), the CVJ argues that the dispossession of the indigenous territories was part of a State policy against individuals and peoples, denying them not only the right to own their lands and territories, but also fundamental rights, such as the right to life, personal identity, freedom, and integrity [32,33].

In addition, as stated in the same document, there are evident practices of discrimination against the indigenous in the distribution of resources for the purchase of land and the privileged sale of land to foreigners [33]. Previous studies theorize forms of structural discrimination focusing on minorities (e.g., gender, race, inequality, and poverty) and, therefore, are an asset to this work for their multi-facet depiction of discrimination [34–36]. By observing how to adopt models of development that are a threat to the maintenance and respect of cultural diversity, more specifically in indigenous societies, the case of the Yshiro in Paraguay may reveal additional facets of received discrimination.

Structural discrimination factors are facilitated, if not driven, by both the irrelevance of the rule of law (e.g., role of the public sector) and interethnic factors [37–40]. The latter is understood as the relations among individuals and groups with different national, racial, cultural origins, as well as

ethnic belonging [37–42]. Discourses based in fixed concepts and stereotypes serve as the basis for marginalization and social invisibility. As for the case of the Yshiro, the incommunicability between global and local generates a mutual exclusion between the actors involved.

Stereotypes are grounded on the recognition of non-acceptance of the ethnic, cultural, and historical differences, the function of which is to create a "new place" of "subject peoples." These subjects, however, are placed disproportionally between opposition and domination [43]. The existence of structural discrimination toward the Yshiro group and, in general, toward all indigenous communities in Paraguay can be defined as the form of discrimination that is encouraged by central government policies favoring agribusiness and real-estate speculation over indigenous land rights. Besides, the weak implementation of basic concepts of the rule of law (e.g., constitutional rights, etc.) facilitates this discrimination. Paraguay can be considered a case where the primacy of a type of economy prevails over rights.

Neo-extractivism is a strategy of capital investment, incentivized or implemented by national states, based on the extraction of biophysical resources of different types, which involve the transformation of property rights and use of sub-national territories for the commercial production, to the general disadvantage of its previous owners or users [44]. Most dramatically, from the human rights perspective that underlies the structural discrimination is that neo-extractivism overrides the plans and projects developed by knowledgeable local populations through participatory activities [45]. This concept is reflected in the structural discrimination perceived by the Yshiro.

Land grabbing and **group marginalization** are the most pressing problems revealed in the interviews. They are motivated by the economic interests of a minority of large-scale landowners (e.g., landlords, etc.). In the context of Paraguay, the high dependence on extractivist models, based on exploiting natural resources on a large scale, is an engine of inequality that has led to a high concentration of land and wealth. Neo-extractive economies do not account for environmental costs, only accounting for the productive growth of the intensive exploitation of resources without taking into account their negative impacts on both biophysical processes and on territorial populations—in particular, indigenous ones [45,46].

As a result, violence against those who defend the land, water, and forests, as well as the rights of women, indigenous peoples, and rural communities, has increased [47]. As for the Yshiro community, land grabbing and group marginalization goes hand in hand as it has, according to the results, an increase in forced displacement to urban centers. The CVJ reports (article 164) that the absence of public services, health, education, and drinking water in rural and indigenous communities is chronic, under the jurisdictions of the central government, the governorates and the municipalities (p. 60) [33]. Indigenous peoples, including the Yshiro, have been victims of the continuous dispossession of their territories, before, during, and after the dictatorship of General Stroessner—the State being responsible because it is their responsibility to respect and guarantee rights (Article 156, p. 58) [33].

Hence, Paraguay designs and implements policies that, in practice, tend to legitimize investments that cause negative social and environmental results. Moreover, neo-extractive policies and practices, in addition to generating highly trans-nationalized schemes, have also given way to processes of land grabbing, even in those countries with constitutions that guarantee the territorial rights of local populations [44]. What emerged from the community perception of governance processes is a sense of being patronized by most of the actors, particularly public institutions. Top–down policies tend to widen, thus reinforcing the gap between them and "the others." This includes, for example, non-inclusive education. As a result, socially constructed issues (e.g., values and stigmas) underlie ideological violence, which is also embedded into humanitarian and conservation agencies. Blaser (2009) reminds that bureaucratic scientific conservation could only be applied among the Yshiro through the actual or threatened use of coercive force. He cites government measures imposed in 2001 by the Environment Secretariat as an example. This included the reinforcement of police surveillance in the Yshiro area [30]. Further, most of the traditional Yshiro territory was declared a biosphere reserve and incorporated into a National Park without consent of the Yshiro. Blaser (2009) believes

that by considering the "Yshiro conservation" as being improper, bureaucrats implicitly claim to have an epistemologically superior understanding of the environment, because it is not influenced by culture [30].

The nature of the problem is found in the way land is distributed in the region. Land distribution is systematically thought to be fuzzy as the state holds so little capacity that informal and power relations (especially economic power) prevail. The relationship between State and inter-ethnic groups is complex and difficult, even after policies for identity reaffirmation were adopted in different Latin American countries, such as Bolivia and Peru. In addition to the asymmetric relations between indigenous land rights and state apparatuses, the right for any alternative culture to exist was historically denied [27,48–51].

The history of land tenure in Paraguay underwent radical changes with the laws of sales of public lands made in 1883, 1885, and 1886. With the privatization of public lands, thousands of peasants and indigenous peoples were forcibly displaced [4,25,47]. In some cases, the land in towns is owned by a private firm, including, for example, Puerto Casado. The previous system of land tenure, which came from the time of Independence, did not require a property title to use state lands. The laws of the sale of the public lands postulated a radical change of the perspective of the development of the country. In the 1870s, the State prioritized agricultural development based on the free transfer of land and farms to farmers and, under the same conditions, promoted the immigration of European farmers [2,4,25,26,33].

The shift in the regulations on public lands caused the prioritization of extensive agriculture and livestock production. Governments in power then wanted to take advantage of the increase in land prices in Argentina by selling Paraguayan land to attract foreign capital at much lower prices than the neighboring countries [52]. Under these circumstances, commission agents of foreign investments entered the country and acquired lands with pastures for livestock and forests for logging and timber exports. The rising influence of foreign capitalism and elitist upper-class interests are the main consequences of these policies.

In the chapter regarding rural land distribution, the CVJ examined titles of land property in Paraguay granted by state agencies responsible for agrarian reforms between 1954 and 2003. Serious irregularities in the adjudication and/or concession of land were found (Article 192, p. 71) [33]. Studies by the National Institute for Rural Development and Land (INDERT), the Agrarian Reform Institute (IRA), and the Instituto de Reforma Agraria Rural Well-being (IBR) verify that the State, within the period from 1954 to 2003, delivered more than 200 land concessions, comprising a total area of more than 12 million hectares, of which more approximately 4 million hectares corresponded to the region where the Pantanal is located (Article 194, p. 74) [33].

Over the last twenty years, low prices and favorable purchasing conditions anticipated the massive entry of speculative foreign capital and the transformation of the political class into the dominant economic class. According to Guereña and Rojas [52], Paraguay has a very high percentage of foreign landowners, who also have close ties to political and economic power. The pressures around land use and distribution have made the owners diversify their tenure strategies, dividing properties into several farms of smaller size, creating joint-stock companies in order to hide the names of the owners, and registering properties on behalf of third parties, among others. Paraguay can be considered a latifundian country, almost feudal, where every area of the country has one or a few landlords who own the land, production, and wealth [52]. Article 162 of the CVJ states that the (historical and continuous) forced displacement of indigenous people and peasant communities, as a result of the territorial dispossession of which they were victims, added to the absence of protection of the State in their dignity and rights (p. 59) [33]. This has been and continues to be a source of segregation practices, as in some colonies of the Chaco and in practices similar to slavery on livestock ranches. In the context of territorial insecurity of the Yshiro, there is also a violation of community cultural heritage, the loss of traditional medicine, and the loss of traditional subsistence practices.

The territory, called yrmo by the indigenous community, means cosmos and it is what constitutes them as people [30,53]. The Yshiro have a strong bond to land and, therefore, are the ones most likely to preserve it or use it sustainably. However, they face new challenges that affect not only their governance patterns, but also their survival as a group. The group identity is forged by the occupation and use of the land. In the yrmo, the critical nexus between human behavior and the availability of animals is the reciprocity that must prevail in the network composed of both humans and the force which is understood as the manifestation of an original specimen [30]. If animals are not available, it means that the flow of reciprocity is failing at certain points in the network, usually in a human-to-human interface of the network. Thus, awareness and self-awareness are used by the community as an element of community-based governance.

The Yshiro's practices would be considered anomalies that cannot be negotiated according to modernity values. Blaser endorses this affirmation, through the concepts of Nadasdy [30,54]. When bureaucrats and experts comprehend the indigenous knowledges, those knowledges end up being marginalized because they often contradict the assumptions on which bureaucratic and scientific concerns, goals, and politics are based [54].

Ultimately, the yrmo is what constitutes the Yshiro as people. Human and nonhuman relations are also a component of indigenous identities [55,56]. Reciprocity is the basis for the organization of society and disrespect for such instructions can have negative results in the form of illness, death, drought, and flood [30]. The reality perceived by the Yshiro is that they are placed at the lowest level of hierarchical social categories by other groups of society. Arguments based on anthropological knowledge argue how the yrmo itself underwent a transformation from the contact and interaction with the non-indigenous settlers, institutions and their policies [30].

The Yshiro **response** to such structural problematics is the current system of rights and the role played by their own self-institutionalized group, the UCINY. In Figure 2, we presented the short list of the system of formal and informal laws, including the national and international levels that are instruments available to the Yshiro in order to respond to their problems. From a historical perspective, the progressive expansion of European civilization failed to include the cultural, identity, and territorial roles of indigenous communities [57–60]. The case of the Yshiro is only one example of the result of a permanent condition of subalternity, even beyond the phenomenon of decolonization.

According to Falk [61], for example, indigenous communities represent the most vulnerable category of peoples, not only for being primary victims of exploitation and oppression, but for having been denied the benefits of decolonization. If their existence was limited, then indigenous communities could be, at most, a figure for folklore or a topic of anthropological research [62,63]. Their emergence as subjects of law, however, within either national or international laws, derives from the birth and growth of widespread social and political movements. In our case study, the UCINY is perceived as an instrument for conflict resolution and cooperation (point 12 in Table 1) with the ability to transcend the current set of institutions and laws [20].

Protecting and preserving indigenous rights is enshrined in both Constitutional and administrative law in Paraguay. These rights aim to protect, among other issues, their ethnic identity, their right to participation, their community right, their native language, their education, their health, and their tax exemptions (positive discrimination). However, according to the perceptions of all actors engaged in this research, the absence of a consolidated presence of the State (e.g., rule of law) in the area leads to the rules being irrelevant. Only the community-level self-institutionalized group of the UCINY seems to be fertile ground and a governance pattern that responds to their problems and their impacts.

4.2. Social Norms

As shown in Table 2, this item deepens the Yshiro community leaders' discourses raised in the focus group presented. In order to describe group social invisibility, we analyzed three main categories embedded in 11 of the 12 CBNRM principles (Table 1): (**a**) **values and beliefs**, (**b**) **local perception of development**, and (**c**) **community representation**.

From the statements of community leaders (i.e., see QCL1 in Social Norms, values and beliefs a.), it is possible to note that the connection with the land is decisive in the definition of indigeneity. Moving from the indigenous territory to urban centers can be a difficult step for young people who choose to do it. Data on indigenous life in urban centers reveals disparities between indigenous and non-indigenous residents in terms of access to public services and economic opportunities [64]. Urban indigenous populations are more vulnerable compared to non-indigenous people and are exposed to new dimensions of exclusion [64]. As a result, the Yshiro awareness of their vulnerability, the internalization of the problem and their fight (i.e., see QCL2 in Social Norms, values and beliefs a.) are included in what we categorized as "**values and beliefs**." They connect the community with their past, with the present and with the future. In this regard, the role of reciprocity in the community is central as it provides a good understanding of how resources are used and mobilized, as well as what role self-awareness plays [65]. It is against this background that Yshiro understandings of the relations between human and nonhumans, including animals, must be understood.

Even so, many young people leave home looking for a better life. In urban centers, they continue to be part of the Yshiro Nation, claiming identities. In this regard, it is interesting to note that in the case of Bahía Negra, the border can also be seen as a line to be crossed to find connections with the "other" in a non-dominant position, as we observe in the QCL3 (see Social Norms, local perception of development b.). The border is considered by colonial discourse as a discredited place, where changes occur and are provoked [43]. Such a concept itself is the space of the encounter, where otherness is identified. As a consequent correlation, we place this need to improve networking in what we categorized as "**local perception of development**". According to Blaser (2004), even with many opposite reactions, the developmentalist wave in Latin America, in theory, sought to extend socio-economic human rights to indigenous peoples in the 1960s and 1970s [9]. Within this context of agrarian reforms, relations between indigenous and non-indigenous organizations and movements were intensified.

With the consolidation of the transnational environmental movement, the idea that indigenous peoples have the right to support their own life gained a new importance. The sustainable development discourse provided a platform to build the argument that these societies are a critical resource in the global quest for sustainability. Since indigenous cultures often see themselves as embedded within ecosystems, TEK became a subject of study and preservation interest [66]. At the same time, when industries and governments realized how difficult negotiation with a large number of local communities could be, they began to rely on NGOs to communicate, consult, and implement programs. Thus, civil society organizations eventually performed hybrid functions, serving multiple purposes and shaping, along with state and market organizations, society [67]. In this scenario, Blaser (2004) argues that indigenous organizations are inside and outside not just a civil society but also the state and markets [9]. New alliances among social movements became possible. Networks of exchange and solidarity are strengthened by the world with the potential to break through emerging governance structures. Statements QCL4, QCL5, and QCL6 (see Social Norms, local perception of development b.) show how marginalization operates in the Yshiro community and their development. With limited resources, farm life is not attractive to young people. Nonetheless, there is a wish to gather better and further knowledge in farm practices, including those in industrialized agriculture.

Extractive industries can also be a pull factor for indigenous peoples, with diverse outcomes and, despite many negative experiences, there are many cases proving that the interests of extractive industries and those of indigenous peoples are not always mutually exclusive [64,67]. However, Western indicators of well-being can condition the understanding of situations and the needs of indigenous peoples. It is agreed that a broader notion of development may allow indigenous societies to pursue their own paths of self-development, strengthening their autonomy, reducing vulnerabilities, and promoting the sustainable management of their environments, resources, and knowledge. As for our case, the Yshiro development can only occur if their voices become heard, their decision-making space widens and their abilities to act are understood.

Statements QCL7, QCL8, and QCL19 (see Social Norms, community representation c.) reinforce the need to cope with the current lack of recognition ("**community representation**"). Many indigenous groups are still structurally excluded, which limits their ability to contribute economically and to affect public policies. For instance, in the case of indigenous women, in which gender and ethnicity categories overlap, double discrimination arises [47]. From the initial proposition of this article, "The Yshiro have a strong bond to land therefore are the ones most likely to preserve it or use it in a sustainable way," we ask how to build a community-based governance model based on the Yshiro Nation. We see in QCL10, QCL11 statements regarding the Yshiro vision of human/territorial rights and the State (see Social Norms, community representation c.). The Yshiro community representation is being threatened by extractive polices promoting land speculation at their own cost, without performing, among other things, the appropriate prior consultation procedures (i.e., see Appendix A).

Yet, as the need for a new epistemology of development becomes urgent, we must also consider that the market economy and its concomitant forms of consumption, labor organization, and monetary exchange have penetrated indigenous families, communities, and territories for many decades. By promoting changes in identities, the creation of conditions for market inclusion is an important element for reducing vulnerabilities in rural areas as well as including TEK in sustainable development projects. The recognition of the central role of institutions outside rural and indigenous communities is a key learning notion of conflict management strategies [20]. Thus, new spaces and mechanisms of equitable land use and distribution, in which groups of civil society will participate in this decision, can be created.

5. Conclusions

This study investigated community-based governance models for sustainability in the context of Paraguayan wetlands. It particularly focused on the struggle for recognition of indigenous peoples (e.g., identity, land and rights) that involves many sectors of society within a complex arena, crossing boundaries among state, markets, and civil society. After observing problems, such as marginalization by the impact of land grabbing and inequitable access to land, from the Yshiro community leaders' discourses, a second step is to encourage strong governance that self-determination requires. The findings suggest that community-based governance is constructed by the Yshiro relation to land (e.g., TEK) and their self-organized group (UCINY), as well as highly threatened by the impact of the national neo-extractive economy.

The empirical results reported herein should be considered in light of its main limitation that is the degree to which the research tends to generalize. For example, our most consistent set of data regarded local perspectives. Thus, those results (also due to the lack of comparisons with other case studies or other communities) might not translate or be transferrable to a broader context. However, based on our research scope, we present a case where similar research is scarce.

The following three final remarks aim to offer a concrete example of findings that can be compared and used for similar cases and socio-environmental contexts.

The first remark is about the Yshiro cultural and identity bond to land and its sustainable use. The non-normative objective of the adopted approach in this article is the empowerment of social actors and their territorial organizations (e.g., UCINY). In a democratic context, participatory organizations must be able to ensure that the rights granted to citizens, according to the adopted normative or constitutional frameworks, are effectively implemented. Empowerment (or resistance) arises from the possibility that the rules of the game are not imposed "from outside" or "from above," but rather constructed, modified, and monitored by the territorial social actors and their organizations [44,68]. In principle, public agencies can "nominally" recognize the rights of citizens, but in practice, due to differences in power, it is possible that social actors (and, in particular, those from the most vulnerable and powerless territories) are not able to exercise them.

The second remark regards the impact of the extractive natural resource-driven developmental push. A myriad of natural resources that form the Pantanal eco-region are embedded into the indigenous identity. The destruction of the environment will cause the disappearance of local and indigenous communities, identities, as well as their knowledge (e.g., TEK). The case of the Yshiro and its governance model is emblematic as they have played a role of subalternity since the 19th century within their cultural spatial context (e.g., privatization of public lands, etc.). As stated by Green [18]: "the importance of spatial aspects within the politics of natural resource management, and emphasize that the socio-politics and power dynamics of CBNRM are both shaped by and continually re-shaping the scalar configuration of power (p. 95)." The Paraguayan state, moved by the need of the global market, promoted the development of extractive activities aimed at international markets, directly harming the territorial rights of rural populations and, in particular, indigenous populations and communities. Strengthening the role played by the State in the design and implementation of public policies should not be in conflict with the need to propose fundamental changes in their legal-political structures at different territorial scales (e.g., sub-national scales, etc.). From the perspective of strengthening the territorial and identity rights of indigenous populations (e.g., the Yshiro), one of the most urgently needed restructurings is to increase the capacities of subnational governments to design and implement public policies relevant to their respective areas [44]. At the same time, they must intensify their links with civil society organizations at different scales. Therefore, it is important to review the bureaucratic-vertical paradigm of government, which means taking into account litigation as well as a legal-political form of defense of human rights "from above," as well as natural resource practices (e.g., TEK) by the populations and communities "from below."

The third and final remark argues that the UCINY can be considered as a model of community-based governance. Since the 1990s, in Paraguay, various types of civil society organizations and social movements have emerged as important actors in the restructuring of governance institutions (economic, social, and environmental) across territorial scales. The assumption is that when local populations participate in the processes of economic transformation and are well informed, they tend to demand accountability for the issues that concern them, which will ultimately increase the quality of governance. However, citizen mobilization through isolated organizations is not enough: social networks (possibly moved by the Yshiro concept of reciprocity) are essential for achieving the objectives set by the sub-national territorial organizations and guarantee, through social mobilizations, that governments and markets respond to the needs and demands of citizens. This may be a step toward giving real content to community-based governance and CBNRM, thus empowering and moving beyond political and social constructions (e.g., values and stigmas, etc.).

In addition to the reaffirmation of identities and resistance, many structural changes need to happen (e.g., social/economic standing of indigenous communities to contribute to TEK and cultural survival), since indigenous communities are clearly embedded in post-colonial settler relations in multiple ways. As for the findings of this work, the role of the developmental strategy of extractivism is having negative impacts on the equilibrium of local governance and cultural identities. Likewise, the historical role of identity of the Yshiro community should be included in dialogues of sustainability for its intimate bond to land and its entrenched connotations (i.e., yrmo). Barth [37] argues that "categorical ethnic distinctions . . . entail social processes of exclusion and incorporation whereby discrete categories are maintained despite changing participation and membership in the course of individual life histories (p. 10)." From this perspective, the UCINY can be considered a model of community-based governance for Paraguay in order to develop sovereignty among the Yshiro community.

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Appendix A

National Level
Constitution:
Part I
Of fundamental declarations, rights, duties and guarantees
Title I
Of the fundamental declarations
Chapter V
Of the indigenous peoples
Article 62—indigenous peoples and ethnic groups
Article 63—of the ethnic identity
Article 64—community property
Article 65—the right to participation
Article 66—education and assistance
Article 67—exemption
Chapter VII
Of education and culture
Article 73—the right to education and its purposes
Article 77—teaching in maternal language
Article 81—of the cultural heritage
Article 83—cultural dissemination and tax exemption
Part III
Of the political ordination of the republic
Title I
Of the nation and the state
Chapter I
Of the general declarations
Article 140—languages
National law and regulations:
Law No.904/81: Statute of the Indigenous Communities.
Laws 137-143-145 on supremacy of international or regional legal order.

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5.3 Mechanisms of weak Governance in Grasslands and Wetlands of South America (Article 3)

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Article

Mechanisms of Weak Governance in Grasslands and Wetlands of South America

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Abstract: Weak governance is a major threat to sustainable development, especially in rural contexts and within ecosystems of great social and economic value. To understand and compare its arrangement in the grasslands and wetlands of the Colombian Llanos and the Paraguayan Pantanal, we build upon the Institutional and Development Framework (IAD) as we explore the role of political, economic, and social institutions and combine components of the theory of common-pool resources (CPR) and new institutional economics (NIE). This hybrid conceptualization provides a synthesis of how top-down hierarchical and market-based systems of community-based and natural resource management negatively affect sustainable development in both study areas. Our findings suggest three underlying mechanisms causing a situation of weak governance: centralized (economic and political) power, the role of central and local governments, and social exclusion. Understanding these multidimensional contextual mechanisms improves the understanding that institutional structures supporting arrangements that handle grasslands and wetlands in a sustainable way are needed to protect the ecosystem's social and economic values, especially in rural and marginalized contexts.

Keywords: Colombia; common-pool resources; Orinoquia; Llanos Orientales; Pantanal; Paraguay

1. Introduction

Because grasslands and wetlands cover approximately half of the world's ice-free land area, comprising about 70% of the world's agricultural and livestock area, these are important agricultural resources, especially in areas where people lack food security [1]. Biodiversity and ecosystem services in grasslands and wetlands are degrading faster than ever before in human history [2,3]. These ecosystems are at the center of socio-economic conflicts in areas with extensive rural poverty and where people and economies are highly dependent on natural resources. In South America, grassland and wetland ecosystems cover 269 million ha [4]. Most (76%) belong to the Cerrados of Brazil, but about 11% (28 million ha) form the Venezuelan Llanos and 6% (16–17 million ha) the Llanos Orientales of Colombia [4,5]. These last areas are seen as a single ecoregion, the Llanos of the Orinoquia. The remaining 7% is the mosaic of flooded grasslands, savannas, and tropical forests forming the Pantanal, the world's largest wetland, stretching across Bolivia, Brazil, and Paraguay [6]. This wetland area is part of a larger dry plain of around 100 million ha, known as the Gran Chaco. The Gran Chaco Americano is increasingly used for livestock grazing and raising crops, with the

conversion of natural vegetation accelerating. Approximately 500 ha per day are deforested in the Paraguayan part of the Gran Chaco Americano [7].

These grasslands and wetlands play a crucial role in sustainability issues, with social-cultural, economic, and environmental values. Beyond providing habitat for plants and animals that are adapted to the unique hydrologic regimes and soil conditions [8,9], they provide important ecosystem services, including climate regulation and water purification [10–12]. Local communities and indigenous peoples provide cultural values, embodied in their knowledge about nature conservation and the sustainability of traditional subsistence systems [13,14].

Although literature on these valuations exist [9,15–19], interdisciplinary and socio-economic approaches, especially those including discourses on governance in developing countries, are scarce. Hence, grasslands represent the least understood biome in terms of their true value for sustainable economic uses and their contribution to human health and well-being through sociocultural services [20,21]. Better understanding social dynamics, including indigenous and traditional values, requires science-based valuations to leverage narratives on the region's sustainable development [22–26]. De facto, interdisciplinary research incorporating socio-economic approaches as important determinants of value is critical for policy making [12,18,26–28].

Regarding our Colombian and Paraguayan cases, only a tiny percentage of the Colombian Llanos (in the districts of Yopal and Paz de Ariporo) and Paraguayan Pantanal (in the municipality of Bahía Negra) benefit from legal protection; most land is converted for intensive usage [29–31]. Increasing demand for agricultural commodities drives the conversion of Latin American grasslands and wetlands, including our case study areas, into cropland, with significant consequences for the environment, local communities, and democracy [30–32]. In both Colombia and Paraguay, the expansion of agroindustry, extensive overgrazing, cattle ranching, insecurity of land tenure, unsustainable infrastructure development, and weak enforcement of environmental laws are the main threats to culture and biodiversity conservation [29,33,34].

The historical distribution of land and the roots of both eco-regions are starkly reflected in existing antagonisms between peasants and those elites who control the land: great land owners in Paraguay and guerrilla and paramilitary groups in Colombia [35–40]. Grasslands and wetlands are unique sites receiving increasing attention from leading environmental and human rights organizations (e.g., The German Agency for International Cooperation (GIZ), World Wildlife Fund (WWF), Amnesty International, etc.). However, for Paraguay, there is a significant gap in the governance research literature, especially at the community level [28,29,41]. We draw on the literature regarding participatory and environmental governance approaches for wetlands in the region [28,42,43]. For Colombia, although several analyses (e.g., policy papers) concentrate on land use, biodiversity, and renewable energy [2,34,44], literature analyzing community-based governance models is lacking. Our contribution tries to fill this gap by investigating local perceptions about economic and political centralization, the role of governments, and social exclusion. We follow existing literature, discussing weak governance, which is understood as a widespread system of corruption and unlawful behavior, and how it contributes to increasing negative consequences, including environmental, socio-economic, and institutional conflicts, along with social exclusion and poverty [12,26–29].

According to Vatn (2010), three governance structures exist: hierarchies, markets, and community management [45]. Community-based governance models offer valid tools to resolve conflicts over a number of issues, including natural resource use and management [46,47]. It also helps empower a community-based environment, where inclusion and engagement are key factors [48]. In South America, as a concrete means to promote social and economic welfare, as well as land-ownership rights and conservation issues, participatory community-based governance is being tested through a number of voluntary actions including cooperatives, syndicates, and associations [23–25,43,49,50]. This trend often results in resistance to centralized, top-down model structures, whether political, institutional, or economic; those only represent the wealthiest elites. Modern governance discourse "signals a weakening of the state-centric view of power and societal steering that has been problematized by recent empirical and ideological developments" [51] (pp. 2–4). Post-modern

decentring of power is a key issue in developing countries [52]. Governmental processes concerning South American grasslands and wetlands must address socio-economic and environmental changes, power and hierarchical structure at all scales, and political dynamics, as well as stakeholder engagement schemes [5,28,29,33,44,52–57]. To this end, our focus is on marginalized rural communities because of their vulnerability to weak governance, as they lack human, political, and financial capacity to protect their rights over land and natural resource use and management [58]. In this context, our research question seeks to investigate mechanisms of weak governance and how they are structured in the Colombian Llanos and Paraguayan Pantanal.

The Umbrella Framework

To contribute to the literature and guide our research, we develop our work under the umbrella of the Institutional Analysis and Development Framework (IAD). IAD is widely employed in research on community-based management of natural and common resources [59–63]. Because institutions are the main prescription for repetitive and structured interactions in governance and self-government environments [60], IAD helps identify key factors for institutional and participatory aspects [63]. It adds the systematic analysis of collective action in relation to the use and management of natural resources, focusing on institutions. IAD's core is the "action arena", comprising the social spaces where actors interact (the actual situation) and the actors themselves (participants) [64,65]. The "exogenous variables", those influencing the action arena, are useful for defining the context (e.g., to understand what might happen in the action arena), including community attributes, physical attributes, and the rules in use [66]. Within our research, we adapt the IAD to the needs and criteria of the two main theoretical frames addressed here: the theory of common-pool resources (CPR) and new institutional economics (NIE). Both theories seek to analyze institutions, whether political, economic, formal, or informal, as well as the possible overlaps, aiming to contribute to economic and social development.

The first theory offers much empirical data and a solid frame [64,66–70], because scholars are increasingly studying the governing of natural resources by a community or a number of individuals. CPR helps us understand the role of communities and their relations with ecosystems. A simple assumption of a successful CPR model is to maintain a common resource for an extended time without outside intervention [67]. Hence, the possibility of overexploitation is resolved when there is an 'increase in the capacities of participants to change coercive rules of the entire game' [71] (pp. 263–277). Similarly, as claimed by Saunders (2014), 'CPR theory tends to conceptualise heterogeneous communities as autonomous "rational resource users" with fixed identities and a common purpose' [70] (pp. 649–666). This is how we address the theory of CPR: over time, societies develop institutional mechanisms, whether formal or informal, whether legal or rooted in tradition, and customs that efficiently and successfully manage natural resources.

The second theory reflects an economic approach that is relevant in the rules (or institutions) of participants when they are interdependent. Most studies regard the theory of institutional economics [72–75] as a step beyond neoclassical economics because it studies the structure of property rights. As reinforced by Ollila (2009), this theoretical approach,

> "Analyses whose costs are taken into account in the economic calculus and what market measures can be considered as efficient outcomes. For example, what is the relation between efficiency and social acceptance? The market may produce multiple "efficient" outcomes and, thus, one must decide what kind of a state of a market is preferable." [76] (pp. 21–26).

Therefore, efficiency is determined by the institutional set (property rights). A further development of this concept is new institutional economics (NIE), which focuses on the role that culture, legal systems, political institutions, and other instances have on economic development. Yet, the meaning of institutions remains as "the rules of the game" while actors are the "players of the game". As Alston et al. (1996) and North (2005) conceptualize, institutions are informal rules and limitations (sanctions, taboos, customs, traditions, and codes of conduct), as well as formal rules

(constitutions, laws, property rights) [77,78]. Thus, within the lens of economic and social development, mechanisms underlying weak governance are explained, classified, and analyzed using NIE.

2. Methodology

2.1. Case Study Descriptions

Due to the aforementioned socio-ecological similarities, we focus on the Department of Casanare in the Colombian Llanos (in the districts of Yopal and Paz de Ariporo) and the Department of Alto Paraguay in the Paraguayan Pantanal (in the municipality of Bahía Negra) (Figure 1). Agricultural production is the principle threat to the savannahs and grasslands in both areas, while land use and management rarely includes ecological and social criteria that safeguard natural ecosystems, biodiversity, and carbon stocks. Land use and the ongoing transformation of natural ecosystems negatively affect local and community-based governance structures.

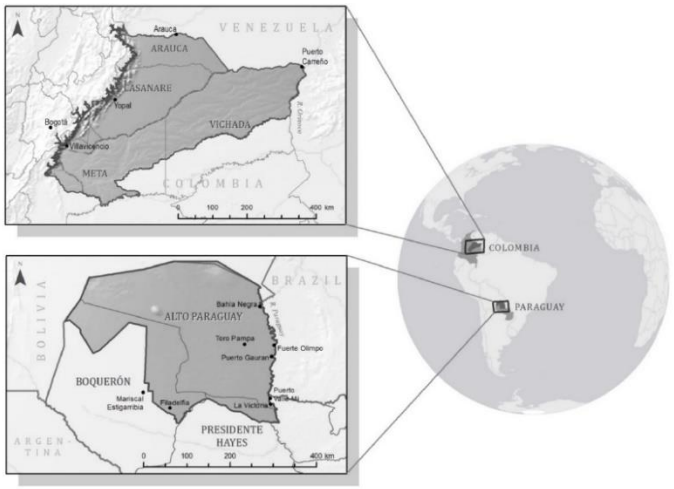


Figure 1. Base-map Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia ©, OpenStreeMap contributors and the GIS User Community.

2.2. Methodological Procedures

We use a mixed methods approach across three methodological phases: (A) exploratory research including an international literature review and non-structured interviews with 10 key informants; (B) field-based studies consisting of an online survey of 32 regional experts; and (C) a set of semi-structured interviews based on the Governance Analytical Framework (GAF) [79], involving 102 local participants. Figure 2 displays the three steps of the procedure. Data were gathered from 144 people, including informants, regional experts, and local participants. The entire methodology draws upon the IAD framework, including contextual perspectives (attributes of community, attributes of physical world rules-in-use) throughout Phases A, B, and C. Figure 3 shows the adapted IAD framework.

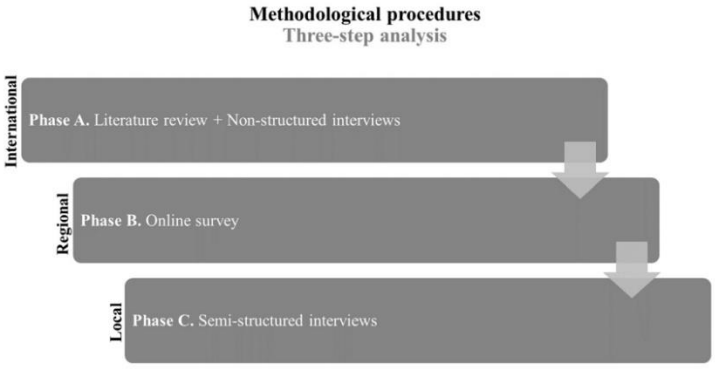


Figure 2. Methodological procedures—Three-step analysis.

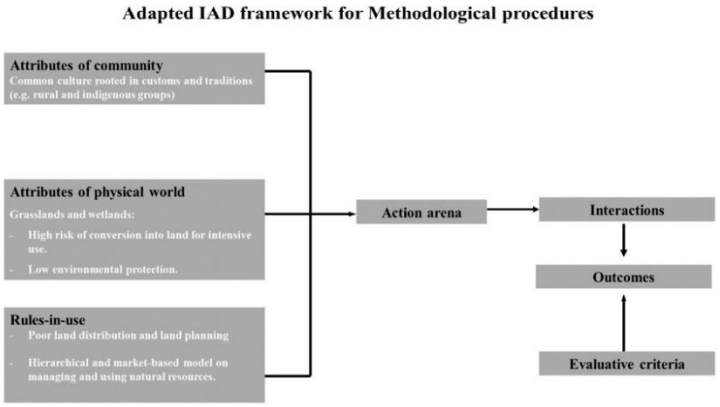


Figure 3. Adapted Institutional and Development (IAD) framework for Methodological procedures. Source: [63].

During Phase A, we reviewed the international literature on the governance, participatory approaches, and socio-economics of grasslands and wetlands. The screening of science-based knowledge used online databases (e.g., Science Direct, Google Scholar, etc.) and national archives in both English and Spanish, including studies from the 1970s to early 2019. Keywords used included grasslands, governance, South America, and community-based governance. Case studies on wetlands and grasslands were found by interviewing 10 key informants identified through networking and inter-institutional connections (see Appendix A). The non-structured interviews focused on two specific case-studies, one in Colombia and one in Paraguay.

In Phase B, we conducted an online survey (http://soscisurvey.de/), targeting experts from well-established organizations in Colombia and Paraguay. From an initial pool of informants, we employed snowball sampling, identifying potential participants who met the eligibility criteria [80]. We engaged with organizations based on their expertise with social, economic, political, and environmental issues in the case study areas (see Appendix A). Criteria for the Phase B study-sample comprised: presence (e.g., minimum 5 years) of work in the areas of study; professional career (e.g.,

working position/responsibilities) and relevance to the areas of study; and educational degree (e.g., undergraduate/post-graduate). In total, 45 experts were identified, of which 32 responded to the survey. The sample comprised diverse actors and knowledge areas, covering the complexity of our research problem. Participants belonged to academia (e.g., national universities), civil society (e.g., NGOs (Non-governmental organizations), associations etc.), the private sector (e.g., private companies present in the areas), and the public sector (central, regional, and local institutions).

We created sub-categories corresponding to the characteristics and indicators for each category, presented in Table 1. Questions for experts related to four topics: (1) the use and management of natural resources and their relation to land distribution; (2) the presence of Ostrom's eight principles of managing common-pool resources and their relation with present formal and informal boundaries reflecting the perceived power relations [56]; (3) conjectures related to a diverse range of forms of institutions in the areas of study; and (4) existing models of community-based sustainability within the agenda of economic models. Under Topic 1, we offered a list of potential threats to the specific ecoregion (e.g., misuse of natural resources, over-exploitation, global warming, population growth, urbanization, etc.), asking experts to pick one option. Topic 2 comprised tick boxes with yes/no options for each of Ostrom's eight principles. We also added four open questions about rules (both formal and informal), decision making processes, law implementation, and the current status of information and education about natural resources. Under Topic 3, we added two lists of questions. In the first, experts picked one main possible constraint for governing natural resources from a list (e.g., corruption, impunity, centralized natural resource management, lack of human and financial capacity of local governments, etc.). For the second, experts were asked to pick the two most relevant social interactions in the regions (e.g., economic exchange, voter-politician relations, inter-ethnic conflicts, and/or cooperation, etc.). Topic 4 comprised a single tick box (yes/no) about existing cases of communities managing natural resources. If the answer was yes, they were asked to choose an economic model (either top-down or bottom-up). If no, there were four open questions about social relations (e.g., corporations/social marginalization, social welfare/sustainable development, local interests/national and local scales, intra-sectorial relations/conflicts, gender equality/social exclusion) that sought relevant considerations. In Phase B, we designed and implemented a questionnaire of 45 questions, using the sections of characteristic and indicators (Table 1). From the online questionnaire, we extracted percentages for each characteristic and indicator to determine the most relevant perceptions of the local experts.

Phase C is based on the Governance Analytical Framework (GAF) [79]. This tool allows us to systematize our field work analysis. With its broad adaptability and applicability on the ground, GAF allows researchers to describe socio-ecological processes within specific and unique contexts [81–83]. GAF focuses on social interactions within which actors/participants make decisions regarding a collective problem, thereby creating and reinforcing social norms or institutions [79]. It comprises five analytical tools: problems, actors, social norms, processes, and nodal points. Field study constraints limited us to focusing on two: problems and social norms (Figure 4.). The category actors were initially covered by a stakeholder identification and mapping based on the analysis for this research. Time constraints for our field study prevented us from developing an analysis of processes and nodal points. The GAF survey was clustered in two blocks: questions to understand perceived shared problems, a condition to be improved upon (collective problems); and questions highlighting the perceived institutions or practices to preserve (social norms). Both sets of questions were formulated as lists, thus providing respondents the opportunity to rank suggested categories from most to least relevant.

In the Colombian Department of Casanare (the districts of Yopal and Paz de Ariporo), we interviewed 50 individual respondents, representing 17 groups, including civil society (9 groups), the public sector (5 groups), and the private sector (3 groups). Each interview was authorized and transcribed, lasting between one and three hours. In Paraguay, we analyzed the municipality of Bahía Negra in the Department of Alto Paraguay, interviewing 52 people, representing 15 groups across three societal sectors: the public sector (3 groups), the private sector (5 groups), and civil society (7

groups) (see Appendix A). A field diary recorded qualitative data and notes on the behaviors and interactions of all actors involved in this study [84,85].

Table 1. Characteristic and indicators of common-pool resources (CPR) and the new institutional economics (NIE) in the context of the four topics (1, 2, 3, 4).

CPR	NIE
1. Use and management of natural resources	
If, and how, experts address issues about managing resources (common pool) such as grazing land, grasslands, wetlands, and forests.	Roots and significance of land distribution (property rights) according to experts' perception (updated data from official sources is missing).
2. Common pool resources	
If, and how, local and rural communities respond to Ostroms´ eight principles for managing Commons:	Expert's perception of institutions and power relations in the area (hierarchy):
1. Define clear group boundaries (effective exclusion of external unentitled parties).	
2. Match rules governing use of common goods to local needs and conditions.	
3. Ensure that those affected by the rules can participate in modifying the rules.	• Informal boundaries (sanctions, taboos, customs, traditions, and codes of conduct)
4. Make sure the rule-making rights of community members are respected by outside authorities.	
5. Develop a system, carried out by community members, for monitoring members' behavior.	
6. Use graduated sanctions for rule violators.	• Formal boundaries (constitutions, laws, property rights).
7. Provide accessible, low-cost means for dispute resolution.	
8. Build responsibility for governing the common resource in nested tiers from the lowest level up to the entire interconnected system.	
3. Institutions	
Formal/informal/legal/illegal institutions managing natural resources.	
4. Cases	
Specific cases of communities managing natural resources directly and in which forms.	Economic models (export-market asset) in relation to community-based rules:
	1. Given top-down from central governmental bodies.
	2. Created locally (formal/informal settings).

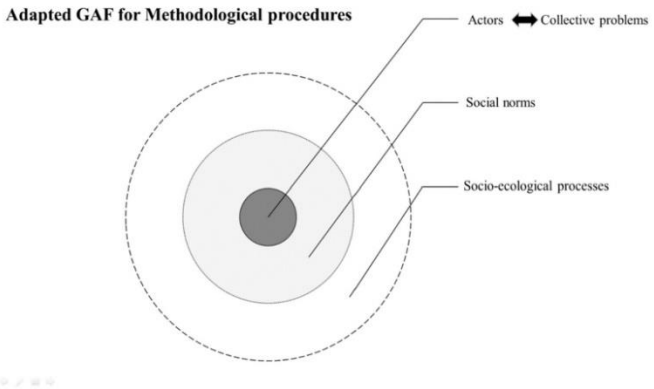


Figure 4. Adapted Governance Analytical Framework (GAF) for Methodological procedures. Source:[81].

3. Results

The results follow the same structure of the two main methodological Phases (B and C) for each case study. Results of Phase A served to develop a better contextual understanding. A total of 144 people (informants, experts, and participants), representing many institutions, participated.

3.1. Colombian Llanos

3.1.1. Online Survey in Colombia (Phase B)

Fifteen experts from Colombia responded fully to the online questionnaire (Phase B). The respondents were diverse: 40% from academia, 26% public sector, 26% non-governmental organizations, and 8% the private sector. Figure 5 summarizes relevant findings in percentages and corresponding number of persons, based on local expert perceptions.

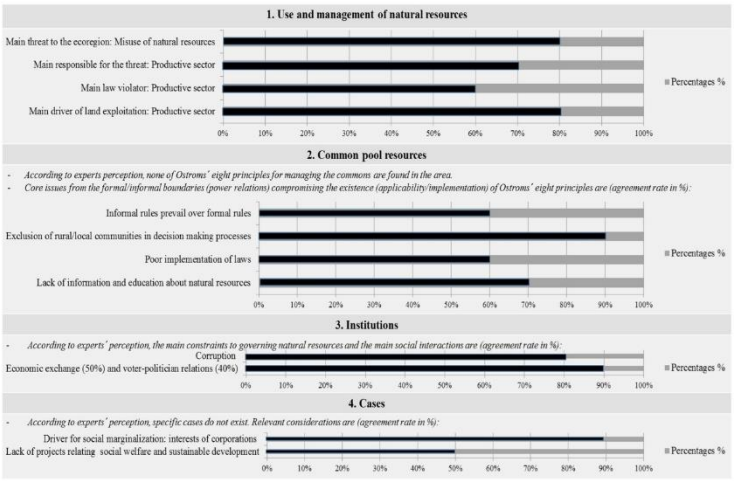


Figure 5. Colombia—Results of characteristic and indicators of common-pool resources (CPR) and the new institutional economics (NIE) in the context of the four topics (1, 2, 3, 4).

Regarding the use and management of natural resources in comparison to land distribution (Topic 1 in Figure 5), more than 80% of experts (12) perceive that the **misuse of natural resources**, understood as excessive and destructive use, is the most relevant threat in the Colombian region of the Llanos Orientales. For 70% of respondents, the productive sector is seen as the most detached from sustainably using natural resources, because its main priorities are intensifying productivity and generating profits. Productive sector stakeholders are not only perceived as the main law violators (60%, 9 experts), in terms of non-compliance with current environmental laws, but also as the main drivers of land exploitation, including deforestation (80%, 12 experts).

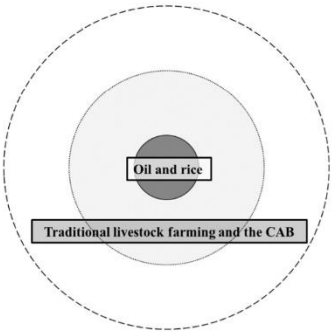
For common pool resources and the role of hierarchy (Topic 2 in Table 1), none of Ostrom's eight principles for managing resources are observed. Respondents report a lack of inclusive and effective community-based governance models. Four core issues regarding formal/informal boundaries (power relations) compromise the existence (applicability/implementation) of Ostrom's eight principles. The first is that 60% of experts (9) agree that informal rules (sanctions, taboos, customs, traditions, and codes of conduct) prevail over formal rules (constitutions, laws, property rights). Secondly, the remoteness of the region and the lack of decentralization of powers, particularly in relation to natural resource management and use, mean that local and rural communities are excluded from decision making processes; a claim supported by 90% of experts (13). The third factor, with 60% of experts agreeing (9), is poor implementation of laws, mostly due to weak local institutions (e.g., law enforcement). Finally, 70% of experts (10) agree that the lack of information and education about the sustainable use and management of natural resources is an informal boundary constraining ecological alternatives.

Institutional perceptions (Table 1, Topic 3) suggest that **corruption** is the most relevant issue with regard to social inclusion in the use and management of natural resources; with 80% of experts (12) agreeing. Additionally, main social interactions are represented by economic exchange (50%, 7 experts) and by voter-politician relations (40%, 6 experts). With regard to the role of existing community-based governance models (Topic 4 in Table 1), experts could not identify any specific cases of local and rural communities managing natural resources. Yet, they raised two important considerations. First, 90% of experts (13) agree that the interests of agro-industrial and extractives companies are major drivers of social instability and marginalization. Second, 50% of experts (7) agree that the lack of projects relating to social welfare and sustainable development is a limitation for the future development of community-based governance models.

3.1.2. GAF Colombia (Phase C)

GAF survey results are presented in Figure 6. Extractive activities, such as exploiting hydrocarbons (especially **oil**) and monoculture expansions (specifically, **rice**) are the two highest ranked collective problems, as perceived by the respondents. The critical importance of **traditional livestock** is represented as the main social norm in the region. Additionally, Community Action Boards (CAB) are ranked as an important social norm affecting community conduct. **CAB** are voluntary and participatory schemes of legal-norm-related action where communities can discuss and find solutions to collective problems. Not only are they civic and non-profit mechanisms, they are also community based organizations for social management.

Results of the GAF (Colombia)



Actors	Collective problems	Social norms
Public Sector	Oil 27% Rice 20% Uncontrolled fires 14% The shift in cultural values 13% Illegal immigration 12% Drug abuse 7% Prostitution 7%	Traditional livestock farming 41% Eco-tourism 39% Community Action Boards (CAB) 20%
Private Sector	Oil 25% Rice 25% Lack of environmental knowledge 13% Uncontrolled fires 13% Lack of infrastructure 14% The political situation 10%	Certification schemes (livestock-farming) 60% Grassland farming on native pasture 23% Eco-tourism 17%
Civil Society	Rice 22% Infrastructure 22% Oil 19% Unsustainable livestock farming 11% Uncontrolled fires 7% The shift in cultural values 7% Oil palm plantations 4% The political situation 4% Hydrocarbon (other than oil) 4%	Community Action Boards (CAB) 52% Traditional livestock farming 26% Subsistence agriculture 22%
Total value: 100%		

Figure 6. Colombia—Results of the GAF (ranking). Source: [81].

3.2. *Paraguayan Pantanal*

3.2.1. Online Survey in Paraguay (Phase B)

Seventeen Paraguayan experts completed the online questionnaire, representing the public sector (35%), NGOs (35%), 18% academia (18%), the private sector (6%), and the media (6%). Figure 7 summarizes the relevant findings, in percentages and corresponding number of persons, based on the perceptions of local experts.

Expert perception of land use and management of natural resources (Topic 1 in Figure 7) shows that **over-exploitation of natural resources** in the Paraguayan Pantanal is the main threat to the ecosystem (80%, 13+). Both private and public sectors are responsible (40% of agreement rate, 6+ experts). The legacy of Paraguayan history, specifically Stroessner's dictatorship (1954 to 1989), still affects land-reparation and land-distribution issues, among other things. Moreover, not only do experts regard the private sector as the main law violator in the region, but also as the main driver of natural resource exploitation (50% and 50% agreement rate, 8 and 8 experts, respectively).

With respect to common pool resources and the role of hierarchy (Topic 2 in Figure 7), experts could not relate any of Ostrom's principles to present experiences or cases on the ground. However, important considerations were raised and agreed upon. For instance, 60% of experts (10) agreed that informal rules (sanctions, taboos, customs, traditions, and codes of conduct) prevail over formal rules (constitutions, laws, property rights). Further, 80% of experts (13+) agreed that the region's remoteness and a lack of power decentralization, mainly in relation to natural resource management and use, mean that local and rural communities are excluded from decision making processes. An additional issue is the poor implementation of laws, mostly due to weak institutions (e.g., law enforcement) at the local level; something that 60% of experts (10) agreed upon. Lastly, 80% of experts (13+) agreed that the lack of information and education about the sustainable use and management of natural resources is an informal boundary constraining ecological alternatives.

Regarding institutional perceptions in the area (Figure 7, Topic 3), more than 70% of the experts (11+) found that **impunity**, understood as exemption from punishment or fines, is a central rule-of-the-game. Consequently, the two most perceived social interactions are economic exchange and voter-politician relations; with experts agreeing 60% (10) and 20% (3) of the time, respectively. Regarding existing practices of community-based governance models (Topic 4 in Figure 7), experts did not find any cases of local and rural communities managing natural resources. Nevertheless, they raised and agreed on two pertinent reflections. First, half the experts agreed that representation of local and indigenous interests at all scales, from the local to international, is low. Second, 90% of experts (15) agreed that intra-sectorial conflicts also emerge from the lack of participatory and community-based governance models.

3.2.2. GAF Paraguay (Phase C)

GAF survey results for Paraguay are presented in Figure 8. **Land-grabbing**, locally understood as a contentious issue surrounding large-scale land acquisition/speculation, is perceived as the main collective problem. Social norms show that **sectorial representation and inclusion** (in the forms of community roundtables and indigenous association) are two key factors through which problems are addressed and actions taken.

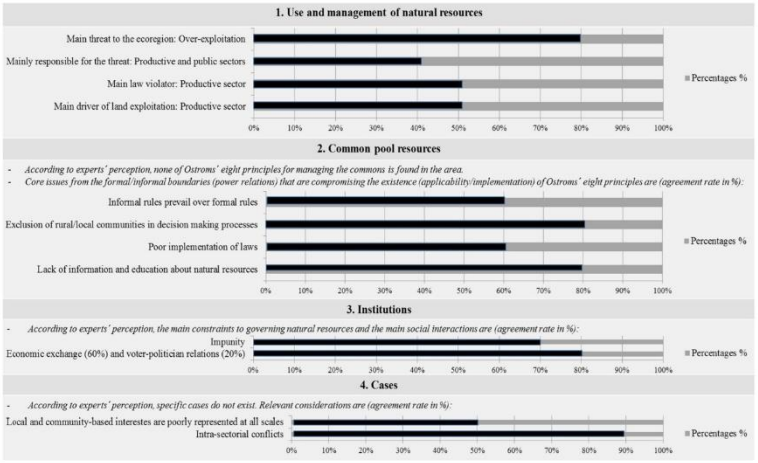
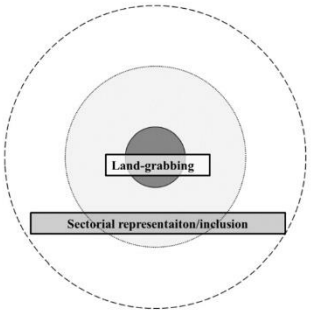


Figure 7. Paraguay—Results of characteristic and indicators of common-pool resources (CPR) and the new institutional economics (NIE) in the context of the four topics (1, 2, 3, 4).

Results of the GAF (Paraguay)



Actors	Collective problems	Social norms
Public Sector	Uncontrolled fires 29% Land-grabbing 25% River-contamination 23% Lack of infrastructure 23%	Eco-tourism 55% Indigenous associations (Yshiro) 30% Roundtable for territorial planning 15%
Private Sector	Lack of infrastructure 25% Poor land use planning 25% Uncontrolled fires 13% Political situation 13%	Certification schemes (livestock-farming) 70% Sustainable agricultural practices 26% Roundtable for territorial planning 4%
Civil Society	Land-grabbing 22% Group-marginalization 22% Deforestation 25% Poor land use planning 21%	The indigenous *cosmo-vision* (Yshiro) 67% Indigenous assosiation (Yshiro) 22% Subsistence agriculture 11%
Total value: 100%		

Figure 8. Paraguay—Results of the GAF (ranking). Source: [81].

4. Discussion

Relations between political, economic, and social institutions dealing with environmental issues, challenges, and changes fall under the IAD framework (Figure 9). Issues around the use and management of natural resources are regarded as political ecological problems [86,87]. The following discussion tackles the complexity of economic and political centralization, the role of governments, and social exclusion as causes of weak governance.

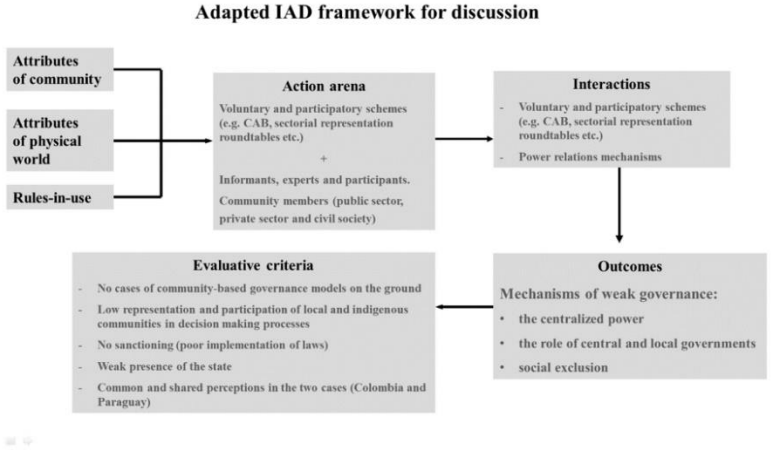


Figure 9. Adapted IAD framework for discussion. Source: [63].

4.1. Comparative Analysis: Governance in Colombia and Paraguay

In both Colombia and Paraguay, the productive sector (extractive activities, agroindustry, etc.) is predominantly considered responsible for the misuse (Colombia) and over-exploitation (Paraguay) of natural resources (Figures 5 and 7). All groups involved, directly or indirectly, in the use and management of natural resources (e.g., private and productive sector, public sector, rural and indigenous communities, etc.) are related hierarchically, ultimately with the productive sector (e.g., often represented by financial and foreign investments) on top, the main ruler of the game [29]. The exploitation of hydrocarbons, monoculture expansion (oil and rice in Colombia), and land grabbing (Paraguay) are the main collective problems addressed in the context of weak governance (Figures 6 and 8). These occur due to the present neoliberal economic model under which productive sectors use their political and economic power to pursue market-driven interests [88].

Thus, this accumulation mode (often unregulated) of natural resources for international export might be the main constraint to sustainable alternatives. Regional literature suggests extractive interventions are an increasingly important development strategy and policy throughout Latin America [42,54,55,89]. Economists and analysts argue how "extractivism" is an evolution of the development path chosen by most South American countries, prioritizing extraction and exploitation of natural wealth for global markets [55]. In both Colombia and Paraguay, land distribution and land planning are strategic means for power relations and negotiations. Alongside neoliberal perspectives, extractivism prefers external markets to local ones; it encourages wealth concentration, marginalizing equitable distribution of the same wealth [55]. In one market-oriented extractive economic model, within the political and productive-sector agenda, natural resources are managed under a hierarchical structure where power-relations and interferences occur [88]. Historically, socio-

ecological and distributive conflicts related to extractivism have been occurring for centuries in both rural Colombia and Paraguay [37]. Equity in the distribution of goods and services is not an option when the 'rules of the game' are designed by those institutions, whether formal or informal, holding greater economic assets and political influence. Instead, literature on good governance of natural resources reaffirms the importance of wide involvement, representation of diverse interests, legitimacy, and responsiveness to both local customs and formal legal systems [90].

4.1.1. Centralization

In addition, the wide expanses and remoteness of the areas are key obstacles inhibiting transparency measures (e.g., monitoring) and formal boundaries (e.g., law enforcement and control). Nevertheless, policy reforms over land use and land distribution in both Colombia and Paraguay show, not just trends toward privatization, but also the delegation of service provisions to the private sector and, at times, civil society actors [57]. The results reflect this, although the presence of the state, even in formal forms of delegation of action and powers, is not perceived as a reality; instead it generates informal patterns regarding the use and management of natural resources. Within formal institutions and settings, centralized and top-down models, supported by neoliberal and extractive systems, exacerbate the marginalization of local governments and institutions (e.g., lack of financial and human support, etc.). In such contexts, alternatives ensuring public service provision by community members, while demanding support from the state to facilitate the conditions for such effort, are compromised [56,62]. Both the lack of trust in and within public institutions and the lack of standards for democratic governance may negatively affect the fairness of decision making processes [90]. Thus, the mechanism of **power centralization** and authority in the hands of private economic actors, especially in terms of economic impacts, underlies weak governance [91].

4.1.2. Role of Governments

Under the NIE lens, property rights models are economic property rights, not legal property rights (enforced by the government). These rights aim to consume, either directly or indirectly through exchange or transactions, the goods and service of the resources by including rights for resource usage, rights to earn income from it, and rights to transfer ownership rights [92,93]. Economic property rights inherently represent institutions that benefit from the weak resource management of public institutions and, particularly, the unclear structures of ownership, monitoring, and control (e.g., law compliance etc.). These can foster informal institutions, such as corruption (Colombia) and impunity (Paraguay) that cause social and environmental conflicts. Under this scenario, natural resource struggles require a clear definition of group boundaries to be solved [94]. However, the nebulousness of property rights, due to different circumstances (e.g., armed conflict, foreign interferences, and financial speculations, etc.), is disastrous for natural resources [55]. As these cases show, unsuccessful efforts to govern and manage natural resources appear linked to hierarchical organizational structures. Decision-making processes and accountability can represent a major threat to democratic processes when it excludes local perspectives, thus increasing institutional tensions throughout [90], (Hare et al., 2018). Where the main user obtains control through force (e.g., economic, rooted into informal institutions, etc.), due to the other groups' inability or impossibility (e.g., public institutions, local and rural communities etc.) to govern natural resources, conflicts over the inequity of products or raw materials from natural resources arise [94]. Thus, the same resources are exposed and subject to misuse and (unsustainable) exploitation unless formal or informal limits are enforced [68]. As Stebek (2011) notes, there is no automatic association of natural resources with any property regime type [94]. Further, common property arrangements are essentially share-contracts [92] and, as such, face problems of opportunistic behavior and moral hazard. Without solid formal institutions present on the ground, as well as a shift away from neo-liberal and extractivist approaches, **the role of central and local governments** (how it functions) causes weak governance. By prioritizing the interests of economic powers over those of rural communities, governments are unwilling or unable to fully assume their responsibilities, especially with regard to reducing inequalities over the use and management of natural resources [95].

4.1.3. Social Exclusion

Further, from the community perspective, rural and indigenous groups are typically left behind and marginalized (see "evaluative criteria", Figure 9). Thus, the voices of the most vulnerable citizens are unheard when there are conflicts balancing land-use between the exploitation and provision of natural resources with local needs and conditions. Hence, social inclusion in managing natural resources and creating better models for governance is a mirage and, in most cases, viewed through the prism of informal or illegal economic exchange and voter-politician relations. Nevertheless, in order to facilitate and encourage inclusive and collective actions for common purposes, local group members suggest a stronger focus on those assets intrinsic to social relations, such as trust and networks of association representing local needs and groups within the 'action arena' (e.g., CAB or indigenous associations) [65]. Even if public trust practices vary across cultures and over time, and when local laws and norms do not directly embody specific standards for democratic governance, they are likely to be situated within governance systems in which good governance applies at some level [90]. In the social sciences, there is a vast amount of literature on pluralistic approaches in the exercise of politics and governance [63,96–101]. For instance, a higher degree of voluntary participation in movements and association results in better networks of relationships among communities. Likewise, greater inclusion in problem-solving strategies alongside the government allows society to function more efficiently. Smaller community networks increase the need to rely on imposing and authoritative controls, either political or economic [101]. Hence, based on our Colombian and Paraguayan cases, **social exclusion** is an additional mechanism of weak governance [102]. As Beall (2002) argues, "From a neoliberal perspective, social exclusion can be seen as an unfortunate but inevitable side effect of global economic realignment", [103] (pp. 43–44).

In both regions, hierarchical and market-based structures prevail over community management. However, community management of natural resources between government actors and local resource users is promising for conservation and local development [104,105]. While this is critical in both cases, the underlying tenure rights and land concentration only allows for changes in management if the government initiates the changes.

As for future recommendations, we suggest:

- In-depth analysis of land-use using social representation studies that leverage our results when including the mechanisms of weak governance discussed;
- Central and local institutions in Colombia and Paraguay should formulate cross-cutting groups to manage natural resources, building capacity for inclusive forms of governance (principles and frameworks through decentralization of functions and power to locals);
- Civil society should implement projects focusing on need-based development for better management of natural resources as well as poverty alleviation and the reduction of socio-economic inequality.

4.2. Limitations

There are limitations to these results. (1) In the online survey (Phase B) the sample size might not be sufficient (32 respondents) and does not exhaustively cover private sector expertise. The 13 experts who did not complete the survey could have added specific knowledge about agricultural and extractive industries. However, it was challenging to find regional experts willing to participate to our research. (2) In the GAF survey, the research suffers from the quality of the sample composition. Within the private and productive sectors, those who participated belonged to the subsistence and livestock agricultural sector. None of the participants represented the agricultural or extractive industries (e.g., monoculture, hydrocarbons, etc.); heterogeneity in the results may have resulted. Further, the degree to which the research tends to generalize is limited: By implementing only two of the five GAF analytical tools (Phase B) and by having collected subjective perceptions (Phase C), the replicability of this study may be affected. Thus, the results might not translate or be transferrable to a broader context. However, based on our research scope (i.e., perception on mechanisms of weak governance), we present cases where existing research is scarce.

5. Conclusions

The grasslands and wetlands of Colombia and Paraguay face weak governance, in both its institutional and community-based contexts. This work hybrid conceptualization provided a synthesis of how top-down hierarchical and market-based systems of community-based and natural resource management negatively affect sustainable development in both study areas. Three mechanisms causing weak governance were identified: the centralized economic and political power, the role of central and local governments, and social exclusion.

These findings should be seen in the light of the following conceptual contributions. First, they underpin the knowledge that weak governance encourages social inequalities and the erosion of local cultures, with destabilizing consequences [91]. Second, they are often in relation to environmental degradation, including in national parks and other protected areas, as well as illegal land grabbing and land tenure speculations. Third, the mechanisms of weak governance may thrive under the following circumstances: (i) where formal laws are complex, incoherent, or outdated; (ii) where informal institutions, such as corruption or impunity, are directly linked to socio-environmental conflicts; (iii) where decision making and budgeting processes are centralized in urban areas, having direct impacts on law enforcement and monitoring at the local level; (iv) where weak property regimes of land tenure, land distribution, and land planning are in place; and (v) where multi-level exclusion (social status, gender, ethnicity, education, etc.) exists.

Instead, good governance should ensure human and land rights and protect natural resources, while also promoting socially and economically sustainable development [58,81,106]. Therefore, institutional structures supporting arrangements that handle grasslands and wetlands in a sustainable way are needed to protect the ecosystem's social and economic values, especially in rural and marginalized contexts.

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Appendix A

Table A1. List of institutions involved in the field-based studies (online survey, Phase B).

Colombia		Paraguay	
1.	Universidad de los Llanos	1.	Green Solutions S.A.
		2.	Ministry of Agriculture and Livestock - Programa Nacional Fomento Agropecuario
2.	Universidad del Rosario	3.	Secretary of the Environment—SEAM
		4.	National Secretariat for Housing and Habitat -SENAVITAT
3.	Universidad de los Andes	5.	Technical Secretariat for Economic and Social Development Planning—STP
4.	Universidad de los Andes	6.	Forestry Institute -INFONA

5.	Universidad Nacional de Colombia	7.	Minister of Foreign Affairs—Coordination of the Environmental Affairs Unit-
6.	International Center for Tropical Agriculture—CIAT	8.	Paraguay Selvaje
7.	Fundación Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria—CIPAV	9.	Centro de Pesquisa do Pantanal—CPP
8.	Wildlife Conservation Society Colombia—WCS	10.	Solidaridad Paraguay
9.	Corporinoquia Colombia	11.	Fundación para el Desarrollo Sustentable en las Américas del Norte y del Sur
10.	Corporación Para El Desarrollo Sostenible Del Área De Manejo Especial De La Macarena—Cormacarena	12.	Paraguay Magazine
11.	Organización Internacional para las Migraciones (OIM)	13.	Program of Support For Volunteers In Protected Areas—PAVAP
12.	El Orinoco Se Adapta	14.	National University of Asunción
13.	World Wildlife Fund—WWF Colombia	15.	Guyra Paraguay
14.	Instituto de Hidrología, Meteorología y Estudios Ambientales—IDEAM	16.	Wildlife Conservation Society Paraguay–WCS
15.	Asociación de apoyo al Desarrollo—APOYAR	17.	World Wildlife Fund—WWF Paraguay

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Chapter 6: Conclusions

6.1 Discussion of results

This section returns to the research questions (Section 4.1) to discuss the empirical evidence presented in the research publications (Section 5). It critically assesses the relevance of the generated insights for consolidating a novel understanding of local and environmental governance in the grasslands and savannahs of Colombia and Paraguay. Practical implications for integrating CBG models into methodological development are discussed in this section.

Research question 1

How relevant is local culture to sustainable development?

Rural development centering on the valorization of cultural identity is becoming an increasingly important issue for scholars, policy makers, and practitioners. For some, it constitutes a novel element of economic development, while for others, it is a form of resistance to globalization (Fonte and Ranaboldo 2007). Due to the economic approach traditionally given to the concept of development, the relationship between culture and (sustainable) development is complex. Yet, the influence of culture on the economy is well researched. Culture may affect not just the economic performance of a community, but also equity as there are moral and ethical principles conditioning community interests (Fonte and Ranaboldo 2007; Gallegos 2014; Throsby 1995). In addition, scientific evidence based on community approaches demonstrates the effects of culture on individual behavior, resulting in collective and shared results (e.g. growth of employment level, technological exchanges etc.) (Cohen 1996; Goldstone and Gureckis 2009; Johnson and Lenartowicz 1998; Kottak 1990; Sum and Jessop 2013).

In the South American context, there is a lack of literature regarding the role that elements of traditional culture can play for sustainable development (Eufemia et al. 2019). Similarly, not only is there little research investigating how the rapid expansion of agricultural and extractive activities affect local societal and cultural dynamics, there is also limited understanding of the intrinsic relationship between the depletion of natural resources and the erosion of local cultures. However, worldwide, there are many cases demonstrating that local cultures and functioning traditional institutions are important for sustainable development (Adams 1993; Azamar Alonso and Ponce Sánchez 2015; Ostrom 1990; Steelman and Carmin 1998). Considering the characteristics of the group that is dealing with the natural resource (e.g., the exploitation of wetlands for livestock farming), common shared norms and joint successful experiences are key aspects of a fruitful management of the resource (Frey 2018). Local cultures and traditional institutions are ingredients for a prosperous development that is also incorporated in the theories of local and indigenous knowledge. The natural environment combines heritage, spaces, landscapes, and resources that are often related to culture, insofar as they refer to history, knowledge, and identity (Gallegos 2014). Therefore, the integration of cultural institutions into resource use and management is needed to ensure sustainable development (DeWalt 1994; Escobar 1999; Quintero and Arbeláez 2016).

The first article addresses the first research question by investigating collective perception (=50) of anthropic and extractive interventions in the Colombian Llanos (Municipalities of Yopal and Paz de Ariporo, Casanare). The results presented in this work (Eufemia et al. 2019) indicate that practices of the local culture of the Cultura Llanera (CL), in the form of traditional livestock in flooded savannahs, which includes strategies to optimize creole bovine breeding, economic and productive outputs for cattle ranchers, are key elements for the sustainable development of the region. In addition, this work shows that

agricultural and extractive activities (rice and oil) are considered to be the main threats to both the ecosystem and the protection of the CL. Both findings reveal that the spatial relation of local groups rooted in the CL is being increasingly threatened by decades of land-dispossessions, state-corruption, and the tendency to solely rely on one or two economic activities (Hincapié 2017; Salcedo and Barrera 2019). Such findings are useful both for local development processes, such as identifying locally suitable conflict resolution mechanisms, as well as for wider scientific progress, such as identifying conservation opportunities of traditional livestock practices based local knowledge in flooded savannahs ecosystems (Peñuela et al. 2014; Peñuela and Fernández 2010; Rippstein 2001; Uzzell and Badenas 2002).

Notwithstanding this research development, recent political decisions in post-conflict Colombia may be limiting the effective implementation of cultural relevance for development. For instance, a new resolution defining the borders of the National Agricultural Frontier (NAF) will open 35% of the national territory to agricultural interventions, especially in ecosystems of grasslands and savannahs (Eufemia et al. 2018).[5] Likewise, Colombia New Development Plan for 2018 to 2022 (NDP) has set insufficient environmental targets that promote further deforestation and forest degradation. The potential consequences not only rise environmental and conservation concerns but threaten land and human rights (Eufemia et al. 2019).[6] The main problem is political and administrative, with strong roots in the dynamics of land tenure and the expansion of large estates into areas of high environmental and cultural relevance. As an alternative, the value of culture as an engine of economic and sustainable development may be enhancing and improving the attractiveness of the territories with practices that foster exchange and a balanced articulation between public agents, the market economy, and the common

[5] See section III NON-PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC (1)
[6] See section III NON-PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC (2)

goods, including reinvestment in the local wellbeing (Anzaldo and Chauvet 2016; assGallegos 2014). Similar, social inclusion through active participation in cultural life, as well as mutual recognition and cooperation between different groups can strengthen social cohesion. Thus, socio-economical and agricultural scientists may be encouraged to consider elements of local cultures as a research strategy to identify not just collective threats but also to promote sustainable and traditional practices and innovations.

Research question 2

What governance model stands for sustainability in the region?

Since the 1990s, the concept of local and environmental governance has offered an analytical framework to explain the different possible combinations of organization that vary according to the social, political, cultural, and administrative characteristics of each region. Understanding governance models requires prior knowledge of the political, economic, and cultural context (Berkes et al. 2000; Zurbriggen 2014). For instance, it is important to consider the degree of development of democracy as well as the threats and problems affecting specific contexts. This perspective of analysis allows for avoiding normative biases and to understand how social dynamics work, with interest and power relations embedded in institutional frameworks and the cultural environment in which they are inserted. In addition, it would help to improve the design of public policies for sustainable development, understanding shortcomings of existing governance models, and facilitate the building of novel approaches (Zurbriggen 2014). Any institutional analysis of the State or community-organizations must be political, to discern what are the configurations of power, hierarchies, and interests that allow for the promotion of economic and social development (Berkes et al. 2000; Ostrom 2007; Raco and Flint 2001).

With regards to vulnerable groups, such as indigenous communities, research about sustainable development may explore the organizational and educational settings, searching for viable community-based governance models or characteristics. Likewise, science-based analysis and decision-making processes may contribute to governance by creating agendas for education and social learning, where community members evaluate their self-state of vulnerability and shape development plans (Bonatti et al. 2019).[7] With respect to the Paraguayan Pantanal case, however, such approaches are missing, as the perspectives of natural science dominate over human sciences and humanities. Most of the Paraguayan Pantanal is studied with regard to its ecological, biological, and physical properties (Eufemia et al. 2018)[8]. Because of this, some scholars see the need to favor the strengthening and a closer approximation of the interface between human science and policy-making processes, aiming to sustainably use the Pantanal. It is thought that both a functional science network and stakeholder involvement will bolster the collaborative capability of participants to generate sustainable solutions (Schulz et al. 2019; Tomas et al. 2019).

Under this scenario, the second article addresses the second research question, investigating community-based governance models for sustainability in the context of Paraguayan wetlands. It specifically focuses on the struggle for recognition of indigenous peoples (e.g., identity, land, and rights), which involves many sectors of society within a complex arena, crossing boundaries among state, markets, and civil society. After observing problems, such as indigenous group marginalization resulting from land grabbing and inequitable access to land, a second proposal is to encourage strong governance that self-determination requires. The findings (Eufemia et al. 2019) suggest that community-based governance is constructed by the Yshiro relation to land (e.g.

[7] See section II PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC (1)
[8] See section II PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC (2)

Traditional Ecological Knowledge, TEK) and their self-organized institution Unión de las Comunidades Indígenas de la Nación Yshiro, (UCINY); all this is highly threatened by the impact of the national neo-extractive economy.

Although community-based governance models can strengthen the self-awareness of populations in the face of natural or man-made impacts, they can also leverage processes of good public policies and applications of TEK. This cumulative body of knowledge, practices, and beliefs that evolves through historical processes is transmitted through cultural forms from one generation to another and entails the relationships between humans/non-humans with their environment (Berkes et al. 2000). TEK is local, holistic, and bears a vision of the world that integrates physical and spiritual aspects, constituting a solid base for local and environmental governance models. *De facto*, it improves the capacity of societies to manage natural resources, especially in changing and uncertain conditions (Reyes-García 2009). Based on these assumptions, organizational models that include TEK may be investigated in the light of sustainable development. With particular regard to territorial organizations (e.g. UCINY) and their relation to globalization, novel approaches are needed. For instance, organizational models should be built upon the rules that are not imposed "from outside" or "from above," but rather constructed, modified, and monitored by the territorial social actors and their institutions (Cardoso de Oliveira 1976; Korovkin 2000). Future research may improve the concept of community-based governance of this work by developing new articulated governance characteristics, addressing both community empowerment usage and the management of natural resources, including the relevance of TEK.

Research question 3

What are the shortcomings of existing governance models?

In the context of (largely) capitalist development, local and environmental governance that genuinely addresses environmental protection, social equity, and inclusive political participation is a key asset for sustainable development (Zurbriggen 2014). Because of its historical, political, and socio-economical dynamics, South America provides a fertile and challenging ground for research on this topic. After over two decades of failing decentralization state reforms, an increasing scholarship targeting (finite) resource-dependent economies is fostering a debate on public policy, networks, and governance, seeking to offer novel methodological-analytical approaches for sustainable development (Iribarnegaray and Seghezzo 2012; Willis et al. 1999). Greater capacity and more science to describe the complex forms of interaction between State-society, the environment, and the market in rapidly changing historical contexts are required. Likewise, there is a need for novel theoretical and analytical frameworks concerning the extent to which state traditions, constitutional settings, bureaucratic structures, and political culture typical of the region are interrelated. Further, formal and informal institutions and norms (e.g. corruption, clientelism etc.) are central to better understanding state transformations and its relationship with the (global) market and the environment (Graña 2015; Mitsch et al. 2014; Putnam et al. 1994; Schulz et al. 2019; Zurbriggen 2014).

In rural areas of grasslands and savannahs, weak governance contributes to environmental, socio-economic, and institutional conflicts, along with social exclusion and poverty (Beall 2002; Chaikumbung et al. 2019; Fosci 2013; Ioris 2013; Ioris et al. 2014; Mitsch et al. 2015; Safford 2012; Schulz et al. 2019). In the Colombian Llanos and the Paraguayan Pantanal, the wide expanses and remoteness of the areas are key obstacles inhibiting transparency measures (e.g. monitoring) and formal boundaries (e.g. law

enforcement and control). Policy reforms over land use and land distribution show not just trends toward privatization, but also the delegation of service provisions to the private sector and, at times, civil society actors (Safford 2010; Zurbriggen 2014). Within formal institutions and settings, centralized and top-down models, supported by neoliberal and extractive systems, exacerbate the marginalization of local governments and institutions (e.g. lack of financial and human support etc.). Both the lack of trust in and within public institutions, as well as the lack of standards for democratic local and environmental governance, may negatively affect the fairness of decision making processes (Hare et al. 2018). Thus, authority and decision-making processes in the hands of private economic actors, especially in terms of economic impacts, underlies weak governance (Graña 2015; Palmer et al. 2009).

The last article answers the third research question, exploring the mechanisms of weak governance and how they are structured. The comparative analysis describes hierarchical and market-based forms of community and natural resource management. The findings of this comparative work (Eufemia et al. 2019) suggest that there are three mechanisms causing weak governance. First is centralized power, both economic and political, that directly impacts law enforcement and monitoring at the local level. Second is the role of central and local governments, often linked to weak property regimes of land-tenure, land distribution, and land planning. Finally, the third mechanism is social exclusion, impacting the marginalization of rural and indigenous communities with respect to the use and management of natural resources.

One way to treat the results of this work consists of structuring the categories proposed[9] in order to build future scenarios that can be the foundation for a novel analytical

[9] Three categories emerging from the mechanisms of weak governance:
- The role of the local and central governments (political perspective)
- The role of the existing economic model (economic perspective)

framework for community-based governance. The suggested solution has three main strategic scopes. First, to decentralize political decision-making and budgeting processes for a participatory democracy (decentralization). Second, to strengthen associative and cooperative models (associativism). Third, to provide training on social and community-based governance models (social models). From these community-approaches, recommendations to policymakers, stakeholders, and development agencies can be made. This framework aims to facilitate dialogue and build trust between community groups, taking into account local perspectives and promoting the development of the community-based governance models for sustainable development. Figure 5 presents the suggested CBG Framework.

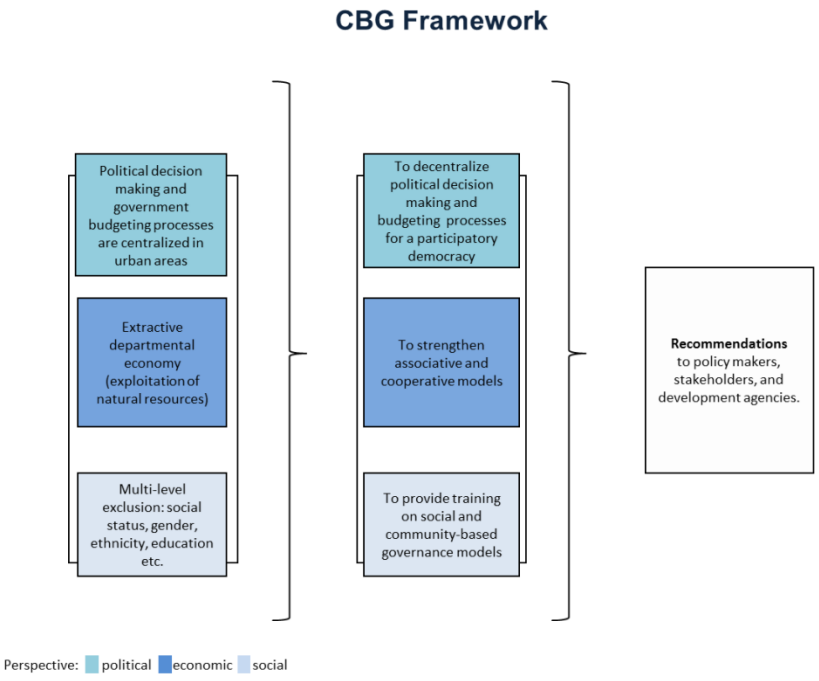

Figure 5: CBG Framework

(Source: Luca Eufemia)

▪ The incidence of social exclusion (social perspective)

6.2 Implications for local and environmental governance

Marginalized rural communities are especially vulnerable to weak governance, as they lack human, political, and financial capacity to protect their rights over land and natural resource use and management (Palmer et al. 2009). All approaches explored in this dissertation involve socio-economic and political contexts where local and environmental governance is weak. This situation has three main implications. First, it reveals that weak governance encourages social inequalities and the erosion of local cultures, with destabilizing consequences (Graña 2015). Second, it causes environmental degradation, including in national parks and other protected areas, as well as illegal land grabbing and land tenure speculations. Third, weak governance may thrive where formal laws are complex, incoherent, or outdated; where informal institutions, like corruption or impunity, are directly linked to socio-environmental conflicts; where decision making and budgeting processes are centralized in urban areas, having direct impacts on law enforcement and monitoring at the local level; where weak property regimes of land tenure, land distribution and land planning are in place; and where multi-level exclusion (social status, gender, ethnicity, education etc.) exists. Instead, good governance should ensure human and land rights, protect natural resources, while also promoting socially and economically sustainable development (Iribarnegaray and Seghezzo 2012; Palmer et al. 2009; Willis et al. 1999).

This dissertation's take on community-based governance brings about a number of challenges under existing conditions of (unsustainable) development. Most notably, local perspectives stand in contrast to agro-industrial and extractives interests, which may imply fundamental influences in political and economic decision-making processes. The CBG approach implies creating a space of dialogue between different interests in order to find a synthesis of collective issues at stake and consequent joint solutions. Furthermore,

its most relevant contribution offers its ecosystem approach to the broader scholarship on local and environmental governance. Linking together the importance to conserve and sustainably manage grasslands and savannahs alongside local culture and identities provides researchers and practitioners a perspective where CBG can be tested and replicated in other, similar contexts.

Further, this work stresses the importance of increasing and diversifying, from both a qualitative and a quantitative perspective, science-based research in the study-areas. The importance of diversifying science-based research to incorporate a more holistic perspective, including communities, making the use and management of natural resources more effective, and providing a stronger legacy for future studies and interventions is developed (Carlsson and Berkes 2005; Eufemia et al. 2018). For scaling up the results, practical methodological tools are developed. Both the Community-Based Governance Manual (CBGM), including a case study on the Colombian Llanos, and the Guidelines to Strengthen CBG in the Paraguayan Pantanal (CBGG), are presented below as outreach tools (Section 7).

6.3 Limitations and further research needs

The empirical results reported herein should be considered in light of its main limitations. Each work presented in Section 5 was performed through a three year process and affected by major political, economic and environmental transformations in both areas under study. In post conflict Colombia, political and administrative resolutions over land tenure and distribution are increasing competition over land use, resulting in land grabbing, land tenure speculation, instability, as well as new conflicts and further violence (Eufemia et al. 2018; Eufemia et al. 2019). As for Paraguay, in 2019, thousands of hectares of grasslands and forests from the Pantanal were lost due to uncontrolled and human-made fires (e.g. farmers burning grasslands to improve the quality of cattle pastures, triggering

forest fires). Consequently, political and environmental implications of the CBG framework might be challenged under new and different circumstances. For example, these events may impact the current scenario of one or more categories created, either from a political, economic, or social perspective, resulting in different projections of locally suitable conflict/problem resolution mechanisms. Although the utility of the tested approaches is demonstrated in principle, further research is needed to adapt external events (e.g. central government resolutions, extreme or unpredicted weather events etc.) to local context. This may imply local replications of the research procedures taken here, for example, to update locally meaningful suggestion for decentralization, including associative and social models.

Another possible limitation relates to the degree to which the dissertation tends to generalize. For example, our most consistent set of data regard local perspectives. Thus, those results (also due to the lack of comparisons with other case studies or other communities worldwide) might not translate or be transferrable to a broader context. The evidence presented here allows for making statements about local and environmental governance approaches in specific grasslands and savannahs ecosystems. The actual development of a generalized model for CBG, however, would have been too time-and cost-intensive for the purpose of the research presented here. Consequently, the CBGM and the CBGG were developed in partnership with locals in order to offer practitioners methodological, generalizable, and (perhaps) simplistic guidelines about CBG. Although this constraint has important implications, based on the research objectives, cases where similar research is scarce are presented. While the explored concepts are promising under the assumption that novel local and environmental governance models are needed, the conditions under which this assumption holds true may vary greatly by context. Highly participatory research and widely accepted governance design processes are now needed

to create a regional and global understanding of bottom up organizational approaches for grasslands and savannahs.

Regarding difficulties to merge and compare development theories and perception/representation studies, there may be deficiency of robust theoretical arrangements. Based on the hypothesis, an investigation of novel governance approaches for non-normative governance perspective in socio-economic and policy research was carried out; these can contribute to an improved understanding of socio-economic and political processes, including formal and informal ones, those embedded in larger and smaller social systems, as well as both vertical and horizontal socio-economic and political arrangements. The mix of theoretical methods (e.g. GAF, CBNRM, IAD, CPR, and NIE) used, may have favored operational descriptions over conceptual descriptions. Although the deep meaning of each of the theoretical concepts is not meticulously discussed and new theory building is not carried out, theoretical and empirical applications are. Hence, the resulting perspectives may be narrowed or limited with respect to the overall theoretical framework. However, as CBG is defined as a bottom-up organizational model, which increases the participation of local groups in the planning, research, development, management, and formulation of policies and strategies for a wider community, it is operationalized in terms of three scopes (decentralization, associativism, and social models) that are linked to development theories and perception/representation studies.

Further, the way the methodological tool of the Governance Analytical Framework (GAF) is used in all three main publications may negatively impact the quality of the sample composition. The GAF focuses on social interactions within which actors/participants make decisions regarding a collective problem, thereby creating and reinforcing social norms or institutions (Hufty, 2011). It comprises five analytical tools: problems, actors, social norms, processes, and nodal points. Field study constraints limited the research to

focus on only two: problems and social norms. As for the actual implementation of the GAF surveys, within the private and productive sectors, participants belonged to the subsistence and livestock agricultural sector. None of the participants represented agricultural or extractive industries (e.g. monoculture, hydrocarbons etc.), thus a certain degree of heterogeneity in the results may have resulted. In future applications of GAF, more rigorous research is needed to account for all five analytical tools, as well as for a diverse and heterogonous participation.

Lastly, the research presented here emphasizes the potential feasibility of the CBG framework, thus offering manuals and guidelines applied in the field studies (see Chapter 7). However, despite the potential of the tested approaches, it is not clear to what extent their implementations may influence local policy and be adopted in research projects for sustainable development. Recent research suggests that community-based concepts are needed to tackle socio-economic and environmental instances (Alvarado and Sánchez, 2019; Calfucura 2018; Flores et al. 2016; Gutiérrez et al. 2019; Sanchez-Betancourt and Vivier 2019; Wilson et al. 2018). However, for grassland and savannah ecosystems, further studies and applied models are needed to understand the potential benefits of CBG. Investigating replicability factors where models can be tested within diverse ecosystems and communities could help evaluate the veracity of the concept of CBG.

Chapter 7: Outlook

CBGM and CBGG are resources for local communities and development practitioners who wish to apply participatory methods to local and environmental governance in rural contexts. The CBGM covers all methodological phases of CBG - from definition and strategy design to participatory planning and implementation - offering an illustrative case study in the Colombian Llanos (Municipality of Paz de Ariporo, Casanare). The CBGG showcases the first training workshop on CBG in the Paraguayan Pantanal (District of Bahía Negra, Alto Paraguay). It includes learning activities, practical tools, and guidelines created by locals for their specific context. Both publications are the result of a three-year fruitful collaboration between the Leibniz Centre for Agricultural Landscape Research (ZALF) team, the Humboldt University of Berlin, the WWF teams in Germany, Colombia, and Paraguay, the Fundación Horizonte Verde, and the Unión de las Comunidades Indígenas de la Nación Yshiro (UCINY), within the framework of the International Climate Initiative (IKI). It is hoped that these publications will inspire and guide the work of development and policy programs, rural institutions, and field staff in the implementation of inclusive local and environmental governance models.

7.1 Community-based Governance Manual (CBGM)

(English)

COMMUNITY-BASED GOVERNANCE MANUAL

Case Study: Municipality of Paz de Ariporo, Casanare (Colombia)

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INDEX

4

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INTRODUCTION

Governance models offer valid tools to solve a number of conflicts, including the use and management of natural resources. They also help to promote the community perspective, where inclusion and commitment are key factors [11]. The following manual presents Community-based Governance (CBG) as a possible key to understand the socio-political-economic perspectives of local groups. It has two objectives: first, to offer those interested in applying this model a practical, methodological and concise plan of action. Also, through a specific case study, this work presents the perspectives of the community members of the Municipality of Paz de Ariporo (Casanare, Colombia).

WHAT IS COMMUNITY-BASED GOVERNANCE (CBG)?

Community-based Governance (CBG) is a bottom-up organizational model. It can be facilitated by a central government, private organizations and / or NGOs. The CBG aims to increase the participation of local groups in the planning, research, development, management and formulation of policies and strategies for a wider community. Decentralization of management strategies allows for dealing with the territory's unique political, economic and social problems [11]. The attention and inclusion of local perspectives allow for a synthesis of collective problems and the development of joint solutions to solve them.

Many cases around the world demonstrate that under a CBG model, local cultures and traditional institutions are highly important for sustainable development [1, 18, 19, 22]**.**

This applies especially to rural contexts in developing countries where strong economic pressures have favored the accelerated incorporation of natural resources for immediate productive use. In most cases, this is based on external rationality, with the consequent impact on the natural and human environments [5, 15, 20]. Undoubtedly, CBG must address socio-political-economic development in relation to the use and management of natural resources. Local cultures and traditional institutions are a key ingredient in prosperous and sustainable development, and

also incorporate local and ancestral knowledge [7]. Therefore, integrating traditional institutions in the use and management of natural resources is necessary to ensure sustainable development [2, 10, 17, 18, 22, 23].

HOW TO BUILD COMMUNITY-BASED GOVERNANCE (CBG)?

The "how" to build CBG uses a methodological approach that both understands and values the local perspective. This manual proposes to follow 3 steps (Figure 1):

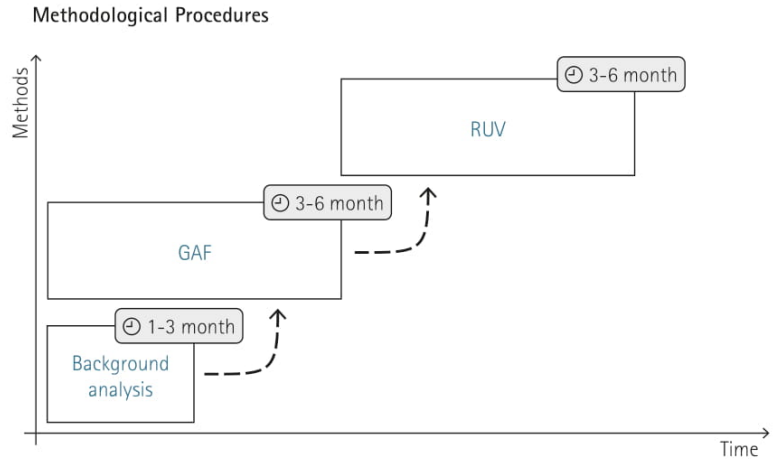

Figure 1: Methodological procedures.

1. **Background analysis**: A review of the literature and creation of questionnaires addressed to a representative sample of experts (in economics, politics, sociology, environment, etc.) in order to know reliable trends and opinions. It is also possible to create categories and variables for a selection of the same experts. Interviews can be live or online, and structured or unstructured. Key participants represent experts from local institutions and civil society groups in the selected regions. This step helps us to know and explore the local context as well as to support the next steps.

2. **The Governance Analytical Framework (GAF)**: This method can be used to identify current governance processes [13]. It analyzes the social interactions in which stakeholders make decisions regarding collective problems, thereby creating, reinforcing or changing social norms and institutions. We therefore suggest the development of qualitative approaches (e.g. questionnaires for interviews, workshops and focus groups, world cafes, etc.) that aim to understand and synthesize collective problems, as well as to identify hierarchical and power structures within a society and institutions.

3. **RUV pedagogical framework**: The pedagogical tool known as **RUV** [4] implies the organization of workshop(s) with community members. It is built on three conceptual phases:

   - ✓ Recognition of collective problems (**R**):
     value, identify and integrate local values
   - ✓ Better understanding of collective problems (**U**):
     recognizing the structure of the problems according to local people and their motivations
   - ✓ Visualizing the future with collective solutions (**V**):
     rethinking images of the future and creating operational solutions to problems

In accordance with these three principles, and in order to implement the RUV methodology, the structure of the workshop is outlined in six steps (Table 1).

STEPS	ACTIVITIES	RUV METHODOLOGY	OBJECTIVE
	Participant registration		
1.	Kick-Off: Welcome, presentation, setting expectations	Dialogue and individual presentation	Self-definition and community characterization
2.	Sharing workshop agenda and methodology Dialogue about governance models	Present definitions of the concepts (e.g. community-based governance)	To build a common understanding of the concepts (e.g. community-based governance)
3.	Presentation of a „current scenario" (case study) Explain and guide participants through the elements of weak governance (conflict, politics, economics and land use, etc.)	Recognition (**R**) (rescue, identify and integrate local values) Group activity (theatre of images, drawings etc.) (Reference method: Resource map)	Draw a "current scenario" of the concepts
4.a	In-depth understanding of the causes of the "current scenario"	Better understanding (**U**) Group activity (theatre of images, drawings etc.) (Each group explains the problem by role playing the challenge) Open discussion with guiding questions Group presentations (Reference method: Ishikawa/ fish-bone diagram)	Understanding "current scenario" in complex situations (recognize the structure of the problems)
4.b	Search for local solutions. Visualize an "expected scenario" (own local alternatives to change the situation)	Visualize (**V**) (rethink images of the future and create operational solutions to problems) Group activity (theatre of images, drawings etc.) Open discussion with guiding questions Group presentations	Create an "expected scenario" for the next 5 years Imagine new conditions

5.	Evaluation of solutions	Visualize (**V**) (rethink images of the future and create operational solutions to problems) Group activity (theatre of images, drawings etc.) Open discussion with guiding questions Offer a list of possible solutions to rank (evaluation)	To create and evaluate solutions for "current scenario" Critical education process (learn to evaluate and criticize solutions)
6.	Workshop evaluation	Open discussion with guiding questions	Evaluating the effectiveness of applied methods

Table 1: Six steps for the application of the RUV pedagogical methodology.

Groups are formed for the joint activities. They represent different sectors, in an exercise of constant integration and dialogue. Under the RUV framework (Figure 2), each group aims to create images and key points (e.g. theater of images, drawings etc.) for three key categories, and then present the results in a plenary session. Integrating the GAF (step 2), the categories proposed in order to build a current scenario are the following:

- The role of the local and central governments (political perspective)
- The role of the existing economic model (economic perspective)
- The incidence of social exclusion (social perspective)

Afterward, the same groups create new images and key points (e.g. theater of images, drawings etc.) for the three proposed categories, followed by a plenary where the following desired scenario proposals are presented (expected scenario):

- **How can we improve** the role of central and local governments?
- **How can we improve** the role of the existing economic model?
- **How can we promote** social inclusion?

10

Finally, the last group exercise includes a platform where each group has the opportunity to evaluate the images and key points of the others' proposals in a collaborative exercise.

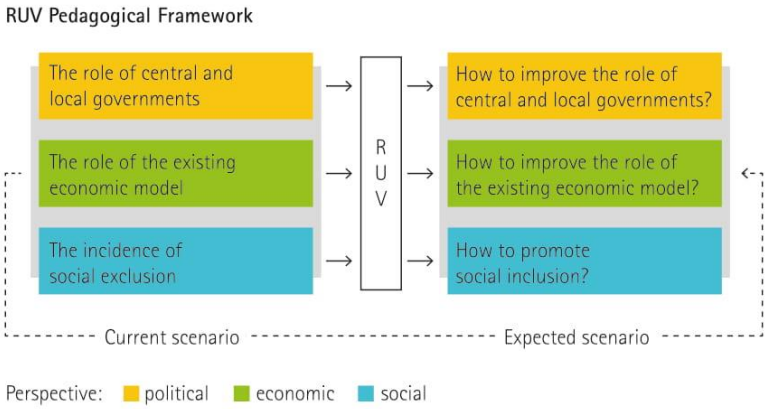

Figure 2: RUV pedagogical framework.

CASE STUDY:
MUNICIPALITY OF PAZ DE ARIPORO, CASANARE (COLOMBIA)

Contribution of community members:

Ardila Rodríguez, Andrea Vanessa
Barreto Meta, Leidi Johana
Broccardo, Alessio
Camargo Caballero, Aurora
Cáceres, José Tibaldo
Duran, Yamith
Gaitán, Hugo
Gaitán, Nelson
Gordillo, Prada Osman
Latriglia, Víctor
Lizarazo Aaron, Ruiz
Madrid, Gilma
Martínez, Luis
Martínez Nino, Marina
Parales, Libia
Pérez, Yohaira Andrea
Ramirez, Daniela
Rojas, Luisa Fernanda
Sánchez, Ana Edilce
Suarez, Luz Elena
Vargas, Edwin

Context:

This work focuses on the Municipality of Paz de Ariporo, located in the flooded savannas of the Colombian Llanos, in eastern Colombia in the Orinoco River basin. This region was chosen due to its peculiar characteristics both at the ecosystem level and the processes of radical changes in the use and the management of natural resources. The region's biome is characterized by floodplains, gallery forests and a large number of sub-units, such as the sub-Andean jungle, etc. [16]. It

12

has two distinct seasons, the rainy season and the dry season, and is characterized by its extensive, diverse and heterogeneous savannas [24]. Its climate is of intertropical savanna [8]. The economy in Los Llanos is mainly based on extensive cattle ranching and oil extraction [12]. During the 1970s, only 2% of the eastern plains of the Orinoco basin had been affected by significant changes in land use. However, due to anthropic and extractive interventions, in 2012, the unsustainable transformation of the region already reached 15.5%, which caused a drastic reduction of the flooded natural savannas – from 11,401 km^2 to 9,283 km^2 (18.5%) [24]. These changes have negative impacts on the biological and cultural diversity of the Llanos, including the loss of habitat due to the expansion of extractive interventions, intensive agriculture, water and soil contamination, the introduction of exotic species and the growing threat of climate change [14, 21].

Flooded Savannas, 2017 (© Jorge García, Courtesy WWF Colombia).

Flooded savannas are strategic and mostly unknown ecosystems, despite their ecological, biological and economic importance. They represent 12.5% of the Orinoco basin, an ecosystem with great cultural, economic, biological and ecological importance [17].

The local communities of the Municipality of Paz de Ariporo seek a concrete and replicable example of how to strengthen community governance. This reflects the role of different groups in the municipal community and their perspectives on anthropic and extractive interventions (agricultural expansion and the exploitation of hydrocarbons, including oil) and the link between natural resources. In the same way, it is understood to draw a new paradigm of socio-environmental and economic models and the relationship with local culture, known as Cultura Llanera (CL). Therefore, we wish to present the application of the three steps of the manual of community governance in the Municipality of Paz de Ariporo. The objective of this exercise is to present the perspectives of community members in order to alleviate the impacts of anthropic interventions on local social and cultural dynamics, and at the same time help in understanding the intrinsic relationship between natural resource depletion and CL erosion in Colombia.

1 **Background analysis:** In this phase, we conducted a review of the scientific and gray literature on the economic, environmental, political and social history of the region. Then, we organized unstructured interviews with 10 local experts and branches of civil society. Subsequently, we conducted an online survey targeting a larger group with national and international experts, with the active participation of more than 50 members. People were chosen for their experience and commitment to social, economic, political and environmental issues in the department of Casanare. After compiling the responses, we extract the percentages for each characteristic and indicator created and structured the results. The findings suggest that there are three mechanisms that cause weak governance. The **first** is centralized power, both economic and political, that directly impacts law enforcement and monitoring at the local level. The **second** mechanism is the role of central and local governments, often linked to weak land tenure regimes, land distribution and land planning. Finally, the **third** is social exclusion and the impact that marginalization of rural and indigenous communities has on the use and management of natural resources.

2 **Governance Analytical Framework (GAF):** We created a GAF-survey that focused on the understanding of social interactions within which actors/participants make decisions regarding a **collective problem**, thereby creating and reinforcing **social norms** or institutions. In addition to the acquired data, we used "snowball" sampling techniques, selected local groups based on their membership in the study area and their experience in CL [3]. In parallel, we maintained a field diary based on the GAF. Under this step, we interviewed a total of more than 50 participants in the Municipality of Paz de Ariporo. Each interview was authorized and transcribed, with a duration between one and three hours. The results show the following:

- **The collective problems** are related to the growing model of extractive development, which is mainly based on agricultural expansion (rice) and the exploitation of hydrocarbons (oil). These are perceived as the main threats to the protection of CL.
- **The social norms** integrated into the CL are both formal and informal. Under an extractive economic model, and within the political agenda and the productive sector, natural resources are managed under a hierarchical structure where power relations and interference occur. However, from the perspective of land use and the management of flooded savannas, participants perceive the critical importance of maintaining and preserving **traditional livestock** as the most appropriate action for CL protection due to its identity factor in the region. Likewise, community action boards (**CAB**s) are seen as an important form of citizen action for the protection of community rights. These mechanisms are civic and non-profit, community-based organizations for social management.

3 **Pedagogical Framework RUV:** To achieve this step, we organized the first *Inclusive Workshop on Community-based Governance in Flooded Savannas* in the Municipality of Paz de Ariporo. It had two objectives: first, to share and evaluate the results of the previous steps (1 and 2); second, draw guidelines to identify how to strengthen community-based governance, presenting suggestions and/or recommendations. This workshop served to foster the dialogue between different actors and to promote

a better understanding, acceptance and inclusion of community-based governance models. 21 members of the community participated, representing civil society, as well as the public and private sectors. The process for strengthening community-based governance involves the recognition (R) and the better understanding (U) of the current situation.

The description of R and U is built upon the following elements:

- The definition of community-based governance that is agreed with the members of the community and takes into account the local reality:
  e.g. "Community governance is a process of interaction and decision-making among the actors involved in a collective problem that lead to the creation of social norms and institutions".

- With the recognition of weak governance:
  e.g. Due to socio-environmental and socioeconomic problems.

- With the identification of a collective problem:
  e.g. The way in which agricultural expansion (rice) and exploitation of hydrocarbons (oil) develop in the district.

- With the recognition of social norms:
  e.g. Traditional Livestock and the role of community action boards (CAB).

- With the common points that unite the different actors:
  e.g. The CL is deeply rooted in natural resources, their use and management.

- With the existing processes of dialogue and interaction among the actors:
  e.g. Workshops and the role of the CAB.

The perspectives of the groups were discussed in order to reach a consensus about each of the proposed categories. The results are presented in Figure 3.

16

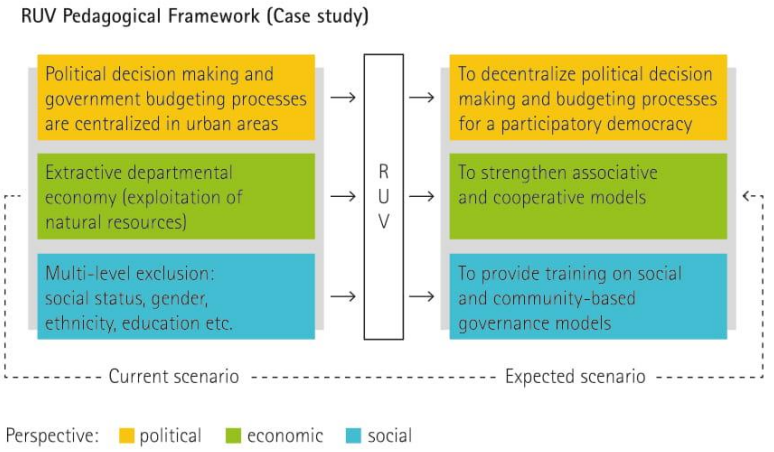

Figure 3: RUV pedagogical framework (case study).

From a current scenario to an expected scenario, the 21 participants found consensus on the three proposed categories:

- The role of central and local governments

  Political decision-making and government budgeting processes are centralized in urban areas

- The role of the existing economic model

  Extractive departmental economy (exploitation of natural resources)

- The incidence of social exclusion

  Multi-level exclusion exists based on: social status, gender, ethnicity, education etc.

The visualization (V) of operational solutions to community problems supports the development of an expected scenario. It presents suggestions on the local, economic and social policy of the municipality, built together with the different actors.

The group's common perspectives on the proposed categories are the following:

- **How to improve** the role of central and local governments?

  Decentralize political decision-making and budgeting processes for a participatory democracy (decentralization)

- **How to improve** the role of the existing economic model?

  Strengthen associative and cooperative models (associativism)

- **How to promote** social inclusion?

  Provide training on social and community-based governance models (social models)

Decentralization, associative and social models are common points that were articulated in a list of specific suggestions (steps to follow) for public institutions and community members (Table 2). Each column represents a category supported by a list of concrete suggestions that support local perspectives. Also, to demonstrate the connections between the political (decentralization), the economic (associativism) and the social (social models) elements, we created three advocacy groups:

Capacity building	Lobbying	Research
		

18

From here, it is important to reinforce these connections to better understand the local reality, as well as to strengthen or build community-based governance models in the region.

Inclusive Workshop on Community-based Governance in Flooded Savannas in the Municipality of Paz de Ariporo; 2019 (© Alessio Broccardo).

GROUPS	DECENTRALIZATION	ASSOCIATIVISM	SOCIAL MODELS
	○ Develop initiatives to strengthen citizen participation systems ○ Prepare a historical review of the movement to defend natural resources ○ Develop an agenda of allies detected at the local, national and international levels (contact details and brief explanation of their field of action) ○ Periodically organize a situation analysis (such as drawing negotiation strategies, social communication strategies, how to draw up an action plan)	○ Propose economic diversification alternatives for the communities	○ Promote dialogue on social structures that propose alternatives to existing values in society and the economy ○ Rethink the notion of the value of work that each person in the community can contribute, based on seeing citizens as valuable resources to influence reality ○ Create spaces of organizational work that allow its participants to experience systematic practices that expose the value of human beings with their different knowledge, work and perspectives ○ Develop workshops on diversity and its value within the social and community fabric (social state, gender, ethnicity, education, etc.)
	○ Strengthen existing legislation (national and international) on human rights, participation and public information ○ Analyze the possibility of developing programs of state transfers to NGOs or intersectoral community instances ○ Draw strategies to bring municipal services closer to their localities (state decentralization) and establish alliances with solidarity actors in urban centers for the management of bureaucratic procedures and lobbying processes that support their interests ○ Elaborate a basic guide of political education	○ Establish a direct or indirect relationship scheme with companies that promote the transformation of savanna ecosystems (build dialogue and interaction) ○ Create political and corporate alliances at the national and international levels to make conflicts and denunciations visible	○ Organize a workshop on community lobbying

	○ Compile the current legislation relevant to the topic under discussion (local, national and international). ○ Use virtual tools to research, organize and communicate ○ Develop a reference bibliographic guide to learn about similar experiences in communities in Latin America and the world, as well as specific information on actors involved in socio-environmental and socioeconomic conflicts ○ Promote training on climate change to qualify the political discourse, going beyond the particular „we defend our way of life" to the general „we defend the whole planet in this small but valuable trench"	○ Promote the formation of companies about climate change in order to make an invaluable contribution when making economic decisions ○ Rescue literature on the use of land under traditional livestock within the framework of the Llanera Culture ○ Explore economic alternatives for the zones, preserving the role and the low environmental impact of traditional livestock in particular	○ Promote processes of research, analysis and training to influence local government policies

Table 2: Lists of suggestions and connections between categories.

CONCLUSION

This manual can be widely used as a tool for the community in general, as it seeks to promote the political, economic and social analysis of community actors as well as scenarios to address the socio-environmental and socio-economic problems that affect them. The political, economic and social formation of the communities must allow the generation of real processes of social dialogue through a clear understanding of the interests that each party defends. The steps presented in this manual, as well as the case study developed, can facilitate dialogue and build trust between community groups, take into account local perspectives, and promote the development of the community-based governance models for sustainable development.

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On behalf of
Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety
of the Federal Republic of Germany

(Español)


Luca Eufemia
Michelle Bonatti, Stefan Sieber
MANUAL DE CONSTRUCCIÓN
DE GOBERNANZA COMUNITARIA
Estudio de caso
Municipio de Paz de Ariporo,
Casanare (Colombia)
español
zalf
Leibniz-Zentrum für
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Obras Públicas y Seguridad Nuclear
en virtud de una resolución del
Parlamento de la República Federal de Alemania

MANUAL DE CONSTRUCCIÓN DE GOBERNANZA COMUNITARIA

Estudio de caso: Municipio de Paz de Ariporo, Casanare (Colombia)

DATOS, EDICIONES Y AUTORES

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ÍNDICE

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INTRODUCCIÓN

Los modelos de gobernanza ofrecen herramientas válidas para resolver conflictos sobre una serie de problemas, incluidos el uso y el manejo de los recursos naturales. También ayudan a impulsar una perspectiva comunitaria, donde la inclusión y el compromiso son factores clave [11]. Por ende, el siguiente manual presenta el modelo de la Gobernanza Comunitaria (GC) como una posible clave de lectura para entender las perspectivas socio-político-económicas de los grupos locales. El mismo tiene dos objetivos: en primer lugar, ofrecer al público interesado en aplicar este modelo un plan de acción práctico, metodológico y conciso. También, a través de un caso concreto, este trabajo desea presentar las perspectivas de los miembros de la comunidad del Municipio de Paz de Ariporo (Casanare, Colombia).

¿QUÉ ES LA GOBERNANZA COMUNITARIA (GC)?

La Gobernanza Comunitaria (GC) es un modelo organizativo con un enfoque ascendente (*bottom-up approach*). Lo mismo puede ser facilitado por un gobierno central, por organizaciones privadas y/o una estructura de ONG. La GC apunta a la participación de los grupos locales en la planificación, la investigación, el desarrollo, la gestión y la formulación de políticas y estrategias para una comunidad en general. La descentralización de las tácticas de gestión permite lidiar con los problemas políticos, económicos y sociales únicos del territorio [11]. La atención y la inclusión de las perspectivas locales permiten visibilizar una síntesis de los problemas colectivos y el desarrollo de soluciones conjuntas para resolverlos.

Muchos casos en todo el mundo demuestran que, las culturas locales y las instituciones tradicionales, bajo un modelo de GC, son importantes para el desarrollo sostenible [1, 18, 19, 22].

Esto aplica especialmente a contextos rurales y a países en desarrollo donde las fuertes presiones económicas han favorecido la acelerada incorporación de los recursos naturales para un uso productivo inmediato, la mayoría de las veces en función de una racionalidad externa, con el consiguiente impacto en el entorno natural y humano [5, 15, 20]. Indudablemente, la GC debe abordar el desarrollo

socio-político-económico en relación con el uso y manejo de los recursos naturales. La importancia de las culturas locales y las instituciones tradicionales como ingredientes para un desarrollo próspero y sostenible también se incorpora en las teorías del conocimiento local y ancestral [7]. Por lo tanto, la integración de las instituciones tradicionales con el uso y manejo de los recursos naturales es necesaria para garantizar el desarrollo sostenible [2, 10, 17, 18, 22, 23].

¿CÓMO CONSTRUIR UNA GOBERNANZA COMUNITARIA (GC)?

El "cómo" construir una GC constituye el enfoque metodológico que facilita la comprensión y la valoración de la perspectiva local. Este manual propone seguir 3 pasos (Figura 1):

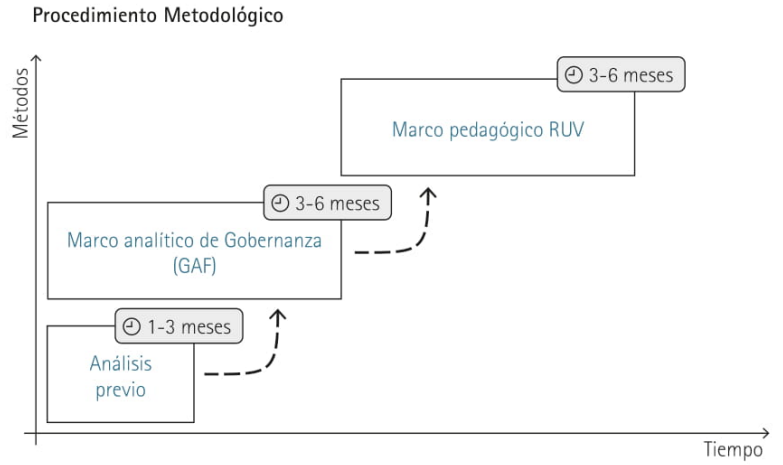

Figura 1: Procedimiento metodológico.

1. **Análisis previo**: Una revisión de la literatura y la construcción de cuestionarios dirigidos a una muestra representativa de expertos (en economía, política, sociología, medioambiente, etc.) con el fin de conocer tendencias y opiniones confiables. Es posible, también, crear categorías y variables para

una selección de los mismos expertos. Las entrevistas pueden ser en vivo o en línea, estructuradas o no estructuradas con informantes clave, que representen a expertos de las instituciones locales y grupos de la sociedad civil en las regiones seleccionadas. Este paso nos ayuda a conocer y explorar el contexto local y al mismo tiempo respaldar los siguientes pasos.

2. **Marco analítico de Gobernanza (GAF)**: La identificación de los procesos actuales de gobernanza a través de un marco analítico conocido como GAF [13]. Lo mismo propone analizar las interacciones sociales en las que los actores toman decisiones con respecto a problemas colectivos, creando, reforzando o cambiando las normas e instituciones sociales. Por ende, sugerimos el desarrollo de enfoques cualitativos (cuestionarios para entrevistas, talleres y grupos focales, café del mundo etc.) que apunten a la compresión y síntesis de los problemas colectivos, así mismo a la identificación de las estructuras jerarquías y de poderes, de las normas e instituciones sociales.

3. **Marco pedagógico RUV**: La aplicación del instrumento pedagógico conocido como RUV [4] a través de un taller inclusivo para la comunidad en general. El mismo está conformado por tres fases conceptuales:

   - ✓ El reconocimiento de las problemáticas colectivas (**R**): rescatar, identificar e integrar valores locales.
   - ✓ El mejor entendimiento de las problemáticas colectivas (**U**): reconocer la estructura de los problemas de acuerdo con los locales y su motivación.
   - ✓ **Visualizar el** futuro con soluciones colectivas (**V**): replantear imágenes del futuro y crear soluciones operativas para los problemas.

De acuerdo con estos tres principios y con el fin de implementar la metodología RUV, la composición del taller se desarrolla en seis pasos (Tabla 1).

PASOS	ACTIVIDADES	METODOLOGÍA RUV	OBJETIVO
	Registro de participantes		
1.	Inauguración: Bienvenida, presentación, expectativas	Diálogo y presentación individual	Autodefinición y caracterización comunitaria
2.	Puesta en común de la agenda y metodología del taller. Diálogo sobre gobernanza comunitaria.	Presentación de las definiciones de los conceptos claves (ej. gobernanza comunitaria).	Construir un mensaje común de los conceptos (ej. definición de gobernanza comunitaria).
3.	Presentación un "escenario actual" (estudio de caso). Explicar y guiar elementos de la gobernanza débil (conflictos, políticas, economía y uso de la tierra, etc.)	Reconocimiento (R) (rescatar, identificar e integrar valores locales). Actividad en grupos (teatro de imágenes, dibujos etc.). (Referencia: metodología Resource Map)	Construir "escenario actual".
4.a	Comprensión profunda de las causas del „escenario actual".	Mejor entendimiento (U) (reconocer la estructura de los problemas de acuerdo con los locales y su motivación) Actividad en grupos (teatro de imágenes, dibujos etc.). (Cada grupo explica los problemas). Discusión abierta con preguntas orientadoras. Presentaciones grupales. (Referencia: metodología diagrama de Ishikawa/fish-bone).	Comprender el "escenario actual" (facilitar el reconocimiento crítico de situaciones complejas).
4.b	Visualización de un „escenario esperado" (alternativas locales propias para cambiar la situación). Búsqueda de soluciones.	Mejor entendimiento (U) (reconocer la estructura de los problemas de acuerdo con los locales y su motivación) Actividad en grupos (teatro de imágenes, dibujos etc.). Discusión abierta con preguntas orientadoras. Presentaciones grupales.	Crear un „escenario esperado" para los próximos 5 años. Imaginar nuevas condiciones.

5.	Evaluación de soluciones.	Visualización (V) (repensar las imágenes del futuro y crear soluciones operativas a los problemas). Actividad grupal (teatro de imágenes, dibujos, etc.). Discusión abierta con preguntas orientadoras. Ofrecer una lista de posibles soluciones para clasificar (ranking, evaluación).	Crear y evaluar soluciones para el „escenario actual". Proceso educativo crítico (aprender a evaluar y criticar soluciones).
6.	Evaluación de taller.	Discusión abierta con preguntas orientadoras.	Evaluación de la efectividad de los métodos aplicados.

Tabla 1: Seis pasos para la aplicación de la metodología pedagógica (RUV).

En las actividades conjuntas se forman grupos, incorporando participantes de diferentes sectores, en un ejercicio de constante integración y diálogo. Bajo el marco pedagógico RUV (Figura 2), cada grupo se propone crear un teatro de imágenes y puntos clave en función de tres categorías propuestas; los resutlados se presentan luego en plenaria. Ahora, integrando el GAF (paso 2), las categorías propuestas con el fin de construir un escenario actual son las siguientes:

- El rol de los gobiernos locales y centrales (perspectiva política)
- El rol del modelo económico existente (perspectiva económica)
- La presencia de exclusión social (perspectiva social)

Sucesivamente, los mismos grupos desarrollan el teatro de imágenes y puntos clave para las tres categorías propuestas, seguido de una plenaria en la cual se presentan las siguientes preguntas con el fin de construir un escenario esperado:

- **¿Cómo mejorar** el rol de los gobiernos locales y centrales?
- **¿Cómo mejorar** el rol del modelo económico existente?
- **¿Cómo promover** la inclusión social?

Finalmente, el último ejercicio grupal incluye una plataforma en donde cada grupo tiene la oportunidad de evaluar las imágenes y puntos claves de las propuestas de los demás en una práctica de colaboración.

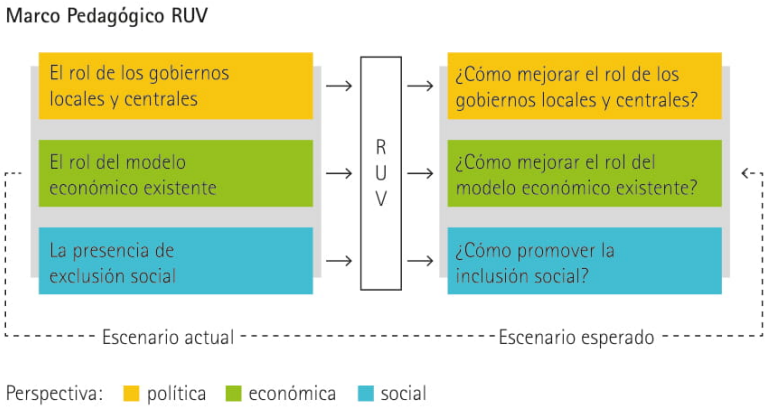

Figura 2: Marco pedagógico RUV.

11

CASO DE ESTUDIO: MUNICIPIO DE PAZ DE ARIPORO, CASANARE (COLOMBIA)

Contribución miembros de la comunidad:

Ardila Rodríguez, Andrea Vanessa
Barreto Meta, Leidi Johana
Broccardo, Alessio
Camargo Caballero, Aurora
Cáceres, José Tibaldo
Duran, Yamith
Gaitán, Hugo
Gaitán, Nelson
Gordillo, Prada Osman
Latriglia, Víctor
Lizarazo Aaron, Ruiz
Madrid, Gilma
Martínez, Luis
Martínez Nino, Marina
Parales, Libia
Pérez, Yohaira Andrea
Ramirez, Daniela
Rojas, Luisa Fernanda
Sánchez, Ana Edilce
Suarez, Luz Elena
Vargas, Edwin

Contexto:

En las sabanas inundables de los Llanos colombianos, ubicados en el este de Colombia en la cuenca del rio Orinoco, nos enfocamos en el Municipio de Paz de Ariporo por sus características peculiares tanto a nivel de ecosistema como de procesos de cambios radicales en el uso y el manejo de los recursos naturales. El bioma de la región se caracteriza por las llanuras de inundación, bosques de galería y una gran cantidad de subunidades, como la jungla sub-andina, etc. [16]. Tiene

dos estaciones distintas, la estación de lluvias y la estación seca, y se caracteriza por sus extensas, diversas y heterogéneas sabanas [24]. Su clima es de sabana intertropical [8]. La economía en Los Llanos se basa principalmente en la ganadería extensiva y la extracción de petróleo [12]. Durante la década de 1970, solo el 2 % de las llanuras del este de la cuenca del Orinoco se habían visto afectadas por cambios significativos en el uso de la tierra. Sin embargo, debido a las intervenciones antrópicas y extractivas, en 2012 la transformación de la región ya alcanzó el 15,5 %, lo que provocó una disminución drástica de las sabanas naturales inundadas de 11.401 km^2 a 9.283 km^2 (18.5 %) [24]. Estos cambios tienen impactos negativos en la diversidad biológica y cultural de los Llanos, incluida la pérdida de hábitat debido a la expansión de las intervenciones extractivas, la agricultura intensiva, la contaminación del agua y el suelo, la introducción de especies exóticas y la creciente amenaza del cambio climático [14, 21].

Sabanas Inundables, 2017 (© Jorge García, Courtesy WWF Colombia).

Las sabanas inundables son ecosistemas estratégicos y poco conocidos, a pesar de su importancia ecológica, biológica y económica. Ellas representan el 12,5 % de la cuenca del Orinoco, un ecosistema estratégico de gran importancia cultural, económica, biológica y ecológica [17].

La resiliencia de las comunidades locales del Municipio de Paz de Ariporo propone rescatar un ejemplo concreto y replicable propuestas de construcción y fortalecimiento de la gobernanza comunitaria. El mismo resalta el rol de los diferentes grupos de la comunidad municipal y sus perspectivas acerca de las intervenciones antrópicas y extractivas (la expansión agrícola y la explotación de hidrocarburos, incluido el petróleo) y el vínculo entre los recursos naturales. Del mismo modo, se entiende dibujar un nuevo paradigma de los modelos socios ambientales, económicos y la relación con cultura local, conocida como Cultura Llanera (CL). Por lo tanto, deseamos presentar la aplicación los tres pasos del manual de gobernanza comunitaria en el Municipio de Paz de Ariporo. El objetivo de este ejercicio es presentar las perspectivas de los miembros de la comunidad con el fin de aliviar los impactos de las intervenciones antrópicas en las dinámicas sociales y culturales locales, y al mismo tiempo ayudar en la comprensión de la relación intrínseca entre el agotamiento de los recursos naturales y la erosión de la CL en Colombia.

1. **Análisis previo**: En esta fase, realizamos una revisión de la literatura científica y gris sobre la historia económica, ambiental, política y social de la región. Luego, organizamos entrevistas no estructuradas con 10 expertos locales y ramas de la sociedad civil. Posteriormente, realizamos una encuesta en línea dirigida a un grupo más amplio con expertos nacionales e internacionales, consiguiendo la participación activa de más de 50 integrantes. Las personas fueron elegidas por su experiencia y su compromiso con las cuestiones sociales, económicas, políticas y ambientales en el departamento de Casanare. Después de recopilar las respuestas, extraemos los porcentajes para cada característica e indicador creados, y estructuramos los resultados. Los resultados sugieren que existen tres mecanismos que causan una gobernanza débil. El **primero** es el poder centralizado, tanto económico como político, que impacta directamente la aplicación de la ley y su monitoreo a nivel local. El **segundo** mecanismo es el papel de los gobiernos centrales y locales, a menudo vinculados a regímenes de propiedad débiles de tenencia de la tierra, a la distribución de la tierra y a la planificación de la tierra. Finalmente, el **tercer** mecanismo de gobernanza débil es la exclusión social y el impacto que la marginación de las comunidades rurales e indígenas tiene sobre el uso y la gestión de los recursos naturales.

2 **Marco analítico de Gobernanza (GAF)**: Creamos una encuesta basada en el GAF que se enfoca en la comprensión de las interacciones sociales dentro de las cuales los actores/participantes toman decisiones con respecto a un **problema colectivo**, creando y reforzando **las normas** o instituciones **sociales**. Además, con los datos adquiridos, utilizamos técnicas de muestreo de „bolas de nieve", seleccionamos grupos locales en función de su pertenencia al área de estudio y su experiencia en CL [3]. Paralelamente, mantenemos un diario de campo basado en el GAF. Bajo este paso, entrevistamos a un total de más de 50 participantes en el Municipio de Paz de Ariporo. Cada entrevista fue autorizada y transcrita, con una duración de entre una y tres horas. Los resultados muestran lo siguiente:

- **Los problemas colectivos** están relacionados al creciente modelo de desarrollo extractivo, que se basa principalmente en la expansión agrícola (arroz) y la explotación de hidrocarburos (petróleo). Estos se perciben como las principales amenazas para la protección de la CL.
- **Las normas sociales** integradas en la CL son tanto formales como informales. Bajo un modelo económico extractivo, y dentro de la agenda política y del sector productivo, los recursos naturales se manejan bajo una estructura jerárquica donde ocurren las relaciones de poder e interferencias. Sin embargo, desde la perspectiva del uso de la tierra y el manejo de las sabanas inundables, los participantes perciben la importancia crítica de mantener y preservar la **ganadería tradicional** como la acción más apropiada para la protección de la CL debido a su factor de identidad en la región. Así mismo, las juntas de acción comunal (**JAC**) son vistas como una forma importante de acción ciudadana para la protección de los derechos comunitarios. Estos mecanismos son organizaciones cívicas y sin fines de lucro, basadas en la comunidad para la gestión social.

3 **Marco pedagógico RUV**: Para lograr este paso, organizamos en el municipio de Paz de Ariporo el primer *Taller Inclusivo Sobre Gobernanza Comunitaria en Paisaje de Sabanas Inundables*. El mismo tuvo dos objetivos: en primer lugar, compartir y evaluar los resultados de los pasos antecedentes (1 y 2); en segundo lugar, dibujar pautas para identificar como fortalecer la gobernanza comunitaria, presentando sugerencias y/o recomendaciones. Este taller sirvió para abrir el diálogo entre diferentes actores y fomentar

una mejor comprensión, aceptación e inclusión de modelos de gobernanza comunitaria. Participaron 21 miembros de la comunidad, en representación de la sociedad civil, al igual que de los sectores público y privado. El proceso para el fortalecimiento de la gobernanza comunitaria involucra el reconocimiento (R) y el mejor entendimiento (U) de la situación actual.

La construcción de estos dos elementos se concreta con lo siguiente:

- Con la identificación de una definición de gobernanza comunitaria que sea acordada con los miembros de la comunidad y tenga en cuenta la realidad local:
  Ej. "La gobernanza comunitaria es un proceso de interacción y toma de decisiones entre los actores involucrados en un problema colectivo que llevan a la creación de normas e instituciones sociales".

- Con el reconocimiento de una gobernanza débil en la actualidad:
  Ej. Debido a problemas socio-ambientales y socioeconómicos.

- Con la individualización de un problema colectivo:
  Ej. La forma en que la expansión agrícola (arroz) y explotación de hidrocarburos (petróleo) se desarrollan en el distrito.

- Con el reconocimiento de las normas sociales:
  Ej. Ganadería tradicional y el papel de las juntas de acción comunitaria (JAC).

- Con los puntos en común que unen los diferentes actores:
  Ej. La CL está profundamente arraigada con los recursos naturales, su uso y manejo.

- Con los procesos existentes que existen de diálogo e interacción entre los actores:
  Ej. Talleres y el papel de las JAC.

Las perspectivas de los grupos fueron discutidas para llegar a un consenso sobre cada una de las categorías propuestas. Los resultados son presentados en la Figura 3.

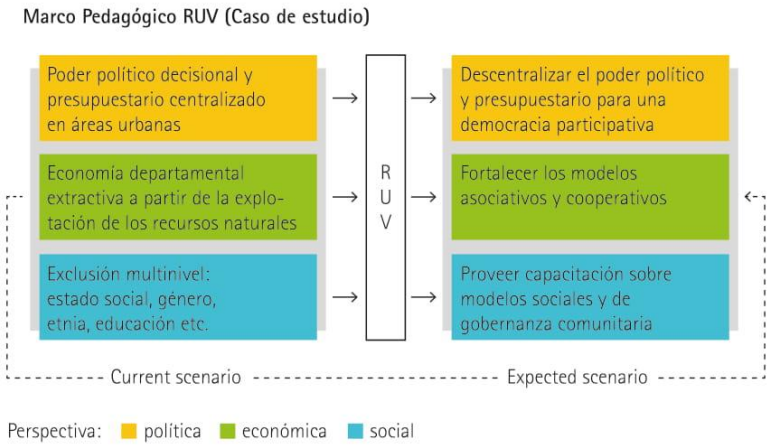

Figura 3: Marco pedagógico RUV (caso de estudio).

De un escenario actual a un escenario esperado, los 21 participantes encontraron un consenso sobre las tres categorías propuestas:

- El rol de los gobiernos locales y centrales

  Poder político decisional y presupuestario centralizado en áreas urbanas

- El rol del modelo económico existente

  Economía departamental extractiva a partir de la explotación de los recursos naturales

- La presencia de exclusión social

  Exclusión multinivel: estado social, género, etnia, educación etc.

La visualización (V) de soluciones operativas a los problemas comunitarios sustenta la construcción de un escenario esperado. El mismo presenta sugerencias sobre la política local, económica y social del municipio construida en conjunto entre los diferentes actores.

Las perspectivas que los grupos tienen en común sobre las categorías propuestas son las siguientes:

- **¿Cómo mejorar** el rol de los gobiernos locales y centrales?

  Descentralizar el poder político y presupuestario para una democracia participativa (descentralización)

- **¿Cómo mejorar** el rol del modelo económico existente?

  Fortalecer los modelos asociativos y cooperativos (asociativismo)

- **¿Cómo promover** la inclusión social?

  Proveer capacitación sobre modelos sociales y de gobernanza comunitaria (modelos sociales)

La descentralización, el asociativismo y los modelos sociales son puntos en común que se articularon en una lista de sugerencias específicas (pasos a seguir) para instituciones públicas y para los miembros de la comunidad (Tabla 2). Cada columna representa una categoría sustentada por una lista de sugerencias concretas y que respaldan las perspectivas locales. Asimismo, para demostrar las conexiones entre lo político (descentralización), lo económico (asociativismo) y lo social (modelos sociales), creamos tres grupos de incidencia:

Creación de capacidad *(capacity building)*	Cabildeo *(lobbying)*	Investigación *(research)*
		

Desde aquí, es importante reforzar estas mismas conexiones para un mejor entendimiento de la realidad local y al mismo tiempo para el fortalecimiento o la construcción de un modelo de GC.

Taller Inclusivo Sobre Gobernanza Comunitaria en el Municipio de Paz de Ariporo; 2019 (© Alessio Broccardo).

GRUPOS	DECENTRALIZACION	ASOCIATIVISMO	MODELOS SOCIALES
	○ Desarrollar iniciativas para fortalecer sistemas de participación ciudadana. ○ Elaborar una reseña histórica del movimiento de defensa de recursos naturales. ○ Elaborar una agenda de aliados detectados a nivel local, nacional e internacional (datos de contacto y breve explicación de su campo de acción) ○ Organizar periódicamente un análisis de coyuntura (como dibujar estrategias de negociación, de estrategias de comunicación social, como elaborar un plan de acción).	○ Plantear alternativas de diversificación económica para las comunidades.	○ Promover el diálogo sobre estructuras sociales que propongan alternativas a los valores vigentes en la sociedad y la economía. ○ Rehacer la noción del valor del trabajo que cada persona de la comunidad puede aportar, a partir de ver a los ciudadanos como recursos valiosos para incidir en la realidad. ○ Constituir espacios de trabajo organizativo que permitan vivenciar a sus participantes prácticas sistemáticas que expongan el valor de los humanos con sus diferentes saberes y trabajos y perspectivas. ○ Desarrollar talleres sobre la diversidad y su valor adentro del tejido social y comunitario (estado social, género, etnia, educación etc.).
	○ Reforzar la legislación (nacional e internacional) vigente en materia de derechos humanos, participación e información pública. ○ Analizar la posibilidad de desarrollar programas de transferencias estatales a ONG o a instancias comunitarias intersectoriales. ○ Dibujar estrategias con el fin de acercar los servicios municipales a sus localidades (descentralización estatal) y establecer alianzas con actores solidarios en los centros urbanos para la gestión de los trámites burocráticos y procesos de cabildeo que respalden sus intereses. ○ Elaborar una guía básica de formación política.	○ Establecer un esquema de relacionamiento directo o indirecto con las empresas que promueven la transformación de ecosistemas de sabana (construir diálogo e interacción). ○ Crear alianzas políticas y corporativas a nivel nacional e internacional para visibilizar los conflictos y las denuncias.	○ Organizar taller sobre cabildeo comunitario.

	○ Compilar la legislación vigente relevante al tema en discusión (local, nacional e internacional). ○ Usar herramientas virtuales para investigar, organizar y comunicar. ○ Desarrollar una guía bibliográfica de referencia para conocer experiencias similares en comunidades de Latinoamérica y el mundo, así como información específica sobre actores que intervienen en los conflictos socio-ambientales y socioeconómicos. ○ Promover la formación en materia de cambio climático para calificar el discurso político, trascendiendo del particular "defendemos nuestro modo de vida" al general "defendemos a todo el planeta en esta pequeña pero valiosa trinchera".	○ Promover la formación de las empresas en materia de cambio climático con el fin de brindar un aporte invaluable al momento de realizar decisiones económicas. ○ Rescatar la literatura sobre el uso del suelo bajo ganadería tradicional en el marco de la Cultura Llanera. ○ Explorar alternativas económicas para las zonas rescatando el rol y el bajo impacto ambiental de la ganadería tradicional en particular. estock in particular	○ Promover procesos de investigación, análisis y formación para incidir en las políticas los gobiernos locales.

Tabla 2: Listas de sugerencias y conexiones entre categorías.

CONCLUSIONES

Este manual tiene un amplio uso como herramienta para toda la comunidad en general, busca promover el análisis político, económico y social de los actores y escenarios comunitarios para enfrentar los problemas socio-ambientales y socioeconómicos que los afectan. La formación política, económica y social de las comunidades debe permitir generar verdaderos procesos de diálogo social mediante una clara comprensión sobre los intereses que cada parte defiende. Los pasos presentados en este manual, asimismo el caso de estudio elaborado, pueden facilitar espacio de diálogo y la construcción de confianza entre grupos de una comunidad, rescatar las perspectivas locales, así mismo promover el desarrollo de la GC para un desarrollo sostenible.

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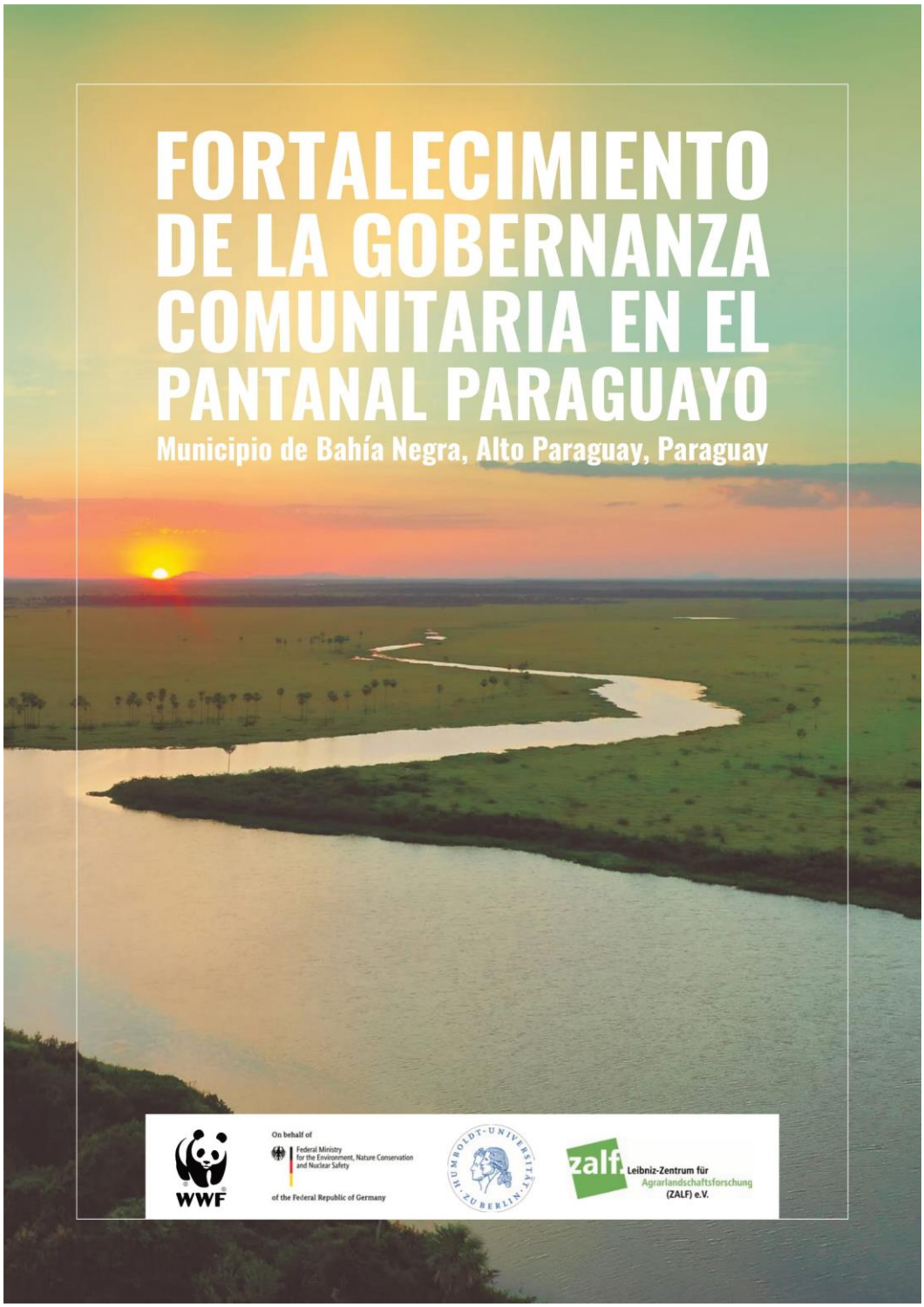
Ministerio Federal de Medio Ambiente, Protección de la Naturaleza, Obras Públicas y Seguridad Nuclear
en virtud de una resolución del Parlamento de la República Federal de Alemania

7.2 Guidelines to Strengthen CBG in the Paraguayan Pantanal (CBGG)

(Spanish)



FORTALECIMIENTO DE LA GOBERNANZA COMUNITARIA EN EL PANTANAL PARAGUAYO

Municipio de Bahía Negra, Alto Paraguay, Paraguay

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Índice

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Prólogo

La GUÍA PARA EL FORTALECIMIENTO DE LA GOBERNANZA COMUNITARIA EN EL PANTANAL PARAGUAYO es el resultado tangible del *Taller Inclusivo Sobre Gobernanza Comunitaria en el Pantanal Paraguayo*, realizado el día 8 de mayo de 2019, en el Distrito de Bahía Negra (Alto Paraguay). El mismo tuvo dos objetivos: el primero, compartir y evaluar los resultados y datos sobre los aspectos socioeconómicos de la región, presentando un escenario actual; en segundo lugar, dibujar pautas que fortalezcan la gobernanza comunitaria, construyendo un escenario esperado.

Este taller sirvió para abrir el diálogo entre diferentes actores, y fomentar una mejor comprensión y aceptación de modelos de gobernanza comunitaria. En el taller participaron 24 miembros de la comunidad, en representación de la sociedad civil, al igual que el sector público y privado. La siguiente guía pretende sugerir indicaciones para el desarrollo de políticas locales, de proyectos sociales, económicos y ambientales, de resolución de conflictos, así como la construcción de confianza entre grupos de interés en el distrito.

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Introducción

El Pantanal es uno de los humedales de agua dulce más grandes del mundo, cubriendo aproximadamente 150.000 km² en la cuenca superior del Río Paraguay. Ocupa parte del territorio de tres países: Bolivia, Brasil y Paraguay. Dentro del territorio paraguayo, la vegetación típica forma un complejo de paisajes de sabanas o pantanos inundados alternados; lagunas, playas, bancos de arena, palmerales de Karanda'y (*Copernicia alba*) y bosques, principalmente de quebracho rojo.

Este ecosistema es reconocido internacionalmente por su gran riqueza de vida silvestre, particularmente aves, peces, anfibios, reptiles y mamíferos [3,6,4,10], y contiene la mayor concentración de especies acuáticas en el mundo [7]. Sin embargo, el mega diverso bioma del Pantanal Paraguayo está en peligro debido a la expansión de la frontera agropecuaria y la deforestación, que amenazan no solo el frágil equilibrio de los recursos naturales, sino también las identidades culturales del territorio. Los modelos de gobernanza comunitaria, entendidos como procesos inclusivos para la resolución de problemas colectivos, ayudan a fortalecer las perspectivas socioeconómicas y culturales.

En este contexto, nos enfocamos en el distrito paraguayo de Bahía Negra por sus características peculiares, tanto a nivel de ecosistema y dinámicas socioecológicas, como de procesos de cambios radicales en el uso y el manejo de los recursos naturales. La resiliencia de las comunidades locales del Distrito de Bahía Negra propone rescatar un ejemplo concreto y replicable de construcción de propuestas de fortalecimiento de la gobernanza comunitaria. El mismo resalta el rol de los diferentes grupos de la comunidad y sus perspectivas acerca del desarrollo rural de sus territorios. Del mismo modo, se entiende proponer un nuevo paradigma de los modelos socioambientales, económicos y la relación con cultura local y la identidad indígena. Por lo

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tanto, deseamos proponer escenarios de gobernanza comunitarias que alivien los impactos de intervenciones antrópicas en las dinámicas socioculturales locales, y al mismo tiempo ayuden a la comprensión de la relación intrínseca entre el agotamiento de los recursos naturales y la erosión de la cultura local e indígena.

Muchos casos en todo el mundo demuestran que, las culturas locales y las instituciones tradicionales, envueltas en esquemas de gobernanza comunitaria, son importantes para el desarrollo sostenible [1, 7, 8, 9].

Teniendo en cuenta las características de los grupos que tratan con los recursos naturales (por ejemplo, la explotación de humedales), las normas comunes compartidas y las experiencias exitosas conjuntas son aspectos claves del manejo sostenible de los recursos naturales [5]. La importancia de las culturas locales y las instituciones tradicionales como ingredientes para un desarrollo próspero y sostenible también se incorpora en las teorías del conocimiento local y ancestral. Por lo tanto, la integración de las instituciones sociales y culturales en la explotación y uso de los recursos es necesaria para garantizar el desarrollo sostenible [5, 6].

Metodología

El 8 de mayo de 2019, el Centro Leibniz para la Investigación del Paisaje Agrícola (ZALF) y la Universidad Humboldt de Berlín (HU), con el apoyo de la Organización Mundial de Conservación (WWF), organizaron un taller sobre gobernanza comunitaria en sabanas inundadas en el Distrito de Bahía Negra (Departamento de Alto Paraguay, Paraguay). Los 24 participantes son miembros de la comunidad, en representación de la sociedad civil, del sector público y privado (Municipalidad, Junta Municipal, Unión de Comunidades Indígenas de la Nación Yshir (UCINY), Servicio de Transporte aéreo militar (SETAM), Registro del Estado Civil (REC), Radio Comunitaria Bahía Negra Poty, Consejería Municipal por los Derechos del Niño (CODENI), Armada Nacional, Clínica Municipal, entre otros).

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El enfoque metodológico se ha construido sobre la base del instrumento pedagógico conocido como RUV [2]. El mismo está conformado por tres fases conceptuales:

- El reconocimiento de las problemáticas colectivas (R): rescatar, identificar e integrar valores locales.
- El mejor entendimiento de las problemáticas colectivas (U): reconocer la estructura de los problemas de acuerdo con los locales y su motivación.
- Visualizar el futuro con soluciones colectivas (V): replantear imágenes del futuro y crear soluciones operativas para los problemas.

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De acuerdo con estos tres principios y con el fin de implementar la metodología RUV, la agenda del taller fue desarrollada en seis "pasos" (Tabla 1.). En las actividades conjuntas se crearon tres grupos (Grupo 1, 2 y 3), los cuales estuvieron conformados por los tres diferentes sectores, en un ejercicio de constante integración y diálogo.

Cada grupo se propuso crear un teatro de imágenes y puntos claves para las tres categorías propuestas, para luego presentar los resultados del escenario actual en una plenaria:

- El rol de los gobiernos locales y centrales.
- El rol del modelo económico existente y su impacto a nivel local.
- La presencia de exclusión social a nivel local.

Sucesivamente, los mismos grupos desarrollaron el teatro de imágenes y puntos claves para las tres categorías propuestas, seguido de una plenaria en la cual se presentaron los resultados del escenario esperado.

- **Cómo mejorar** el rol de los gobiernos locales y centrales.
- **Cómo mejorar** el rol del modelo económico existente y su impacto a nivel local.
- **Cómo promover** la inclusión social a nivel local.

Finalmente, el último ejercicio incluyó una plataforma en donde cada grupo tuvo la oportunidad de evaluar las imágenes y puntos claves de las propuestas de los demás, en una práctica de colaboración.

Tabla 1. Seis "pasos" para la aplicación de la metodología pedagógica (RUV):

PASOS	ACTIVIDADES	METODOLOGÍA	OBJETIVO
	Registro de participantes	RUV	
1.	Inauguración: Bienvenida, presentación, expectativas.	Diálogo y presentación individual.	Autodefinición y caracterización comunitaria.
2.	Puesta en común de la agenda y metodología del taller. Diálogo sobre gobernanza comunitaria (interacción). Presentación del "escenario actual" (resultados investigaciones PhD).	Identificar / Presentar / Votar elementos claves y existentes de gobernanza comunitaria. Reconocimiento (R) (rescatar, identificar e integrar valores locales).	Definición de gobernanza comunitaria.
3.	Actividad en grupos para teatro de imágenes y foros. Explicar y guiar elementos de la gobernanza débil (conflictos, políticas, economía y uso de la tierra, etc.)	Teatro de imágenes y foros. (Cada grupo explica el problema haciendo la escena del problema). Discusión abierta con preguntas guía. Mejor entendimiento (U) (reconozca la estructura de los problemas de acuerdo con los locales y su motivación). ¿Quiénes son esas personas? ¿Qué están pasando? ¿Por qué?	Explotar o investigar el tema complejo. Entender las perspectivas locales. Facilitar el reconocimiento crítico de situaciones complejas.
4.	Búsqueda de soluciones locales. Actividad en grupos para teatro de imágenes y foros. Presentación en grupos de alternativas "escenario esperado".	Discusión abierta con preguntas guía. ¿Quién puede ayudar? ¿Cómo? ¿Qué se puede modificar? ¿Qué y cómo podemos cambiar? Visualizar (V) (replantear imágenes del futuro y crear soluciones operativas para los problemas).	Crear alternativas locales propias para cambiar la situación. Visualizar nuevas condiciones.
5.	Evaluación de las soluciones. Actividad en grupos para teatro de imágenes y foros. Presentación en grupos proceso de educación crítica. "escenario esperado"	Discusión abierta con preguntas guía. ¿Por qué es bueno para ellos? ¿Hay algo malo con eso? Visualizar (V) (replantear imágenes del futuro y crear soluciones operativas para los problemas)	Proceso de educación crítica. Aprender a evaluar y criticar las soluciones.
6.	Evaluación del taller.	Discusión abierta con preguntas guía. ¿Experiencia para ellos? ¿Qué fue positivo y negativo? ¿Cómo mejorar?	Evaluar la efectividad de los métodos pedagógicos.

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Escenario actual

El proceso para el fortalecimiento de la gobernanza comunitaria involucra el reconocimiento (R) y el mejor entendimiento (U) de la situación actual. La construcción del escenario actual se divide en las posiciones comunes y acordadas por los grupos de la comunidad:

- La definición de gobernanza comunitaria aprobada por los miembros de la comunidad es el punto de partida y la dirección de marcha:

"La gobernanza comunitaria es un proceso de interacción y toma de decisiones entre los actores involucrados en un problema colectivo que llevan a la creación de normas e instituciones sociales".

- El reconocimiento de una gobernanza débil en la actualidad: Debido a problemas socioambientales y socioeconómicos.

- La individualización de un problema colectivo:
La forma en que la expansión agropecuaria se desarrolla en el distrito.

- La individualización de normas sociales:
Las perspectivas de un desarrollo sostenible con buenas prácticas ganaderas y pesqueras.
La cosmovisión indígena de los Yshir que pone en el centro la relación íntima humanos-territorios.

- Los puntos en común que unen a los diferentes actores:
La diversidad cultural está profundamente arraigada con los recursos naturales, su uso y manejo tradicional.

- Los procesos de diálogo e interacción que existen entre los actores:
Talleres y el Plan de Ordenamiento Urbano y Territorial del Municipio (POUT) de Bahía Negra, cuya finalidad es organizar, reglamentar, orientar y administrar el desarrollo físico y sustentable de su territorio.

Las perspectivas que los tres grupos del taller tienen en común sobre las categorías propuestas son las siguientes (ANEXO 1.):

- El rol de los gobiernos locales y centrales

> Insuficiencia de inversiones públicas para un desarrollo participativo (falta de infraestructuras básicas como electrificación, redes de comunicación, rutas, etc.).

- El rol del modelo económico existente y su impacto a nivel local

> Economía departamental en pocas manos de grandes terratenientes, sin comercio ni industria local (valor agregado, certificaciones locales, etc.).

- La presencia de exclusión social a nivel local

> Falta de capacitación e inclusión entre grupos de las comunidades.

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Escenario esperado

La visualización (V) de un escenario futuro con soluciones operativas a los problemas comunitarios sustenta la construcción de un escenario esperado. El mismo presenta la visión de la política local, económica y social del distrito construida en conjunto entre los diferentes actores.

Las perspectivas que los tres tienen en común sobre las categorías propuestas son las siguientes (ANEXO 2.):

- **¿Qué hacer para mejorar** el rol de los gobiernos locales y centrales?

> Fortalecer el trabajo de incidencia desde la comunidad a todos los niveles (municipal, departamental y estatal).

- **¿Qué hacer para mejorar** el rol del modelo económico existente y su impacto a nivel local?

> Invertir en capacitación y educación sobre los modelos corporativos de empresas.

- **¿Qué hacer para promover** la inclusión social a nivel local?

> Valorar el conocimiento y la cultura local e indígena, con enfoque específico en mujeres y juventud.

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Conclusiones y enfoques

La siguiente guía tiene un amplio uso como herramienta para toda la comunidad en general, busca promover el análisis político, económico y social de los actores, y escenarios comunitarios para enfrentar los problemas socioambientales y socioeconómicos que los afectan. Como conclusión y con el fin de **fortalecer la gobernanza comunitaria** en el Distrito de Bahía Negra, esta guía propone tres enfoques estratégicos.

El enfoque político

Fortalecer el trabajo de incidencia desde la comunidad a todos los niveles (municipal, departamental y estatal).

Posibles pasos a seguir para instituciones gubernamentales:

- Liderar el desarrollo de las iniciativas del POUT como instrumento de las políticas de estado, contribuyendo a que los gobiernos locales (municipalidad y gobernación) orienten la regulación y la promoción de una visión para un desarrollo sostenible a largo plazo.
- Desarrollar iniciativas para fortalecer sistemas de participación ciudadana. Por ejemplo, creando un sistema inclusivo de monitoreo y evaluación de estudios sobre el desarrollo de infraestructura (ruta y aeropuerto). Asimismo, sobre población, las etnias, el nivel educativo, así como los lugares donde se presentan fenómenos meteorológicos y tectónicos como lluvias, sequías y derrumbes.
- Apoyar programas de transferencias de conocimiento del estado (i.e. fortalecimiento de capacidades) a grupos de la sociedad civil y a instancias comunitarias intersectoriales.

Recomendaciones para los actores en general de la comunidad:

- Definir estrategias para acercar los servicios municipales a las localidades (descentralización estatal) y establecer alianzas con actores solidarios en los centros urbanos para la gestión de los trámites burocráticos y procesos de cabildeo que respalden sus intereses.
- Elaborar una guía básica de formación política, con el fin de generar verdaderos procesos de diálogo social, mediante una clara comprensión de todos los intereses que cada parte defiende.
- Elaborar una reseña histórica del movimiento de defensa de recursos naturales.
- A través del consejo del POUT, organizar periódicamente un análisis de coyuntura (como definir estrategias de negociación, de comunicación social, así como elaborar un plan de acción).
- Compilar la legislación vigente relevante al tema en discusión (local, nacional e internacional).
- Promover la autonomía de la comunidad en cuanto a la investigación y el análisis, favoreciendo sus condiciones para incidir en defensa de sus recursos. Este proceso es imprescindible, a modo de exigir a los gobiernos exponer los datos que la comunidad necesita para formular sus denuncias e instancias. Las leyes de información pública y transparencia son grandes aliados en este sentido, pero deben ser utilizadas por una población que está en proceso de entender su realidad e incidir en ella.
- Usar herramientas virtuales para investigar, organizar, educar y comunicar.
- Elaborar una agenda de aliados detectados a nivel local, nacional e internacional (datos de contacto y breve explicación de su campo de acción).

- Desarrollar una guía bibliográfica de referencia para conocer experiencias similares en comunidades de Latinoamérica y el mundo, así como información específica sobre actores que intervienen en los conflictos socioambientales y socioeconómicos.
- Promover la formación en materia de cambio climático para calificar el discurso político, trascendiendo del particular "defendemos nuestro modo de vida" al general "defendemos a todo el planeta en esta pequeña pero valiosa trinchera".

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El enfoque económico

Invertir en capacitación y educación sobre los modelos corporativos.
Pasos a seguir para los actores de la comunidad: • Establecer un esquema de relacionamiento directo o indirecto con los grandes propietarios que deforestan o promueven la deforestación (construir diálogo e interacción). • Rescatar el rol de las empresas agropecuarias que promueven el modelo de la agricultura respetuosa del medio ambiente. • Promover la inclusión a la formación de los grandes propietarios en materia de cambio climático, con el fin de brindar un aporte invaluable al momento de realizar decisiones económicas (por ejemplo, a través de ONGs o entidades intersectoriales).

- Rescatar la literatura sobre el uso del suelo bajo ganadería tradicional y buenas prácticas.
- Explorar alternativas económicas para las zonas, rescatando el rol y el bajo impacto ambiental de la ganadería y la pesca tradicional en particular.
- Crear alianzas políticas y corporativas a nivel nacional e internacional para visibilizar los conflictos y las denuncias.
- Plantear alternativas de diversificación económica para las comunidades (por ejemplo, el valor agregado de la artesanía indígena, de la pesca o la apicultura).
- Promover la formación de las comunidades en materia de cambio climático para espacios de diálogo intersectoriales.

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El enfoque social

Valorar el conocimiento y la cultura local e indígena, con enfoque específico en mujeres y juventud.
Pasos a seguir para los actores de la comunidad: • Constituir espacios de trabajo organizativo que permitan vivenciar a sus participantes prácticas sistemáticas que expongan el valor de los humanos con sus diferentes saberes, trabajos y perspectivas.
• Generar capacidades de cabildeo comunitario para mujeres y juventud. • Promover procesos de investigación, análisis y formación para incidir en las políticas de los gobiernos locales. • Desarrollar talleres intergeneracionales sobre la diversidad y su valor dentro del tejido social y comunitario (estado social, género, etnia, educación, etc.)

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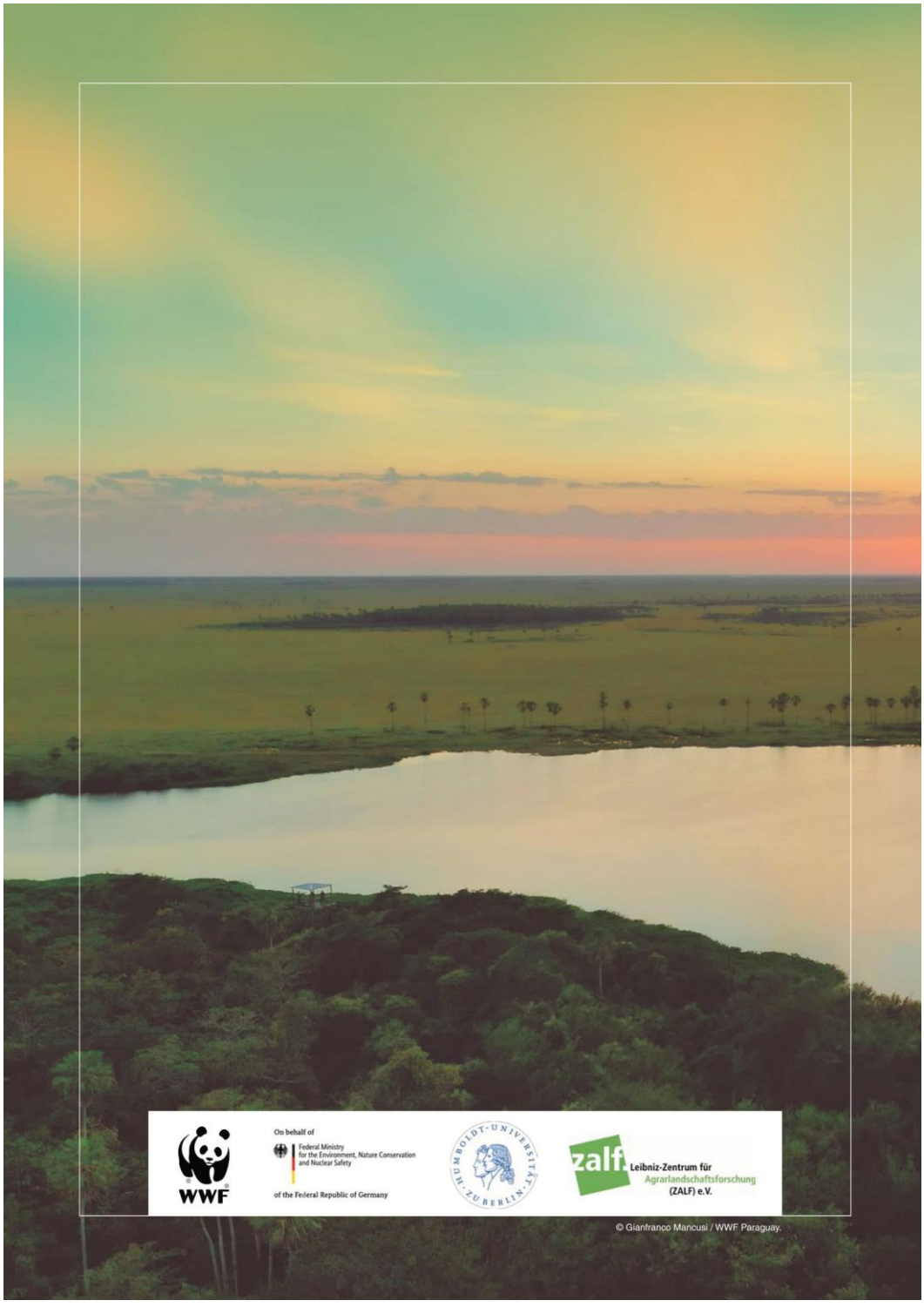
Índice de infografías

ANEXO 1

Roles	Temas claves	Comentarios
GRUPO 1 – Escenario Actual		
LOS GOBIERNOS CENTRALES Y LOCALES	- Gobierno centralizado - Gobierno departamental (gobernación) no invierte en infraestructuras (ruta y aeropuerto) - Gobierno local débil - Falta de asistencia en medios de identificación dentro del territorio (cédulas de identidad) - Falta de inversiones en educación superior (universidades) - Falta de inversión en planeación turismo local (ausencia de la Secretaría de Turismo – SENATUR)	- La centralización del gobierno y del poder es en áreas urbanas (también, el manejo del presupuesto es a nivel central). Falta de participación de la sociedad civil local en toma de decisiones - Corrupción a nivel central y local - Falta de autonomía a nivel local para toma de decisiones - Falta de conocimiento de la realidad local
EL MODELO ECONÓMICO Y SU IMPACTO	- Falta de bancos y financieras en el territorio - Incremento de gastos superfluos que triplican el costo original de los productos locales (no existe un valor agregado a nivel local) - Falta de empresas turísticas	
EXCLUSIÓN SOCIAL	- Falta de interés de los pobladores en participar en los cursos, talleres y capacitaciones del estado central/departamental/municipales, y de las ONGs	- Existe participación integral en discusiones locales entre grupos de la sociedad civil local, incluyendo los indígenas
GRUPO 2 – Escenario Actual		
LOS GOBIERNOS CENTRALES Y LOCALES	- No hay inversiones públicas en comunicación e infraestructura para todo el distrito (ruta, aeropuerto, salud, energía eléctrica)	
EL MODELO ECONÓMICO Y SU IMPACTO	- Modelo económico favorece a grandes terratenientes (ganadería) - Falta de alternativas económicas y viables basadas en apoyo a los ganaderos medianos y pequeños. Asimismo, falta de apoyo en la pesca para una comercialización que salga del territorio local - Falta de salida al mercado departamental o nacional de la artesanía indígena - Falta de economía del turismo (incluyendo lugares históricos y arqueológicos) y de la gastronomía local (no existen protocolos ni etiquetas)	- No existen muchas fuentes de trabajo y espacio de recreo para jóvenes del distrito (causa de vicios y delincuencia)
EXCLUSIÓN SOCIAL	- Intereses particulares dominan sobre los intereses generales	
GRUPO 3 – Escenario Actual		
LOS GOBIERNOS CENTRALES Y LOCALES	- Falta de planeación en turismo e infraestructura (caminos, salud y educación) - Falta inclusión y participación a nivel departamental; asimismo, influencia y representación para toma de decisiones	- No hay plan de capacitación para las generaciones futuras y posibilidades de empleos (por ejemplo en turismo etc.) - Falta de diálogo y representación a nivel departamental
EL MODELO ECONÓMICO Y SU IMPACTO	- Modelo económico (pesca, comercio y turismo) esta trancado por problema de accesibilidad al distrito - No existe un modelo sostenible y económico para áreas protegidas del distrito (son 6 en Bahía Negra)	- Falta de conocimiento acerca de la Reserva de la Biosfera del Chaco que puede ayudar la economía local.
EXCLUSIÓN SOCIAL	- La exclusión social se manifiesta por conflictos políticos	- Hay mucho respeto entre todos los grupos de la comunidad

ANEXO 2

Roles	Temas claves	Comentarios
GRUPO 1 – Escenario Esperado		
LOS GOBIERNOS CENTRALES Y LOCALES	- Descentralización para una democracia local, participativa y directa - Creación de inversiones en lo positivo, que ya existe (clínica municipal, servicios escolares, mantenimiento y reparación de caminos internos) y lo que se necesita a nivel departamental (ruta y aeropuerto) - Valorización del rol de la Secretaría Nacional de la Vivienda y el Hábitat (SENAVITAT) (viviendas sociales, programas de asistencias a familias vulnerables y personas en tercera edad) - Empoderar el Municipio a través del POUT	- Aprovechar las visitas institucionales (Presidente y Ministros) para solicitar las inversiones en infraestructuras (ruta y aeropuerto) - Se necesita una visión a largo plazo - El Municipio puede encargarse de crear oficinas en cooperación o a través de convenios con el Estado para coordinar: Registro del Estado Civil (REC), la Secretaría de Acción Social (SAS), el Servicio Nacional de Calidad y Salud Animal (Senacsa), Justicia Electoral, etc.
EL MODELO ECONÓMICO Y SU IMPACTO	- Más Estado con capacitación y, sobretodo, en la pesca con abertura de más mercado en tiempo de abundancia - Buscar medidas compartidas y de capacitaciones para que la expansión ganadera respete los ecosistemas naturales (¡la vocación de una ganadería y una pesquería sostenibles de la región respetan los recursos naturales!)	- Fomentar el apoyo del Estado en capacitación técnica, especializaciones y buenas prácticas en la ganadería y la pesca
EXCLUSIÓN SOCIAL	- Valoración del conocimiento tradicional para la toma de decisión (inclusión de indígenas, militares, policías, etc.) y fortalecimiento de diálogo interno y de capacitación en asociacionismo	- Insistir con la importancia de las charlas locales para una mejor unidad entre los grupos (mejor invitación, etc.)
GRUPO 2 – Escenario Esperado		
LOS GOBIERNOS CENTRALES Y LOCALES	- Trabajo de lobby para facilitar proyectos e inversiones departamentales (mesa del POUT)	- Articulación, gestión y monitoreo municipal para la mejora de infraestructuras y salud pública (por ejemplo, la gobernación y el municipio pueden solicitar médicos especializados). Es importante cambiar el enfoque para uno multisectorial (uniendo organismos locales municipales y departamentales).
EL MODELO ECONÓMICO Y SU IMPACTO	- Mejorar el diálogo entre ganaderos de todos los niveles (grandes, medianos y pequeños) - Promover la educación tributaria para la comunidad y los enfoques corporativistas (por ejemplo, fortalecer la participación en la mesa del POUT, invertir en la piscicultura, en propuestas para la cría y la venta de ganado investigando el modelo brasilero, la apicultura que necesita de asistencia técnica y capacitación)	- Asistencia técnica y crediticia a ganaderos pequeños y medianos - Favorecer la educación financiaria y el intercambio de experiencias para negocios y con el fin de regular tanto la ganadería local como la pesca y la artesanía indígena (darle valores agregados y una marca local)
EXCLUSIÓN SOCIAL	- Generar liderazgos comunitarios: educación y bienestar	- Mejorar la comunicación entre todos los actores de la comunidad y crear o, mejor, fortalecer comités sociales
GRUPO 3 – Escenario Esperado		
LOS GOBIERNOS CENTRALES Y LOCALES	- Promover mayor participación y apertura para apoyar la funcionalidad de los comités y comisiones de trabajo para incidir en la toma de decisiones	
EL MODELO ECONÓMICO Y SU IMPACTO	- Crear un ambiente más propicio y atrayente a inversionistas (por ej. en turismo) - Promover asistencia técnica y económica para el sector productivo, incluyendo las actividades económicas indígenas	- Exigir la seguridad de los pobladores y productores, y sus bienes e inversiones
EXCLUSIÓN SOCIAL	- Mayor inclusión de mujeres y jóvenes en políticas y en cargos para toma de decisiones	- Apoyar los jóvenes con actividades y espacios saludables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for the Environment, Nature Conservation
and Nuclear Safety
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ANNEX

1. PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC

Bonatti, M., Lana, M. A., D'Agostini, L. R., de Vasconcelos, A. C. F., Sieber, S., **Eufemia, L.**, da Silva-Rosa, T., Schlindwein, S. L. (2019) Social representations of climate change and climate adaptation plans in southern Brazil: challenges of genuine participation. Urban Climate 29, Article 100496.

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Social representations of climate change and climate adaptation plans in southern Brazil: Challenges of genuine participation

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ABSTRACT

Despite some honorable advances, a huge quantity of public, private, and civil climate adaptation initiatives have failed to work in the Santa Catarina State (SC), Southern Brazil. Consequently, the state continues to face climate impacts; sometimes resulting in human fatalities. The main objective of this paper is to present a case study (Tapera da Base) within the context of the project, "Climate Change and Vulnerable Populations in Brazil", which discusses the problems associated with climate adaptation and relates these to risk-reducing activities. The methodology adopted involved: identifying local development organizations, focus group, interviews, and survey among families in the most vulnerable areas. The main findings show that Tapera residents do not associate the possible increase in their vulnerability to climate dynamics. They point to areas such as education, sanitation, and social assistance, as their most important local problems; thus not including climate change. To generate genuine participation it is crucial to creating initiatives that promote a social learning space for residents to evaluate their self-state of vulnerability and possibilities of development. Therefore climate change can make sense and the responses at the community level will be created in the context that shape how climate risk is perceived, prioritized and managed.

1. Introduction

Officially recognized climatic disasters have killed and impacted millions of people around the world (Global Humanitarian Forum, 2009, Silva-Rosa et al., 2013, Blaikie et al., 2014, FAO, 2017). However, climate adversities do not homogeneously affect the human population, since social groups face varying levels of vulnerability. Typically, economically disadvantaged populations are more affected by climate adversity (FAO, 2017). For these populations in Brazil, climate adversities mean the further intensification of previously existing problems for survival instead of the creation of new ones (Silva-Rosa et al., 2013; D'Agostini et al., 2011).

Vulnerability, risk, and threat are closely related. According to Cardona (2003), the risk of disaster comprises two factors: threat

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and vulnerability. Cardona claims that a threat corresponds to a predictable external factor that is usually difficult to control, such as heavy rain, hurricanes, or earthquakes. The vulnerability is an internal factor that represents the degree of susceptibility of a system or subject to a threat. Thus, it constitutes the condition of a threatened subject within his or her social system and, for that reason vulnerability can be understood as a sociocultural and biophysical state (Birkmann et al., 2013). Cardona also suggests that a decrease in the levels of threat and vulnerability may lead to a decrease of overall risk. Nevertheless, as vulnerability is a socially constructed state, it is, therefore, susceptible to change by human agency (FüSsel and Klein, 2004; Braga et al., 2006).

Vulnerability, as highlighted by Braga et al. (2006), is a consequence of economic, social, environmental, and political processes merging, thus exemplifying the level of complexity that must be acknowledged when tackling such issues (Eakin and Luers, 2006). It corresponds to an internal condition of the system that is determined by social, physical, and ecological dimensions, all of which determine, in combination, the vulnerability level of a community (Chardon, 1999; Braga et al., 2006; Macchi et al., 2008; Bonatti et al., 2016). Human perceptions and social representations of climate events are examples of socio-cultural aspects related to vulnerability.

As Gifford (2011) points out, although most people think climate change and sustainability are important problems, few of the global citizens responsible for high-greenhouse-gas-emitting are engaged in mitigating behavior that stems the increasing flow of greenhouse gases and minimizes other environmental problems. Structural barriers, such as climate infrastructure, are part of the answer, but psychological barriers also obstruct the behavioral choices that facilitate mitigation, adaptation, and environmental sustainability.

In the context of climate change, there is relatively little emphasis on acknowledging and exploring cognitive barriers to adaptation (O'Brien, 2009; Gifford, 2011; Grothmann and Patt, 2005). Furthermore, sociocultural factors are critical in understanding why communities perceive and respond to climate change risks in specific ways but remain relatively unexamined (Granderson, 2014, Adger, 2010).

The way humans represent and determine the significance of certain climate threats prompts them to take actions regarding the prevention and reaction to disasters in their everyday life. The study of how humans perceive and socially represent climate change can help to build development projects that integrate different perspectives of reality and, simultaneously, prepare the community for expected future climate change impacts s that they might experience (Bonatti et al., 2016).

Climate adaptation projects that need community engagement are unlikely to succeed when they adopt only one view of reality and the top-down approaches because climate is locally experienced and managed (Freire, 1993; Dodman and Mitlin, 2011; Granderson, 2014). Freire claims that development projects should include an educational process, cultural understanding and, "lead with the significant dimensions of reality of all those people involved" (p.113). The author proposes the praxis of dialogical communication or intersubjective communication as crucial for development, collective strategies and transformative action (Otto and Fourie, 2009, Freire, 1993). For him, communitarian transformative actions can only occur if reflective and collective learning occurs in linguistically constructed settings where local perception are identified and understood.

Therefore, the study of how different communities and social actors perceive climate change can decisively determine how science contributes to policy making that seeks to transform the state of socio-cultural vulnerability and to develop climate adaptation strategies. Gottschick (2008) asserts that there is a science–policy system that can be drawn up as a forum where actors interact to exchange information, knowledge, and perspectives, as well as an arena where actors interact in order to pursue their interests and to wield power.

In this context, this work presents constructs from the research project "Climate Change, Social Inequalities and Vulnerable Populations in Brazil: Building on Skills," coordinated by the Reference Centre for Food and Nutrition Security at the Federal Rural University of Rio de Janeiro and the Centre for Urban and Socio-environmental Studies at the University of Vila Velha (2010 − 2012). The research results from activities performed by the National Mobilization Network/National (COEP) that was undertaken among economically disadvantaged communities throughout Brazil with the common purpose of developing actions to reduce the level of poverty. The research focus on the local level is required in order to determine the adaptive capacity of one community regarding how well it can shape its own social mechanisms.

This paper focuses on understanding the state of vulnerability, examining the capacity and need to promote climate adaptation among two selected populations from the urban poor periphery of Florianópolis, Southern Brazil. According to meteorological records, average air temperatures and rainfall levels have increased over the last century in Southern Brazil (Campos et al., 2006). In particular, since 1980, Southern Brazil has experienced extreme climatic events, including intense rainfall, prolonged droughts, and windstorms (Herrmann, 2001). Apart from impacting agricultural production and damaging the infrastructure (water and electricity supply) of several cities, these events have also resulted in human fatalities (Marcelino et al., 2006; Bonatti et al., 2016). The challenges are only increasing: it is expected that by 2100 the state of Santa Catarina landslides will severally increased, encompassing much of the land area (Debortoli et al., 2017).

2. Methodology

The research was carried out in Tapera da Base Community, located in Florianópolis (island), Southern Brazil (Fig. 2). The community is situated between an ocean bay and a mangrove, with an Air Force Base situated between the community and the city center. Located 27 km south of the center of Florianópolis, Tapera da Base has a population of about 9000, of which 5000 live in precarious housing (IBGE, 2012) (Cesa and Duarte, 2010). Ecologically, this region is part of the Atlantic Rainforest biome, containing dense mangrove formations (Fig. 1, south and southwest). The community is situated between the edge of the sea and the mangrove.

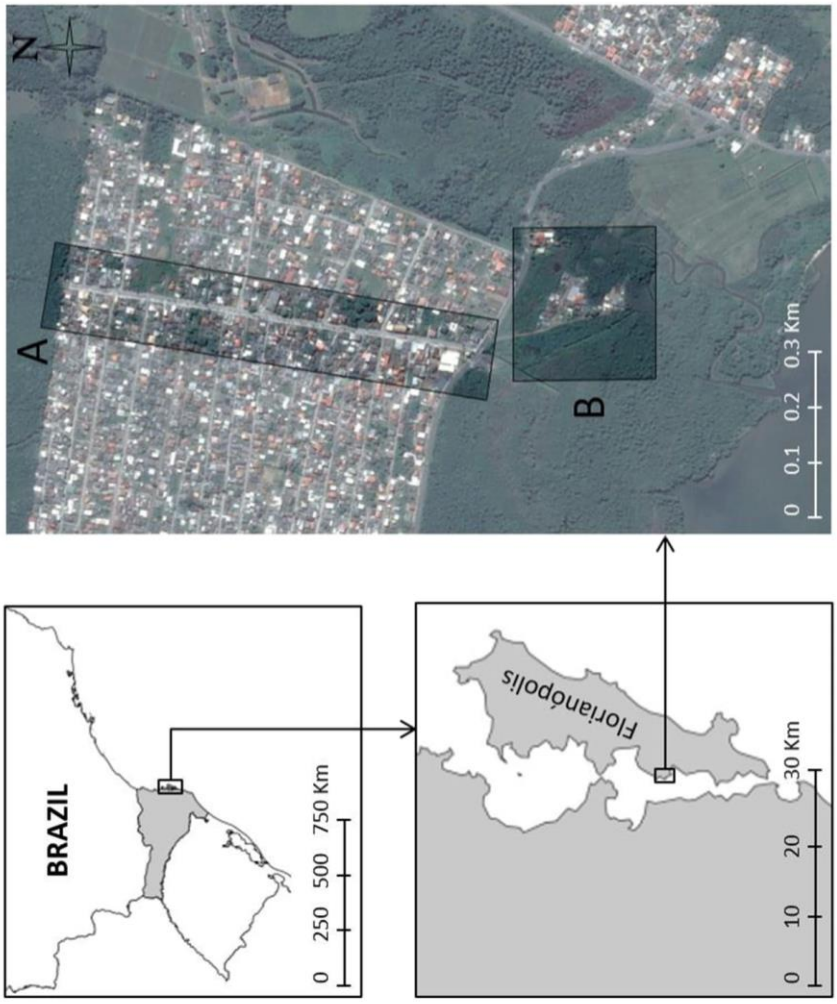

Fig. 1. Location of Tapera da Base Community and its borders with mangrove areas. On the right picture, (A = the residences in the flood-prone areas of the Rua do Juca and B = the cockle pickers' area). Source: Adapted from GoogleEarth (2014).

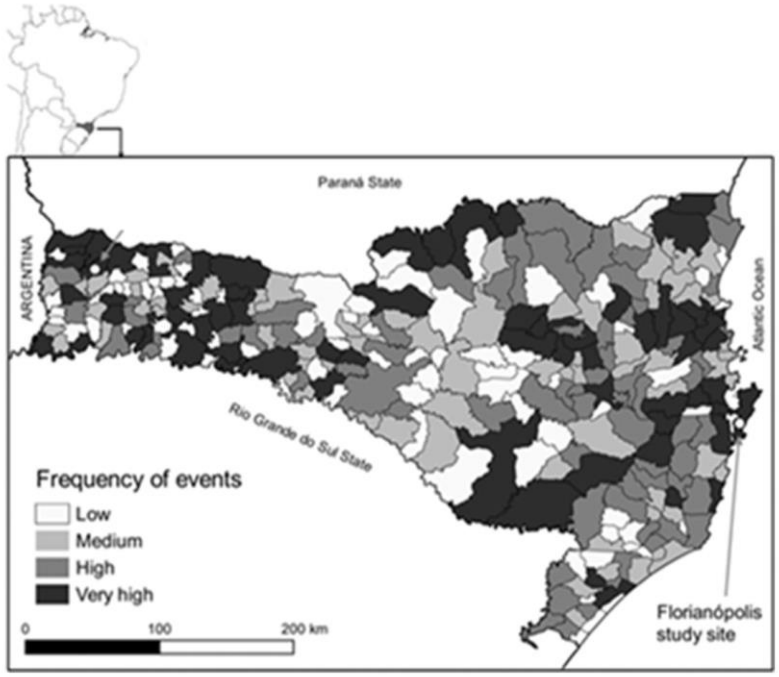

Fig. 2. Spatial and frequency distribution of climate events in Santa Catarina State, Brazil. Source: (Marcelino et al., 2006).

2.1. Study site

According to Marcelino et al. (2006) Florianopolis city, where Tapera da Base Community is located, has a higher frequency of climate events than other State regions (Fig. 2). Florianopolis presents an unequal process of development and the vulnerability conditions can accordingly differ among its distinct regions. Although the Brazilian Institute of Geography and Statistics (IBGE, 2012) has pointed out that Florianopolis has presented an increase of Gross Domestic Product (GDP) and Human Development Index (HDI) in the last decade, this socioeconomic growth is highly unequal.

Tapera da Base Community has a high degree of vulnerability to climate dynamics, mainly due to its social and environmental conditions. This community is a low-income settlement that differs from most of the other low-income settlements in the region because its buildings are situated on a floodplain. The community has had an ongoing process of occupation, majority informal owners (*terrenos de posse*[1]), encompassing modest to very precarious housing (self-made constructions) (D'Agostini et al., 2011). Therefore, the area is characterized as a socioeconomic mosaic (diverse geodemographic conditions).

Whereas some areas have better conditions others are extremely precarious. In a study carried out in 2005, the Community Council raised the main needs of residents of the Base Tapera Community (Cesa, 2008) from information gathered with 217 families living in the neediest areas. In this study several problems were and the results pointed to demands ranging from health to the regulation of land tenure. About 70% of respondents have only possession documents (informal owners), of which 21% have been resident there for more than 15 years. The population number keeps stable during the Florianopolis tourism sessions due this area is not considered one of the main touristic regions and the access to the Tapera small beaches is restrict.

[1] Tapera da Base has a special land legislation condition in terms of ownership. Part of the urban occupation (starting in the 1960s) characterizes the land plots as "Terrenos de Posse". This is a singular legal condition for the people who occupied a piece of land for more the ten years. A definitive ownership is the result of a legal process incorporating an analysis of how the process of occupation was done and is based on Brazilian Civil code rules. Further, the part of Tapera da Base where the settlement is located is considered marine land and is under other specific legislation according Brazilian Civil code.

Regarding family income, 48% have income between one and two minimum wages and 46% said they had one or more unemployed persons in the household. When asked about the main environmental problems of the community, 67% responded to the lack of sewage collection and treatment system, as well as its implications on human health. Regarding the type of treatment given to residential sewage, 61% used septic tank systems, 24% threw in ditches, 9% threw directly into the the rainwater drainage system, and the rest waste in the streams and in the sea (Cesa, 2008). In sum, 39% of the population disposes of waste directly in waterways and at sea, while 61% do so indirectly.

The combination of high tides, poor drainage, and the growing number of buildings have contributed to the occurrence of floods in different parts of the community (D'Agostini et al., 2011). These floods have led to provisional solutions frequently proposed and implemented by local residents, resulting in a lack of long-term planning, despite the community's rapid growth. The population of Tapera da Base increased by nearly 250% between 1990 and 2000 (IBGE, 2012).

In order to assess the living conditions of the local populations, the Department of Urban Development and Environment of the State of Santa Catarina (SDM/SC) applied the Localized Human Development Index in 88 Florianópolis neighborhoods (Logullo, 2005). According to Cesa (2008), although the assessment indicated that the living conditions had improved between 1991 and 2000, this improvement was not uniform across the city. Among the assessed districts, Tapera da Base placed 84th.

The mangroves attached to the community spread over approximately 54 ha (Fig. 1, bottom). Despite being fundamental to the maintenance and reproduction of various marine species of ecological and economic interest, this ecosystem is being seriously impacted by disorderly urban growth. The pollution and environmental changes are the probable causes of the reduced availability of the clam cockle (*Anomalocardia brasiliana*), a significant product for the local fishing industry and source of income to the local population.

The houses in Tapera da Base are mostly built on land with a high groundwater table that is strongly influenced by tides. Further, constant flooding in the mangrove region affects almost half of the inhabitants in the Tapera da Base community. About half of the houses are on plots less than two meters above sea level, which makes them vulnerable to flooding. Near the mangrove, clandestine subdivisions and other plots are located on landfills that are composed of a wide range of materials that are usually inadequate to sustain tidal dynamics, resulting in conditions that are dangerous for human health (D'Agostini et al., 2011; Silva-Rosa et al., 2013). Thus, by hindering the drainage of water from the intense rainfalls, a combination of factors, such as high tides, the lack of sewerage adequate to drain high volumes of water, the soil topography, and sealing of soil contribute to the occurrence of high impact floods.

Two groups of residents within Tapera da Base, namely the a) residents in the flood-prone areas of Rua do Juca and the b) cockle pickers (identified in Fig. 1), are especially vulnerable to climate events. Their vulnerable condition is the result of unfavorable location, failure of public policies, and socioeconomic aspects. They are separated by about two kilometers. They are relatively small areas most affected by weather events. A Civil Defense consultation determined that these two groups are the most vulnerable to climate change in Tapera da Base (D'Agostini et al., 2011).

Therefore, the first group comprises the residents of Rua do Juca, an area affected by rising tides and a high incidence of floods during heavy rains. The second group, called the cockle pickers, is the community living directly in the mangrove area. In this case, their vulnerability is derived not just by the same aspects of the first group but by the unsanitary conditions in which they perform their working activities, plus the difficulties of continuing cockle picking activities in the face of heavy rain events and pollution. Such conditions also affect local biodiversity and impact the population's food security.

2.2. Research design

The general approach is qualitative (Maxwell, 2012; Sautu et al., 2014; Smith, 2015). This equates to a “moving structure” (Mendizábal, 2006) that places the various research components in a dialectical and interactive relationship among research phases (Fig. 3). As Tapera da Base is a vulnerable area where few studies have been undertaken, a research scheme was designed.

The research entailed four interconnected phases (Fig. 3), whose main features are summarized in Table 1.

The first phase (identifying actors and programs) was taken to systematize public programs, as well as the institutional and non-institutional measures in progress while identifying those social actors more heavily involved with the issues raised in the

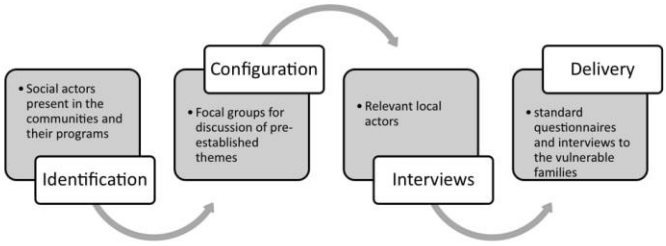

Fig. 3. The four interconnected methodological research phases utilized at Tapera da Barra.

Table 1
The four interconnected methodological research phases and methods utilized.

Phase 1: Cartography of local institutions involved in the characterization of the problem	Phase 2: Focus group with local leaders and representatives of education, health, and security sectors	Phase 3: Interviewing representatives of education, health, and security sectors	Phase 4: Surveys of families living with extreme climate vulnerability
Methods: Archive and public documents review. Public institutions and social actors in Florianópolis were also contacted and informally interviewed (municipality, secretary of education, secretary of health, secretary of public security).	**Methods: Meeting with the participants of the Tapera da Base community council (n = 14)**	**Methods:** Interview with **Public agents (question), using eight semi-structured guiding questions with the nursery coordinator, community medical doctor, the police station agents, the coordinator of the health center, and the director of Tapera da Base community theater group (n = 6).**	**Methods: Questionnaire-based surveys (structured interviews with closed answers) of 16 householders (n = 16) Sample characterization: -Gender distribution: 25% women, 75% men. -Age: 100% living more than 20 years in Tapera da Base)** -Family Income **Range: 100% less than US$ 691.56 monthly**

characterization of the problem. A particular emphasis on previously defined impact factors (house-urbanization, availability of water, health, food, and biodiversity) was assigned. For such identification, various public institutions and social actors in Florianópolis were contacted and interviewed.

The second phase, the focus group consultation, aimed at assessing the participants' perception of climate phenomena and its impact on the perceived degree of community vulnerability. This activity was carried out during a meeting with the participants of the Tapera da Base community council (14 participants). In parallel, it helped to determine the social actors who could be interviewed in greater depth.

The third phase, the interview with social actors (n = 6), aimed to study the treatment of guiding research questions and preparation of questionnaires to be applied in the next phase, clarifying any issues raised in the discussion with the focus group and adding aspects to the investigation. Semi-structured interviews had eight guiding questions[2] about community problems, climate and weather events, as well as institutional actions regarding climate adaptation. At this stage, public agents were interviewed, including the nursery coordinator, two police station agents, the coordinator of the health center, and the director of Tapera da Base community theater group. The interviews lasted about 45 min.

The fourth phase, the surveys of families, sought to assess the degree of vulnerability as perceived by the community. For this purpose a questionnaire with 28 closed questions was developed, tested, and refined by addressing the following issues:

a) the respondent's identification,
b) families' socioeconomic profile,
c) community risks and problems in general,
d) problems regarding food security, water availability, biodiversity, health conditions,
e) community vulnerability factors and changes in the community in the last years,
f) changes in the community regarding weather conditions, changes in climate in the last years, knowledge about climate change, and, finally,
g) adaptation issues or ideas for an action agenda (and other open issues, if required to better understand previous issues).

Interviews were conducted by pairs of interviewers, comprising one psychologist and one agronomist.

In Tapera da Base, questionnaires were applied to 16 households across the two community segments selected. “Family” was defined as a group of at least two or more individuals in the studied nuclear family, with one of the individuals representing the head of the household. Even though the questionnaire had closed questions, the time to conduct the questionnaire varied because, in some cases, the household wanted to explain details about the community vulnerability. The average interview time was 75 min.

Two criteria, respectively quantitative and qualitative, were used to define the number of people interviewed within the most vulnerable regions: 1) each community sample should include at least 50% of vulnerable households in the area, and 2) the collected material should present collective representations (symbolic systems, codes, values, attitudes, and ideas) in relation to the central research issues. The number of respondents was considered sufficient when it was possible to identify a pattern from the material obtained and allowing setting conditions for generalization.

[2] Guiding questions for interview: (i) What are the most important problems and threats to your community? Some do they relate to climate or weather events? (ii) Are you or your organization aware of the phenomenon of change climate? What is your opinion on this phenomenon in global and national terms? Is it integrated in the institutional activities or projects? (iii) In your opinion, what would be the likely threats and impacts on your community? (iv) What is (are) your involvement(s) or organization(s) with the issues raised in the two previous answers? (v) Characterize the interaction and debates between the entities present in your community, highlighting the interests and possible conflicts related to the issues previously addressed, (vi) What elements would you suggest for the construction of a local action agenda and which institutions should be involved?

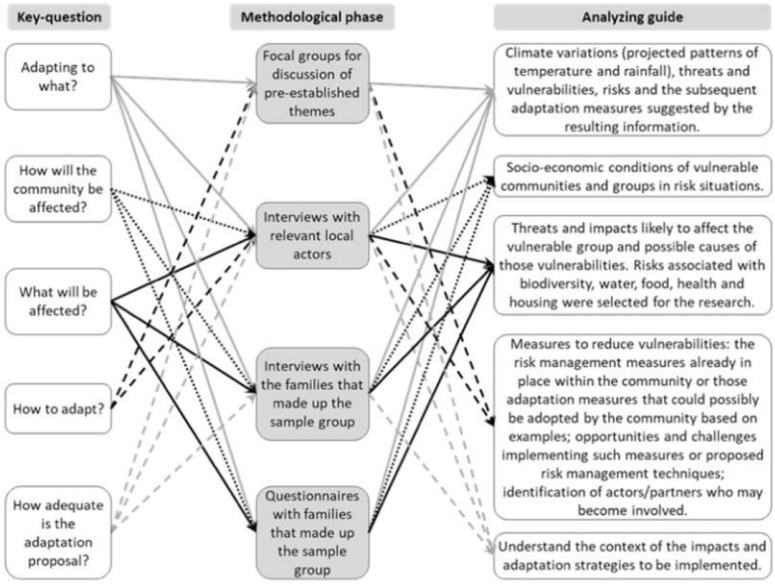

Fig. 4. Framework containing the five key research questions that guided the axes of investigation (on the left), the different methods applied (center), and the respective guide to support the interpretation and analysis of answers (on the right). The lines connect the respective key questions to specific methods used to gather the information, as well as to the specific analyzing guide.

2.3. Key-questions of investigation

In this study, five key-questions of investigation, based on UNDP/GEF (2003), shaped the four methodological phases. They worked as conceptual key research questions using different methods (Fig. 4).

3. Results

The results are presented based on the corresponding methodological phases. The first, second, and third phases are grouped together because they involve representatives of local institutions and community experts. Phase 4, representing the speech of the most climate vulnerable population, is presented separately.

3.1. Results from cartography of local institutions, focus group, and interviews

The cartography reveals that six local organizations and four external organizations are working in development projects in Tapera da Base. Only one of them operates in the occurrence of extremes weather events (Table 2). Regarding how civil society organize themselves to cope with problems as extreme weather episodes, four programs were identified and only one was targeting problems related to climate change and sustainability issues.

Regarding the specific key questions, “Adapting to what?” and “What will be affected?”, the responses point to several aspects, including the lack of public infrastructure (sanitation, street paving, places of leisure, access to education, transport, and health), invasion of mangrove areas by the residents, the large number of abandoned animals, and high criminality mainly as a result of drug trafficking (Table 2). About the consequences arising from changes in the environment, but not necessarily linked to climate change, the most common perception was the decrease in the number of clam cockles. To cockle collectors, the falling clam population is commonly attributed to the effects of the mangrove areas being invaded and to the noncompliance of pickers during biological rest or technical closure periods.

Social actors interviewed in the second and third phases addressed the key research questions “How to adapt?” by suggesting that programs with marginalized recyclers could be developed in association with infrastructure renewal programs and correct trash disposal. Respondents highlighted the need to improve community infrastructure, including the conditions that influence flooding

Table 2
Local and external organizations working in development projects in Tapera community.

Institution or organization (local or external)	Assignments	General work, actions that focus on the factors of vulnerability and/or increase community development.
Tapera Communitarian council (local)	Represent community interests and social services.	Acting on the social fabric, helping cohesion and social organization of the community. Discussion of topics considered relevant to the community. With regard to climate, they work to help families affected by floods.
Rua do Juca friends (*Amigos da Rua do Juca*) (local)	Community activities	It acts on the social fabric, helping the social organization of the residents. Holds social events, sporadic sports activities
Pedregal habitants (*Moradores do Pedregal*) (local)	Community activities	It acts by helping the social organization, especially in the region of the community called Pedregal. Currently not very active.
Association of Florianopolis Volunteer (local)	Social actions in partnership with the City Hall and companies	Actions aimed at minimizing social deprivation. Donations on specific dates and events. Women's self-esteem programs.
Pastoral da Criança (local)	Actions of health, nutrition, education, citizenship, and spirituality.	Food donation for children and educational activities. Weekly activities
Theater Group	Meeting for the development of artistic activities, focusing on the performing arts.	Actions aimed at discussing the problems of the community in an artistic way. It focuses on social cohesion, dealing with problems such as bullying and prejudice.
State Secretariat of education (External)	Center for Complementary Education	Development of training and educational actions. Indirectly it can help to strengthen the community capacity of climate adaptation strategies development.
Municipality Secretariat of health (External)	Family Health Program	Actions aimed at improving the health status of the community. Discussion of community health conditions.
SESC - Trade Social Service (External)	*Mesa Brasil* Program	Food distribution. Development of food security programs.
COEP - National Mobilization Network (External)	*Escola em ação* Project	Training of agents to promote sustainability. Discussion of topics considered relevant to the community

risk. The following suggestions were made regarding questions “How adequate is the adaptation proposal?” and “What would be an appropriate agenda for local action?”: planting of trees, recycling of waste, improvement of public spaces, as well as adopting maritime transport to better link the community with the rest of the city. Community responsibilities and actions included correctly disposing of sewage and the consequent effect of this for drinking water availability and subsequent implications for human health. The interviewed families frequently spoke about the absence of social and environmental initiatives in the community (D'Agostini et al., 2011).

3.2. Surveys of households

The responses of members from both of the two groups of residents within the Tapera da Base community showed high levels of similarity. In this regard, the responses are jointly analyzed, with particularities approached in the subsequent text. Table 3 provides an overview of the main responses to the key questions of investigation.

Regarding the “How will the community be affected? What will be affected?” households living in the vulnerable areas of Tapera da Base do not relate their community problems to climate (Table 3). All respondents express that climate events affect neither their

Table 3
Main responses to the axels of investigation regarding surveys of households.

Key questions	Summary of key results regarding two groups of residents within the Tapera da Base community
Adapting to what?	-Several changes in the environment, but these are not necessarily linked to climate change. -For 100% of the respondents, even in the case of floods, climate change does not affect their lives. -The decrease in the quantity of clam cockle.
How will the community be affected?	-Regarding community conditions: lack of infrastructure (sanitation, street paving, places of leisure, access to education, transport, and health); invasion of mangrove area by the residents; large number of abandoned pets; high marginality mainly as a result of drug trafficking.
What will be affected by increasing weather and climate extreme events?	-For 100% of the respondents, even in case of floods, climate change does not affect their lives. They will not be affected. -The perception of the state of vulnerability is especially linked to the lack of local infrastructure.
How to adapt?	-Developing programs with marginalized recyclers, including measures (infrastructure and activities) for correct trash disposal. Incorrect trash disposal blocks rainwater flow, thus increasing both flood and disease risk. -Improving community infrastructure.
How adequate is the adaptation proposal?	-The planting of trees; recycling of waste; development of public spaces; adoption of maritime transport to link the community to downtown. -Activities mentioned were not related to climate adaptation.

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lives nor their state of vulnerability, even in the case of flooding. Instead, they find that the lack of local infrastructure is what affects their level of vulnerability most. Floods influence the incidence of disease and other health complications, like flu, asthma, allergies, migraine, skin infections, worms, diarrhea, and other ailments resulting from a lack of treated water. According to the cockles-pickers, the increasing difficulty in maintaining their livelihood is because the cockles are found dead before being collected.

Although 81% of household respondents noted the risk of flooding, it was thought to be a community level issue, not one related to climate change. This is reflected by the 88% of respondents either choosing "do not know" or not responding to questions regarding the worsening of the climate or how climate change may affect the community or families. They do not associate the intensification of extreme weather events with climate change.

Regarding the possible risks from extreme climate events, as in the research axel, "How to adapt?," 69% of the respondents reported that they do not know how to prepare or react to the consequences of climate change. Finally, the term climate change and other related terms are not part of the meaningful vocabulary of respondents in the Tapera da Base community. Even if they had heard or seen references to the subject, residents showed no interest in discussing or considering climate dynamics. Respondents instead focused on developing structures to improve hydrological dynamics that would reduce the effects of flooding when it occurs.

Ultimately, the level of vulnerability in the Tapera da Base community is not merely brought about by climate threat, as other factors associated with infrastructure and logistical management also play a role. For this community, daily social and economic difficulties still outweigh the growing risks associated with climate threats, about which residents have little, if any, information to make plans for the future.

Basically, Tapera da Base dwellers must cope with the precarious everyday life conditions. The process of climate adaptation is not a meaningful action. There is, in general, a behavior of conformity if not discouragement, which contrasts with some manifestations about the need to react. Regarding coping or the response capacity of the community to the possible risks arising from extreme weather events, 69% of respondents do not know whether to prepare or react to the consequences of changes. Still, 19% did not answer this question. Thus, taken as a whole, it appears that the Tapera da Base community coping capacity is (very) limited. It is worth noting that more than 80% of those interviewed had no knowledge of any significant climate change taking place. Even when they were prompted, the residents of the Tapera da Base community did not reflect upon the possible need to adapt to severe implications of global climate change that could impact them locally, such as the rise of sea level.

4. Discussion

The social actors in the Base da Tapera community do not link a possible increase in their community's vulnerability to climate dynamics. Experimental research on resource dilemmas demonstrates that perceived or real uncertainty about climate hazards reduces the frequency of pro-environmental behavior (Hine and Gifford, 1996). Individuals tend to interpret any sign of uncertainty, for example, in the size of a resource pool or the rate at which the resource regenerates, as sufficient reason to harvest at a rate that favors self-interest rather than that of the environment. Uncertainty about climate change quite likely also functions as a justification for not participating in climate change adaptation (Silva-Rosa et al., 2013).

As previously stated, the term climate change is not part of the discussions of Tapera da Base residents. In this sense, stimulation for changing the community's vulnerability will require pointing out the need to adopt measures in the face of future emergencies. The inhabitants need both the social space and the conditions to learn and reflect on the phenomenon of climate change and its implications. This requires understanding and discussing the issues that characterize climate dynamics at the local level. Only by understanding the meaning of its possible consequences can the residents consciously prepare for climate change. Previous studies of vulnerable communities on the perception of climate change and human health risks suggest that more integrated and systematic collection of data on local climate variability is needed; for example investigating the increase of heat, the perceived level of rainfall, and seasonal floods (Haque et al., 2012).

Although different groups within a society may share a similar exposure to climatic events, the consequences differ since these groups have different structures, abilities, and perceptions regarding how to handle the impact of a threat (Novelo-Casanova et al., 2012). According to Adger (2010), decisions concerning adaptation are made by different agents, including individuals, groups, organizations, and governments on behalf of the whole society. However, very often these decisions privilege some sets of interests over others, creating winners and losers. Thus, the effectiveness of any adaptation strategy with regard to climate change will depend on its social acceptability, on the existing political institutions, as well as on the economic and social-cultural development of the society in question. In this sense, the social organization and psychological barriers of a community and its modus operandi are inseparable aspects of the human agency.

In this sense, there are several obstacles to make climate adaptation effective. As Gifford (2011) pointed out social organization and psychological barriers impede behavioral choices that would facilitate climate change mitigation, adaptation (Swim et al., 2011) and environmental sustainability. Although many individuals are engaged in some ameliorative actions, most could do more, but they are hindered by seven categories of psychological barriers, or "dragons of inaction": *limited cognition about the problem, ideological worldviews that tend to preclude pro-environmental attitudes and behavior, comparisons with key other people, sunk costs and behavioral momentum, distrust of experts and authorities, perceived risks of change, and positive but inadequate behavior change* (Gifford, 2011). In the Tapera da Base case, *limited cognition of the problem* and *perceived risks of change* in combination with low income and poor education might be one of the main reasons that behaviors are not adapted. Structural barriers must be removed wherever possible, but this is unlikely to be sufficient if climate awareness and education are not improved.

Another issue is that the vulnerability of the community members studied is related to a historical context that facilitates naturalization the climate risks and impacts (de Sousa Camurça et al., 2016, Granderson, 2014). Climate risks naturalization is a concept

based on the idea that frequent events tend to be seen as natural, normal and common because they occur for several years (de Sousa Camurça et al., 2016). Besides that, the reasons why climate disasters occur are unclear to the vulnerable population as well as the mechanism to participate in the process of decision making in order to avoid them. This situation is sustained by historic social exclusion, disempowerment, especially in terms of access to education, resources, basic care and the processes of participation in the decision making.

Since 2011, following large natural disasters, Brazil's national government has systematically established legal instruments that could facilitate the process of adaptation and the participation of the communities. These legal instruments should be operationalized with the city's Urban Plan (*Plano diretor*[3]). However, several problems arose in Florianopolis during the design and implementation of this plan. Although the discussion around the design of the plan could have been an important opportunity to facilitate climate adaptation awareness and planning, what has been seen instead was a dispute among conflicting interests that, in some cases, resulted in a lack of transparency and compliance benefiting some specific social groups.

In January 2011, the Ministry of National Integration, through the National Secretariat of Civil Defense, created the "Building Resilient Cities: My City Is Getting Ready" program as part of the Nations Disaster Reduction Strategy (UNISDR, 2011). The following year, Federal Law 12,608 created both PNPDEC, "National Policy on Civil Protection and Defense," and SINPDEC "Protection and Civil Defense System". Siebert (2017) indicates that over time disaster management was gaining in importance in the state. First regulated by resolution in 1994, it was subject to a 2005 decree and then in 2012 by federal law (CEPED/UFSC, 2014). Law 12,608/2012 amended the texts of Law 6766/Land) and Law 10.257/2001 (City Statute) by inserting restrictions on the occupation of risk areas (Siebert, 2017).

Projected investments for the whole country of R$ 18.8 million for risks prevention, mapping, and monitoring as well as alert, were authorized by the 2012 National Risk Management and Response Natural Disasters, program, effective for 2012–2014 (BRASIL, 2008, Siebert, 2017). However, prevention actions are rarely implemented in vulnerable small areas like Tapera da Base. Thus, processes of structural changes to community adaptation are inhibited.

The adaptation process of a system of interest, like a community, is related to the dynamics of its structural changes. According to Maturana and Varela (1987), systems are determined by their structure, what means that all that takes place in them, or happens to them at any instant, is determined by their structure at that instant. The structure of a system, according to this understanding, refers to its components and the relations between them that realize this system. Structural changes, in turn, are the result both of the system's internal structural dynamics and of the interactions of the system with its environment. However, the environment can only trigger changes that might be admitted by the structure of the system. If they are not, the system disintegrates. Therefore, an adapted system is a system whose structural changes are congruent with the structural changes of its environment. This understanding has far-reaching practical consequences for the adaptation process of a community. If we accept that a community is a determined structure system, it is the community, and only it, that determines the path of the adaptation process (its direction and its features). Therefore, successful community adaptation to climate dynamics requires that the actions taken – for example those regarding dissemination of information, education, policy making, etc. – be congruent with the structure of the community and the way it operates. This process where the community system evolves and adapt itself can be considered a social learning based on genuine participation (McKenzie, 2007).

The Tapera da Base community case study illustrates how different perceptions and the recognition of climate change can influence the capacity to develop a climate adaption plan. To generate genuine community participation climate risks have to make sense to community members. Actions and responses at the community level demand attention to the cultural and political processes that shape how risk is conceived, prioritized and managed (Granderson, 2014). To this end, the following recommendations can be made:

- To commence proper dialogue with the community about the significance and possible implications of climate change and variation (in this case, extreme events). This first phase requires organized information (with different levels of complexity), as well as the appropriate use of this information to develop local adaptation knowledge; and
- Enable the community to understand the phenomenon of climate change and variation. For this, it is necessary to develop collective knowledge so that residents can better link climate-created issues with the biophysical and sociocultural vulnerability aspects of their community, which firstly implies understanding climate change as a threat - as a process of praxis (Freire, 1993). The suggestion here is to create a social learning space for Tapera da Base residents to evaluate their current state of vulnerability, focusing on the promoting of autonomy and education of the community.

5. Conclusions

Future climate risks can be ignored by a local population when there are other socio-economic difficulties to be faced today. In parallel, a historical lack of infrastructure and care as in the Tapera da Base community results in a naturalization of the local problematics, with both public and private institutions being responsible. This phenomenon of "organized irresponsibility" (Beck, 2006) can be clearly identified in the problem situation addressed by this study. The vulnerability of Tapera da Base residents is, therefore, part of a historical context that naturalizes the risks faced by economically disadvantaged communities and isolates local

[3] In Brazil *the Plano Diretor* is the document of a municipal planning process underlying the implementation of urban development policy, thus guiding the action of public and private agents.

social actors from the political decision-making processes.

For those living in poverty, adapting to climate change involves overcoming a number of already existing daily threats. The main priority for the vulnerable residents of Tapera da Base is simply to adapt to precarious state they live in now. For the community, the causes of disasters are understood with respect to social processes and infrastructures, and therefore (extreme) climate events are not understood as a threat. In this sense, any adaptation strategy created must be multidimensional and able to address different community needs.

In fact, climate change is only one of the existing threats to which they are historically exposed (others include disease, lack of basic sanitation and education, various forms of pollution and deforestation). Therefore, with proper investment in basic actions (improvement of education, health, and infrastructure) by the state, the overall level of vulnerability would decrease. These investments should be combined with a social learning process, which must be initiated by individual and collective recognition of the state of vulnerability. It is a way to promote genuine local participation in the climate adaptation process.

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Synthesis of Environmental Research Knowledge: The Case of Paraguayan Pantanal Tropical Wetlands

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Abstract

The Paraguayan Pantanal offers a valuable case of research regarding natural resource management in tropical wetlands. It is one of the world´s largest wetland of globally important ecological and cultural value that is threatened from environmental exploitations. Paradoxically, this area is rarely scientifically investigated. Therefore, in this paper, this case was chosen to identify literature indirectly related to the area and to highlight the dominant research trends and corresponding gaps. This research was conducted to cluster the available science-based research of Pantanal´s tropical wetlands in order to advocate for more environmental governance focus. Concepts used in the scientific literature of the Paraguayan Pantanal were extrapolated and summarized in category system. A cluster framework of 12 variables of community-based natural resource management (CBNRM) was classified into three main search-categories: community engagement and participatory approach (CEPA), natural resources management (NRM) and framework developed (FD). The frequency of different categories demonstrates the natural science´s perspectives dominate over human sciences and humanities. Most of the Paraguayan Pantanal has been studied with regard to its ecological, biological and physical properties. The development of research interest over time and the primary focus on ecological baseline conditions are related to its designation as a Ramsar Site, an UNESCO tentative World Heritage Site and the orientation of national policies towards either environmental protection or regional economic development. A substantial research gap was identified in the FD as studies tended to link their findings to human activities but disregarded the connection between governance variables, natural resource and environmental developments. It is suggested to expand the natural science´s perspective on Paraguay´s wetlands to account for economic, social and political aspects in order to develop a holistic and environmentally sustainable production of science in and about the area.

Keywords: community-based natural resource management, community-governance, literature analysis, Pantanal, Paraguay

1. Introduction

Science based-researches on environmental sustainability have generated numerous theories and principles about the use and management of natural resources worldwide. In the context of South American tropical wetlands, a literature analysis of the Paraguayan Pantanal was chosen because of its global relevance as Wetlands of International Importance (known also as Ramsar Site) and a potential candidate within UNESCO World Heritage List Nominations (WWF, 2016a, 2016b). With a surface area of over 230.000 square kilometres the Pantanal is the world´s largest freshwater wetland system (Swarts, 2000; WWF, 2016). This ecoregion is considered one of the most biodiverse places in the world and includes countries of Brazil, Bolivia and Paraguay. The Paraguayan Pantanal is 5 to 10% of the area and includes a great variety of flora and fauna. There are 650 different birds, 240 fish species, 60 species of amphibians and 100 reptiles, at least 120 mammal species and 1,700 plant species (Horton, 2010; WWF, 2016). Besides, ethnographic, cultural and historical principles and values are core factors of the richness of the Pantanal.

The expansion of agroindustry, extensive overgrazing, distribution and insecurity of land tenure, cattle ranching,

unsustainable infrastructure development, weak enforcement of laws, as well as the lack of awareness of civil society are the main threats to biodiversity conservation and local communities (WWF, 2016). Yet most science-based literature disregards such topics, limiting the scenario for inclusive and comprehensive strategies for environmentally sustainable development. Governance studies are needed in the region, not only to complement existing research strands but also to create a science network and a platform for expert exchange. Because of the key role of community-based governance models to generate, describe and investigate frameworks for environmental sustainability, the political ecological approach is focused on the theory of community-based natural resource management (CBNRM). Despite the importance of concepts that describe key factors for using and managing natural resources (Ostrom, 1990; Sarker & Itoh, 2001; Quinn et al., 2007; Sattler et al., 2016), CBNRM theory contains characteristics that constitute a distinctive way of using and managing natural resources. In the last two decades, these characteristics have been the subject of a robust set of literature and have contributed to frameworks for sustainable development (Agrawal & Gibson, 1999; Armitage, 2005; Bradshaw, 2003; Leach, Mearns, & Scoones, 1999; Olsson, Folke, & Berkes, 2004).

Table 1 displays a concise matrix of 12 CBNRM organisational characteristics or variables developed and applied by Gruber that are used here as a set of essential and resumed variables in order to develop this study (Gruber 2010, 2018 n.d.). These 12 principles guided the study and support the legitimacy of the findings. Besides, what functions as the overall hypothesis is the basic assumption that local communities are considered the best resource managers for their closeness, greater knowledge and dependency of natural resources (Agrawal & Gibson, 1999). For this reason, CBNRM is crucial for science works of environmental sustainability. Hitherto, there is no available science-based literature on CBNRM in the study-area. Therefore, in order to fill this gap, literature was clustered from correlated research areas. These included natural sciences (both life and physical sciences), human sciences and humanities. By digging into selected literature searches to find the existence, role or prevalence of the 12 CBNRM variables, the objective was twofold: (a) to investigate the dominant research trends and (b) to identify the research gaps.

Table 1. The Organisational Principles of CBNRM

1.	Public Participation and Mobilisation
2.	Social Capital and Collaborative Partnerships
3.	Resources and Equity
4.	Communication and Information Dissemination
5.	Research and Information Development
6.	Devolution and Empowerment including Establishing Rules and Procedures
7.	Public Trust and Legitimacy
8.	Monitoring, Feedback, and Accountability
9.	Adaptive Leadership and Co-Management
10.	Participatory Decision-Making
11.	Enabling Environment: Optimal Pre or Early Conditions
12.	Conflict Resolution and Cooperation

Source: Gruber 2010

2. Methodology

A comparative analysis of applied concepts used in prior science-based literature of the Paraguayan Pantanal was applied. The first screening of science-based literature was done from the 1970s until early 2018. Eleven studies between 1995 and 2010 were identified as most significant for their focus on the area, the scientific relevance and the availability. These are listed in Annex 1. They were collected via online database, such as google scholars and science direct, as well as via national literature archives in both English and Spanish. A key words search included terms like: *Pantanal*, *Wetland conservation*, *Community-based governance*, *natural resource governance*. A cluster framework to classify the 12 CBNRM variables into three categories was designed based on concentration of key governance concepts. This is shown in Table 2. The search-categories are also shown in Figure 1.

First, a search into the literature on community engagement and participatory approach (CEPA) was carried out in order to learn about the impact of natural resource´s degradation and exploitation on local communities. The scenario analysis depicted multidisciplinary case studies as well as the integration of stakeholder views and values. This requisite often leads to the development of integrated knowledge for alternative development models or policy-recommendations. The second category searched was on natural resource management (NRM),

both renewable and non-renewable, of the Paraguayan Pantanal with regard to its ecosystem services it provides and its ecological, biological and physical properties. From this, the intrinsic link to the intensiveness of the exploitation of Pantanal´s natural resources, was deduced. The human impact over the Pantanal was a key element of this search, as well as the related health of the resources found in the area. Thirdly, the expected outcomes of the analysed literature searches were to be the frameworks developed (FD), if any. Systems of legal, economic, policy, social, and environmental frameworks could help scaling up proactive solutions for CBNRM models. In the context of governance, it was hypothesized that literature searches would show the way to maintain and sustainably manage both landscapes and livelihoods of local communities.

Table 2. Search-categories: Gruber´s 12 principles of CBNRM

		Categories
1.	Public Participation and Mobilization	CEPA
2.	Social Capital and Collaborative Partnerships	CEPA
3.	Resources and Equity	NRM
4.	Communication and Information Dissemination	FD
5.	Research and Information Development	FD
6.	Devolution and Empowerment including Establishing Rules and Procedures	CEPA
7.	Public Trust and Legitimacy	CEPA
8.	Monitoring, Feedback, and Accountability	FD
9.	Adaptive Leadership and Co-Management	NRM
10.	Participatory Decision-Making	CEPA
11.	Enabling Environment: Optimal Pre or Early Conditions	CEPA
12.	Conflict Resolution and Cooperation	NRM

Source: Author´s own elaboration

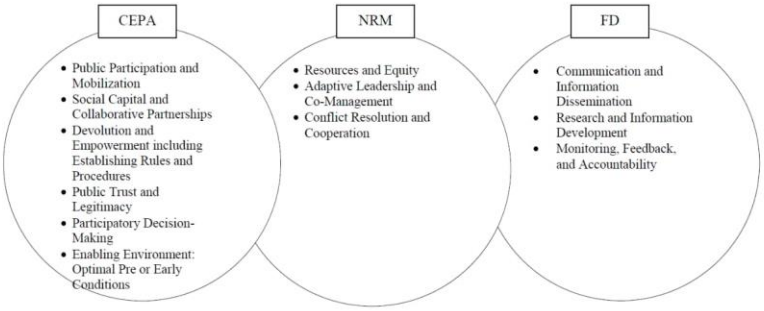

Figure 1. Concentration of key governance concepts

Source: Author´s own elaboration

3. Results and Discussion

The results offer the list of issues of analysis, the research trends and the frame of the three categories applied in this study: CEPA, NRM and FD, as shown in Table 3. Five out of the eleven researches prioritized on natural sciences (both life and physical sciences), that resulted to be the major research trend. The main gaps were found in the production of frameworks (FD). The following discussion is divided in three main blocks according to the category distribution applied in this study: CEPA, NRM and FD.

Table 3. Category distribution results

Authors	Year	Issue of analysis	Research Trend	CEPA	NRM	FD
Blaser, M.	2009	Community-Indigenous	Human Sciences Humanities	√	√	-
Blaser, M.	2010	Community-Indigenous	Human Sciences Humanities	√	-	√
Danilo A. et al.	2004	Biodiversity-Environment	Natural Sciences	-	√	√
DGEEC	2004	Community-Indigenous	Humanities	-	√	√
IDEA	2002	Economy-Environment	Natural Sciences	√	√	-
Hetherington, K.	2009	Economy-Environment	Humanities	-	√	-
Horton Emily Y.	2010	Environment	Natural Sciences Human Sciences	-	√	-
Susnik, B.	1995	Community-Indigenous	Human Sciences	√	-	-
Swarts Frederick A. *Selected Discourses*	2000	Economy-Environment	Natural Sciences	√	√	-
Swarts Frederick A.	2000	Economy-Environment	Natural Sciences	-	√	-
Zanardini, J., Biedermann, W.	2001	Community-Indigenous	Human Sciences Humanities	-	-	√

Source: Author´s own elaboration

Table 4 lists researches and studies where relevant contribution to CEPA was found. It was observed that recurrent and common elements of the studies included the role of public participation and mobilization. The four selected studies described and included multi-stakeholder approaches, as well as community and identity patterns found in the Pantanal. These form key aspects of effective local and inclusive participation, which can empower community-members, raise knowledge levels and build or increase public trust, confidence and legitimization (Gruber, 2010). Hints of social capital and collaborative partnerships were found in the literature-description of networks. Examples of community-relationships can be depicted in the study and description of the Yshiro (Chamacoco) indigenous community living in study-area. Their practices and visions of life and the world (called the *yrmo*) are connected to the Yshiro myth-history. For them, as stated by Blaser (2010, 33) "the backbone of reality is constituted by relations in a permanent state of flux". From this, additional hypothesis and suggestions for further researches might emerge. For instance, "how to include indigenous Cosmo-visions into projects of environmental sustainability?" or "what formal and informal social norms exist to increase relationships and networking in the area of study?" Stakeholders' mutual understanding and agreements at multi-level scales are presented in the CEPA literature as an important contribution to long-term sustainable development strategies.

In addition, two out of four studies also described and analysed the role of multilevel governance and cross-scale coordination for NRM. Alongside the focus of rural and indigenous communities, these science-based works promoted public and community initiatives, such as the creation of side-projects on sustainable production and marketing of honey and craft products, among others (IDEA, 2002). In the socio-institutional context of the Paraguayan Pantanal, these researches offer notions of authority devolution and empowerment as they claim for decentralization of power and decision making. Multiple layers of governments and initiatives related to the role of decision making, monitoring, conflict resolution and governance are often mentioned to advocate for the creation of clear rules that can help empowering local communities. Cases of stakeholders´ sharing power and responsibilities are presented as forms of devolution of authority and responsibility. In the construction on sustainable development, the inclusion and representation of all groups (including the most marginalised) is very important in order to create or modify formal and informal rules and norms (Gruber, 2010). The socio-economic approach of the selected CEPA literature presents a first analysis of the situation and the subsequent development of solutions designed by multi-stakeholder initiatives (Swarts, 2000; IDEA, 2002). Likewise, social and community-based strategies are grounded in the identification of leaders, fostering the formation of groups capable of representing the community and supporting its transformation within formal institutions (e.g. municipalities) and informal ones (e.g. neighbour committees) (IDEA, 2002).

Community leadership, especially among indigenous communities, is observed as a key factor to stronger implement authority devolution and decentralization. Likewise, the integration of ideas and projects can strengthen community relations at all levels. This approach generates inclusiveness and it can be used to problem

solving and decision making as it increases public trust and legitimacy (Suskin, 1995; Swarts, 2000; IDEA, 2002). The CEPA literature also stresses the need to establish frameworks for participatory decision-making that includes the holistic vision to anticipating environmental, economic and social outcomes of socio-economic and ecological challenges (Suskin, 1995; Swarts, 2000; IDEA, 2002; Blaser, 2010). Based on this participatory decision-making framework, community-identities and a shared sense of belonging build the foundation to enabling environment for sustainable development strategies and actions, as well as people´s involvement (Blaser, 2009, 2010).

Table 4. CEPA

Authors	Year	Issue of analysis	Research Trend	CEPA	NRM	FD
Blaser, M.	2009	Community-Indigenous	Human Sciences Humanities	√	√	-
Blaser, M.	2010	Community-Indigenous	Human Sciences Humanities	√	-	√
IDEA	2002	Economy-Environment	Natural Sciences	√	√	-
Susnik, B.	1995	Community-Indigenous	Human Sciences	√	-	-
Swarts Frederick A.	2000	Economy-Environment	Natural Sciences	√	√	-
Selected Discourses						

Source: Author´s own elaboration

Table 5 displays the corresponding texts of interest on NRM. A primary focus of this literature regards social welfare of local communities as it is frequently connected to the role of community values and beliefs (Swarts, 2000; IDEA, 2002; Danilo et al., 2004; Blaser, 2009). In the context of conservation, the initiatives of local community that are compared reflect the importance of multiculturalism in relation to natural resources and the environment. According to Blaser (2009, 15), "having a variety of tools (i.e. different cultures) with which conservation can be realized, whether one uses one or another, is indistinct as long as the environment is affected in the same way". As a result, the take from environmental sustainability is reflected in the inclusion of local knowledge into public and private initiatives. Resources and equity are taken into account in order to describe past and present connections between local economies and conservation (Danilo et al., 2004; Blaser, 2009). Basic needs and fair distribution of local benefits (i.e. compensation for protecting natural resources or regulations on payments for environmental services) are presented as recommendations for the implementation of regulations and sanctions that help the equity of use and management of natural resources (IDEA, 2002; Horton, 2010).

To this regard, what is often considered a central issue is the impact of historical land distribution in the area. For instance, over the past 20 years the role of foreign speculation and dominant economic-political class over land use and distribution in the Pantanal has led to low international prices and unfavourable purchasing conditions (Guereña & Rojas, 2016). Furthermore, agrarian reforms implemented between 1954 and 2003 shaped the land propriety rights in Paraguay. The effects on the Pantanal resulted in hundreds of land concessions, comprising a total area of 4 million ha part of which were confiscated from local and indigenous ancestral territories. Paraguay's indigenous populations and other impoverished minorities are still harbouring the fear of continuation of the land reform as they work out a legal rights-based mechanism that might replace it (Hetherington, 2009, 236). Hence, linkages between territorialism, identities and the past and present system of land use rights define an important research narrative of NRM. The role of multi-stakeholder inclusion and engagement (i.e. capacity building on conservation strategies, trainings and better management systems) is partly addressed in the creation and implementation of projects for environmental sustainability. This approach is taken to be the NRM element of adaptive leadership and co-management because of the importance given to social-ecological organisations, both local and international, to design programs on adaptive capacity (Gruber, 2010). From this perspective, the resilience of Pantanal´s biological diversity has been studied in parallel to the evolution and development of cultural diversities and identities (Swarts, 2000; Blaser, 2009; Horton, 2010).

On a similar note, conflict resolution and cooperation are two connected and recurrent elements of the NRM literature. Although the broad understanding of these two concepts remains merely conceptual and no clear examples can be found, data on community-behaviour can possibly serve as the basis for further development in this regard. For instance, socioeconomic, ethnographic and demographic characteristics of rural and indigenous communities of the Pantanal exist and are widely available (DGEEC, 2002). In addition, NRM strategies should include the analysis of accountability of public and private entities. It is widely agreed that the recognition of the

central role of institutions outside rural and indigenous communities is a key learning notion of conflict management strategies (Gruber, 2010). However, as for the case described in the Paraguayan Pantanal, the lack of effective and multi-stakeholder inclusive decision making processes tends to prevent the promotion of dialogue and increases factionalism (Hetherington, 2009; Blaser, 2009).

Table 5. NRM

Authors	Year	Issue of analysis	Research Trend	CEPA	NRM	FD
Blaser, M.	2009	Community-Indigenous	Human Sciences Humanities	√	√	-
Danilo A. et al.	2004	Biodiversity-Environment	Natural Sciences	-	√	√
DGEEC	2004	Community-Indigenous	Humanities	-	√	√
IDEA	2002	Economy-Environment	Natural Sciences	√	√	-
Hetherington, K.	2009	Economy-Environment	Humanities	-	√	-
Horton Emily Y.	2010	Environment	Natural Sciences Human Sciences	-	√	-
Swarts Frederick A.	2000	Economy-Environment	Natural Sciences	√	√	-

Source: Author´s own elaboration

Table 6 presents the set of literature searches that, in different ways and forms, were able to produce frameworks developed (FD) from science-based methods. The development of systems of policy, social, and environmental schemes were found to be an important contribution to the analysis of the Paraguayan Pantanal, scaling up proactive solutions for CBNRM. The elaboration of atlas, maps, data systematization and statistical methods represent the kind of FD found in the literature. More specifically, we found valuable information about indigenous communities living in the study area. There are ten linguistic trunks, each of them divided in the corresponding forty ethnic groups and exact location within departments and districts of Argentina, Bolivia, Brazil and Paraguay (Zanardini & Biedermann, 2001; DGEEC, 2004). Annex 2 shows the different linguistic families and how they are related to their own corresponding ethnic groups and the location according to the country. This systematization, which prioritizes the ethnic criterion over the geographical one, takes into consideration the way of traditional land use and management of indigenous peoples. Hence, it has a statistical scope rather than a legal one and it intends to provide basic information about each of the indigenous settlements that exist in the country.

As the initial research approach, the role of such systems could strengthen the communication and information dissemination of present and future strategies for environmental sustainability. The role played by transparency and openness of information encourages dialogue between experts and non-experts in multiple approaches and forms (i.e. workshops, fundraising opportunities, seminars, training and capacity building etc.). This ultimately helps supporting decision making, learning and change (Gruber, 2010). In parallel with the basics of transparency and openness, the ones on research and information development were described in the FD literature. For instance, the diversification of information topics only regarded discourses of anthropological, ethnographic and biophysical relevance (Zanardini & Biedermann, 2001; DGEEC, 2004; Danilo et al., 2004; Blaser, 2010). Nonetheless, this is considered as a valid starting point for the production of accessible scientific researches that can influence formal and informal norms to be based upon systematic body of information (Gruber, 2010).

The key element of FD that wasn´t found in the literature analysis is one on monitoring, feedback and accountability of science-based and environmental projects. This possibly may be due to the existing low level of openness, transparency, monitoring, mutual accountability, collaboration, and power sharing between stakeholders and partners in the area. Therefore, this factor isn´t performed in the selected literature, representing a research gap. To fill this gap, it is recommended that systems of reviewing the performance (i.e. monitoring and evaluation methods) should be promoted to those who make the decision and describe them (Gruber, 2010). Systematic processes of collecting, analysing and using information are useful in tracking the progress of programs (i.e. on environmental sustainability) and science-based researches.

Table 6. FD

Authors	Year	Issue of analysis	Research Trend	CEPA	NRM	FD
Blaser, M.	2010	Community-Indigenous	Human Sciences Humanities	√	-	√
Danilo A. et al.	2004	Biodiversity-Environment	Natural Sciences	-	√	√
DGEEC	2004	Community-Indigenous	Humanities	-	√	√
Zanardini, J., Biedermann, W.	2001	Community-Indigenous	Human Sciences Humanities	-	-	√

Source: Author´s own elaboration

4. Conclusion

The conclusion of this synthesis of environmental research knowledge of the Paraguayan Pantanal tropical wetlands lists the dominant research trends and corresponding gaps:

- The branch of natural sciences (both life and physical sciences) was revealed as the main science-based research trend.
- The main gaps were found in the production of frameworks (FD).

Both findings stress the importance to increase and diversify, from both a qualitative and a quantitative perspective, science-based research in the study-area. The reason for it lies beyond the biological and cultural diversity and importance of the site. It has the significance to create, develop, improve and re-shape projects and programs on governance and sustainable development. In this paper, by developing and applying a cluster framework about the concentration of key governance concepts we tried to promote and suggest the inclusion of Gruber´s 12 principles for effective and successful CBNRM. In the study of environmental governance, we believe this tool and method can be transferred to other contexts where field-science is scarce. The importance of diversifying science-based researches offers a more holistic perspective where communities are included (CEPA), the use and management of natural resources is more effective (NRM) and a stronger legacy for future studies and interventions is developed (FD).

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Annex

ANNEX 1. Compared literature

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Source: Author´s own elaboration

ANNEX 2. Linguistic families

Abipón, Argentina, historic group
Angaite (Angate), northwestern Paraguay
Ayoreo (Morotoco, Moro, Zamuco), Bolivia and Paraguay
Chamacoco (Zamuko), Paraguay
Chané, Argentina and Bolivia
Chiquitano (Chiquito, Tarapecosi), eastern Bolivia
Chorote (Choroti), Iyojwa'ja Chorote, Manjuy), Argentina, Bolivia, and Paraguay
Guana (Kaskihá), Paraguay

Guaraní,Argentina, Bolivia, Brazil, and Paraguay
Bolivian Guarani
Chiriguano, Bolivia
Guarayo (East Bolivian Guarani)
Chiripá (Tsiripá, Ava), Bolivia
Pai Tavytera (Pai, Montese, Ava), Bolivia
Tapieté (Guaraní Ñandéva, Yanaigua),eastern Bolivia
Yuqui (Bia), Bolivia
Guaycuru peoples, Argentina, Bolivia, Brazil, and Paraguay
Mbayá (Caduveo), historic
Kadiweu, Brazil
Mocoví (Mocobí), Argentina
Pilagá (Pilage Toba)
Toba (Qom, Frentones), Argentina, Bolivia, and Paraguay
Kaiwá, Argentina and Brazil
Lengua people (Enxet), Paraguay
North Lengua (Eenthlit, Enlhet, Maskoy), Paraguay
South Lengua, Paraguay
Lulé (Pelé, Tonocoté), Argentina
Maká (Towolhi), Paraguay
Nivaclé (Ashlushlay, Chulupí, Chulupe, Guentusé), Argentina and Paraguay
Sanapaná (Quiativis), Paraguay
Vilela, Argentina
Wichí (Mataco), Argentina and Bolivia

Source: Zanardini and Biedermann 2001

Bonatti, M., Bayer S., **Eufemia, L.**, & Sieber, S. (2019) Pathways to improve PAG in a Challenging institutional setting: The case of the Río Negro National Park in Paraguay. *Journal for Nature Conservation* (under revision)

Manuscript File

Pathways to improve Protected Areas governance in a challenging institutional setting: The case of the Río Negro National Park in Paraguay

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Abstract: Protected areas are a fundamental element for the conservation and protection of natural resources worldwide; these are also embedded in Social-Ecological Systems (SES), with its ecological management and sustainable protection subject to various political, economic, and social influences. Good governance of protected areas is recognized as a decisive aspect of biodiversity conservation, which is at risk in institutional contexts where policy frameworks lead to low-capacity environmental authorities; authorities unable to ensure effective management and long-term protection of natural resources. This study presents a case study of SES approaches applied to protected area governance as the theoretical framework to understand and analyze the complex human-environmental relations found at the Río Negro National Park in the Paraguayan Pantanal. Methodologically, the evaluation is based on 19 semi-structured, in-depth, interviews supplemented by a focus group discussion and participant observation. Findings suggest that social capital can be decisive for PA governance. Mechanisms supporting this, from the perspective of collective action are identified. Approaches fostering social capital on the local level result in positive effects that create collective action. Likewise, inclusive decision-making processes do not necessarily have to be initiated by the environmental authority itself, but can build on the processes and initiatives of other public or civil society actors.

Key Words: Protected Area Governance; Good Governance; Inclusive decision-making; Community Participation; Social Capital; Collective Action

1. Introduction

Biodiversity conservation is an essential element of overall sustainable development, while protected areas (PA) are a key tool for the survival of genetic resources and species, while also facilitating the health of ecosystems globally (CBD 2004; MULONGOY AND GIDDA 2008; ERVIN ET AL. 2010; RANDS ET AL. 2010, BALASINORWALA 2014; CUMMING AND ALLEN 2017). Simultaneously, PA provide livelihoods for almost 1.1 billion people and are an important factor ensuring global food security and ecosystem services (CBD 2004; BUTCHART ET AL. 2010; ERVIN ET AL. 2010). Worldwide, PA coverage is increasing: going from 14.7% of the world's terrestrial land area in 2016 to 15.0% in

2019.[1] However, species remain threatened, environmental degradation continues, and biodiversity is still declining (BUTCHART ET AL. 2010; RANDS ET AL. 2010).

The question of whether PA management is effective is receiving increasing attention, as is the extent to which management protects the values and objectives of each respective protected area for the reasons it was established (BORRINI-FEYERABEND ET AL. 2013; STANCIU AND IONIȚĂ 2014; CASTRO AND URIOS 2016). Aiming to identify and evaluate how well protected areas are being managed, international initiatives set standards and carry out assessments of PA management effectiveness (LEVERINGTON ET AL. 2010) and "*existing operating governance schemes*" (EKLUND AND CABEZA 2017) across diverse political, social, and environmental influences.

The functioning of protected areas can be ensured in countries with well-equipped and funded public environmental institutions, a consolidated civil society, and protected areas that are governed on the basis of common and transparent decision-making processes based on a secure legal framework. However, biodiversity conservation is threatened by challenging institutional settings in many countries, where land ownership and resource tenure may be unclear, environmental government agencies have poor capacity and limited political support, members of local communities are poorly consolidated, and powerful individuals seeking economic benefits through unsustainable natural resource exploitation often act with impunity (BARRETT ET AL. 2001; CLEMENTS ET AL. 2010). In such environments, the lack of capacity, cooperation, and structure impede the full and effective participation of all relevant actors, which is a critical element of good governance for protected areas (CBD 2004; BALASINORWALA 2014). Concerns regarding PA governance are recognized by researchers and international organizations (STEINER ET AL. 2003, GRAHAM ET AL. 2003; ARMITAGE ET AL. 2012; BORRINI-FEYERABEND ET AL. 2013, 2015), yet little attention is given to governance related issues in protected areas in the Latin American context (LEVERINGTON ET AL. 2010); less so in Paraguay.

ARMITAGE ET AL. (2012) state that a detailed understanding of how governance influences a protected area can enhance intervention strategies to achieve desired outcomes. Yet, what occurs if local communities and other civil society actors are poorly consolidated and their ability to participate effectively in decision-making is compromised? How can their participation be guaranteed in such contexts? What role does social capital play in PA governance? These are the research questions this work addresses. In this context, the case study seeks to identify how PA governance can be improved in order to sustainably protect the natural resources of the Río Negro National Park and its surroundings, while simultaneously striving for sustainable development of the local communities. We evaluate protected area governance at the level of the protected area, focusing on those actors directly and indirectly affected by the protected area. The study focuses on Río Negro National Park (RNNP) and its buffer zone in the Paraguayan part of the Pantanal (Figure 1).

The RNNP case provides insights into the portfolio of PA governance in a Paraguayan real-life scenario and provides a baseline that can be transferred to similar contexts, like other Paraguayan PAs or other Latin American countries facing similar frameworks and challenges.

The Paraguayan Pantanal receives little attention in the scientific world, with existing scientific studies limited primarily to biological and anthropological studies of this unique ecoregion. The very limited number of scientific publications regarding this area poses

[1]Last update December 2019 (https://livereport.protectedplanet.net/chapter-2)

an enormous challenge for this study (CARRÓN 1998, MERELES 2000; BLASER 2004, 2009; SALAS-DUEÑAS ET AL. 2004; HORTON 2010, EUFEMIA ET AL, 2018).

Thus, the analysis of protected area governance is a new perspective that will not only contribute to the limited scientific research in Paraguay, but will also provide valuable insights into the prerequisites for improving PA governance and mechanisms that not just ensure an inclusive and empowering PA governance system but also the long-term conservation of biodiversity.

Discussing PA governance on the local level drives focus toward the importance of participatory approaches and the inclusion of local communities in decision-making processes (STANCIU AND IONIŢĂ 2014). The Social-Ecological System (SES) approach, with community participation as a core requirement, is used as the underlying theoretical concept for this study (OSTROM 2009; OSTROM AND COX 2010). Therefore, to answer the research question, an analytical framework is developed and applied to assess the performance of the protected area and discover the scope for its improvement.

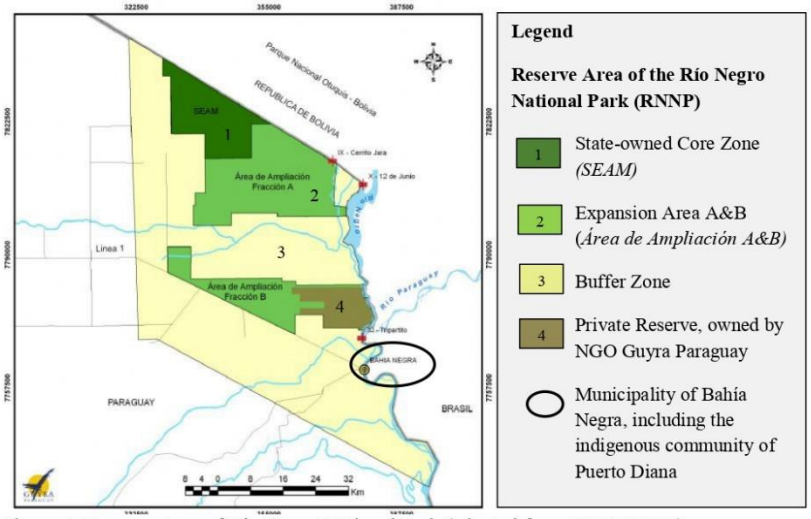

Figure 1: Reserve Area of Río Negro National Park (adapted from SEAM 2011)

1.1 Socio ecological systems as theoretical framework

Human-environment interactions are complex, as they are composed of different ecological systems, like rivers, wetlands, fisheries, forests, and pastures, as well as complex human-made systems, including roads and agricultural activities that alter natural habitats (OSTROM AND COX 2010). To understand the complexity of human-environmental systems and to find ways to sustainably govern and manage these systems, Ostrom develops a diagnostic framework by combining potentially relevant variables that contribute to the sustainable or unsustainable outcomes of these systems (CLEVELAND ET AL. 1996, OSTROM 2009; OSTROM AND COX 2010). According to the framework (compare Figure 2), Río Negro National Park (RNNP)

performance depends, first, on the conditions under which it is operated, determined by several components that affect each other (solid boxes in the Figure 2): resource units-RU (like trees, shrubs, plants, and wildlife within RNNP); an included resource system-RS, (a Protected Area encompassing a specific territory, containing forest areas, wildlife, and water systems) .Secondly, performance also depends on the existing governance systems-GS, the government, other organizations, and actors managing RNNP, the specific rules related to its use, how these rules are made; as well as the defining set rules for actors- A, (their participation, interests, rights). Interactions, like interventions implemented in RNNP and its buffer zone, are influenced by these components and are transformed into outcomes (Figure 2).

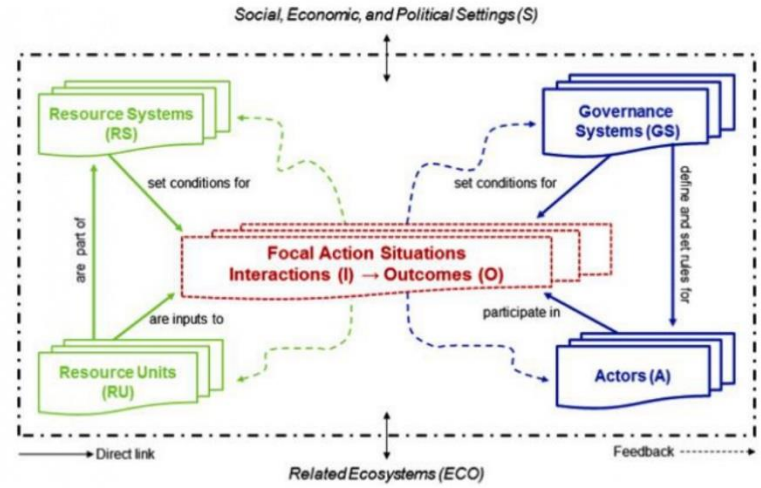

Figure 2: Social-ecological system approach (McGinnis and Ostrom 2011)

In this study, PA governance is understood as the process through which rights- and stakeholders inside and outside the PA, with differing interests and perceptions, on the basis of formal rules, like laws and PA regulations, and informal rules, like local and indigenous community traditions and behavior, interact to drive decisions that influence the performance of PA governance (Fig. 2). The actors are a key point of analysis regarding current relations, interests, and actions and how it influences and compounds the current governance situation. Therefore, a critical point of departure for assessing the governance of protected areas are those key actors engaged in the decision-making process (Borrini-Feyerabend and Hill 2015). These can be many and varied, depending on the type of governance (Balasinorwala 2014; Borrini-Feyerabend et al. 2013), potentially involving governmental and nongovernmental actors, each guided by different underlying interests and motivations (Balasinorwala 2014; Borrini-Feyerabend and Hill 2015).

2. Methodology

2.1 Case study description

Located in the center of the South American subcontinent (Figure 3), the Pantanal is one of the world's largest seasonally-flooded freshwater wetland systems, covering over 160,000 square kilometers. Most of its surface lies within the Brazilian border (140,000 square kilometers), with smaller portions belonging to Bolivia (15,000 square kilometers) and Paraguay (5,000 square kilometers) (WANTZEN ET AL. 2008, JUNK 2013). The Pantanal is fed by a complex system of interconnected rivers and is surrounded by highland plateaus on the Brazilian and Bolivian sites forming the Upper Paraguay River Basin (WANTZEN ET AL. 2008). This globally outstanding ecoregion represents a mosaic of flooded grasslands and savannas combined with gallery forests and dry forests. The key driver for its ecological processes and its patterns of biodiversity is the floodpulse, caused by seasonal rainfall patterns in the catchment of the Upper Paraguay River (JUNK AND WANTZEN 2004). During the wet season, 80% of the area is flooded, but in the drier seasons, large areas become completely dry and are colonized by terrestrial plants and animal species (DINERSTEIN ET AL. 1995, JUNK ET AL. 2006, WANTZEN ET AL. 2008).

The Pantanal is internationally recognized for its high biodiversity, including rare or threatened species of amphibians, birds, fish, reptiles, mammals, and plants (SWARTS 2000; SALAS-DUEÑAS ET AL. 2004; HORTON 2010). Furthermore, it provides numerous ecosystem services, including hydrological services like water purification, groundwater recharging, water provision, and flood alleviation (JUNK ET AL. 2006, JUNK AND NUNES DA CUNHA, 2012; JUNK, 2013; WANTZEN ET AL. 2008).

Like other tropical freshwater wetlands, it has the ability to store carbon and, therefore, plays a key role in climate regulation and the mitigation of global climate change. In addition to its ecological significance, the Pantanal has a high aesthetic and cultural values, being home to various indigenous communities (JUNK AND NUNES DA CUNHA 2012; JUNK 2013; CHIARAVALLOTI ET AL. 2017).

Río Negro National Park (RNNP) (Figure 1) is located in a remote, difficult to access, area of northeast Paraguay. It consists of a core zone, two expansion zones (A&B) including some private properties, and a buffer zone where the municipality of Bahía Negra is located (SEAM 2011). Due to its geographical isolation, the core zone is exposed to relatively few external pressures, like industry or major infrastructure projects. The RNNP lies within the department of Alto Paraguay, which is Paraguay's second largest at 82,349 square kilometers. However, it is sparsely populated, with an estimated population of about 16,000 inhabitants in 2015. The population tends to concentrate in the riparian zones of the Paraguay River, where the proximity to the river ensures communication between the villages and small towns. The four main districts are Bahía Negra, Carmelo Peralta, Fuerte Olimpo, and Puerto Casado. (GOVERNMENT OF ALTO PARAGUAY 2016). In 2017, its approximate population was 2500, based on 2015 census data (DGEEC 2015), with the majority being indigenous people. Since the 19th century, the banks of the Paraguay River are the ancestral territory of the Yshiro indigenous group. Approximately 54,300 hectares of land are registered as their property (FAPI 2018). The Yshiro is the largest human community in the area, with most of their population living in colonies around the municipality of Bahía Negra. They are part of the so-called "Yshiro Nation." The population's livelihoods and economic models in the Bahía Negra district vary widely, from agricultural subsistence practices to activities in the export-oriented livestock sector (SALAS-DUEÑAS ET AL. 2004; SWARTS 2000). The cultural diversity found in Bahía Negra shapes its governance patterns, including those of the nearby RNNP (EUFEMIA 2019; ZANARDINI AND BIEDERMANN 2001).

Several factors threaten RNNP, including the general lack of political will to support national environmental policies in Paraguay, as well as a poorly funded and understaffed protected area authority, insecure land tenure rights, weak protection of the protected area status as a national park, and the lack of management and annual working plans on site. As a biodiversity hotspot and a unique site for wildlife conservation in Paraguay, the ecological importance of RNNP lies, above all, in its location, which makes it representative of a large ecological transition area between the Amazon region and the Chaco region. Hosting the convergence of the different natural systems, the diversity of flora and fauna in RNNP is remarkable, with some of the animal species classified as threatened by the International Union for Conservation of Nature (IUCN) only found in this region (Guyra 2003; SALAS-DUEÑAS ET AL. 2004; SEAM, 2011).

Its geographical isolation from major consumption centers and the difficult access conditions have inhibited regional economic development since colonization. Consequently, the Pantanal is relatively sparsely populated, and economic activity centers on low-density cattle ranching (JUNK 2013). While still in a relatively good ecological state, this is changing due to new economic and political demands, while climate change is also increasing pressure on the Pantanal and its catchment area. In each occupying country, the Pantanal is moving into the focus of national economic development efforts in recent years. As a result, this unique ecoregion, with its high biodiversity and ecosystem services, is under threat. The livelihood of rural and indigenous communities are also under threat by misguided and poorly developed land-use changes, including large-scale deforestation for intensified agricultural production, like cattle ranching, periodic burnings, uncontrolled fires, pollution, as well as large infrastructure projects, like dams and hydropower schemes (JUNK AND NUNES DA CUNHA 2005; ALHO AND SABINO 2011; BERGIER 2013; CALHEIROS ET AL. 2012). These activities have caused a wetland loss of approximately 12% of its area since the 1970s (IPBES 2018). For millennia, this part of the Chaco region was inhabited exclusively by indigenous peoples. In 2020, the indigenous communities of the Ayoreo and Yshir make up most of the population, while the latter are deeply culturally related to the protected area region (GOVERNMENT OF ALTO PARAGUAY 2016). Traditionally, the Yshir subsistence strategy is linked to what the Pantanal naturally offers, such as the collection of carob pods, palm hearts, fruits, palmettos of the caranda, and the bases of the leaves of the caraguata. In addition to gathering activities, they engage in fishing and certain agricultural practices, like cultivating maize, beans, squash, cassava, and peanuts. Currently, they live in different communities in the south of the municipality of Bahía Negra and their livelihoods shifted toward a combination of fishing, hunting, small-scale agriculture, cattle breeding, and employment on cattle ranches or in the logging industry (CARRÓN 1998; MERELES 2000; SEAM 2011).

The rural community, another important population group, includes descendants of immigrants or former day laborers who, in the 20th century, came from other parts of the Paraguayan Chaco to work in the tannin industry. However, with the end of the tannin industry in the late 1980s, many remained, although they lacked further employment opportunities. At present, they earn their livelihoods from fishing and small agricultural production, including the raising of goats as well as, on a smaller scale, cattle and poultry. Additionally, some work as guides for Brazilians who travel the Paraguay River for sport fishing (CARRÓN 1998, MERELES 2000, SWARTS 2000). Further employment opportunities for the rural community exist at the port of Bahía Negra as well as within public institutions and the private sector, the latter mostly comprising neighboring cattle ranches.

The situation within the research area is further exacerbated by the exclusion of the poorly consolidated local community from decision-making processes concerning RNNP and its buffer zone as well as a lack of cooperation in the form of (in)formal arrangements and partnerships with and among civil society and private sector actors. In addition, two expansion zones and their conservation objectives are threatened by severe land-use changes on private properties, including extensive deforestation and the progress of the agricultural frontier, mostly for extensive livestock farming. For these reasons, the case of Río Negro National Park and its buffer zone can be understood as a paradigm for protected area governance in a challenging institutional context.

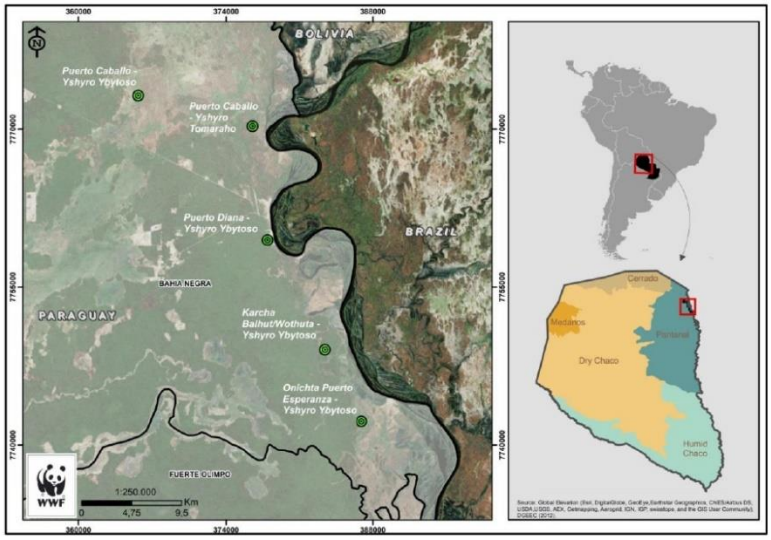

Figure 3: The Paraguayan Pantanal. Source: Global Elevation (Esri, DigitalGlobe, GeoEye, Earthstar Geographics, the French Space Agency (CNES)/Airbus Defense and Space, U.S. Geological Survey (USGS), Adapter Engine Extended (AEX), Getmapping, Aerogrid, Institut Geographique National (IGN), Zonificación Sísmica - Geotécnica (IGP), swisstopo, and the Geographic Information Systems (GIS) User Community); Dirección General de Estadística, Encuestas y Censos (DGEEC) (2012).

2.2 Methods

Designed as a qualitative case study, this work assesses the situation at the case study site on the basis of empirical evidence. This format is chosen as a technique that facilitates the sustained exploration of the PA governance system in the specific case of Río Negro National Park and the in-depth analysis of the relationships and connections among the different rightsholders and stakeholders in the research area.

In order to gain insight into the challenges of the local and rural community in the research area, participant observation was conducted as well as a focus group discussion (FGD) with Yshir indigenous community leaders and members of the Union of Indigenous

Communities of the Yshir Nation (UCINY). Primary data is augmented with secondary data through an analysis of documentary evidence.

In order to gain insights to otherwise inaccessible dimensions of human life of the rural and indigenous community in Bahía Negra district, primary data collection included participant observation. This methodological approach, in which the researcher interacts with people in their everyday life, is very well suited for exploring processes and relationships between different people and events, understanding continuities over time, and acquiring knowledge about the immediate socio-cultural contexts in which human existence develops (JORGENSEN 2015). The primary methods for recording information in this case study were a field diary, photography, and audio recordings.

Furthermore, a focus group discussion (FGD) was carried out in the community of Puerto Diana with community representatives and members of the Union of Indigenous Communities of the Yshir Nation (UCINY). This method is proven to be a good way to gather people from similar backgrounds or experiences to discuss a specific topic of interest. The strength of FGDs is that it allows the participants to articulate agreement or contradiction during the discussion (KRUEGER 1988). This methodological approach allows the researcher to gain insights not only into a group's way of thinking but also the spectrum of opinions and ideas, including the internal inconsistencies and differences in terms of beliefs, experiences, and practices (START AND HOVLAND 2004).

The snowball sampling method was chosen as tool for identifying networks and relationships (KOTZ ET AL. 2004; PRELL ET AL. 2009). In total, 19 different actors and groups of actors (ANNEX 1) were identified and contacted during the research stay in Paraguay, including representatives from the public, civil society, and private sector. The term, "group of "actors refers to people belonging to the same institution (e.g. one interview with different representatives from the ministry). This scope ensures a diversity of the actors' perspectives. From the public sector, interviews were conducted with various representatives of the Environmental Secretariat, which is the PA's managing authority. This includes administrative officials in Asunción as well as the park guard who directly works in the protected area. In addition, interviews were conducted with representatives of the Tourism Secretariat, with regional and local officials from various authorities, and with the military. Civil society is represented by members of national and international environmental and human rights non-governmental organizations (NGOs), experts from academia, rural and indigenous community members, and the local media.

All interviews were formulated addressing the following topics: general information regarding the PA (e.g. what are the threats to, and challenges for, the PA?) and its management (e.g. how is the PA managed? By who?); local participation in PA management (e.g. are there existing forms of participatory management of the PA?); power relations (e.g. what sector holds the stronger power/influence?); influences and cooperation among different actors and sectors (e.g. with regard to the PA, how are institutions, civil society groups and private sectors interconnected and related?); as well as the socio-economic context of the PA and its surroundings (e.g. what is the socio-economics of the region?).

The interview guideline was partly based on the Management Effectiveness Tracking Tool (METT), which is the world's most frequently used PA management effectiveness evaluation tool. It was developed to report progress in improving management effectiveness in individual PAs by applying a simple, questionnaire type approach with two sections (LEVERINGTON ET AL. 2010). First, threats to the PA are identified and ranked. Next, an assessment form is used to obtain valuable information about the PA, such as its legal status, PA regulations, PA objectives, planning processes, staff, budget,

participation of local communities and indigenous peoples, and economic benefits (STOLTON AND DUDLEY 2016). It is considered useful to structure the interviews based on METT in order to identify the main threats and their effects on the PA. Although the identification of threats and their effects are not the main focus of this study, understanding them is important for better contextualizing the area of study.

The principal reason for using METT to support the study is that its application facilitates the identification of key actors involved in the management of the PA, which is an important step toward understanding and analyzing the current governance system (LEVERINGTON ET AL. 2010; LAUSCHE AND BURHENNE-GUILMIN 2011) as well as the relationships between actors, the territory, and its governance (as proposed in the theoretical framework based on socio-ecological systems).

A pre-test of the interview guideline was carried out with WWF employees, which helped with adapting the survey to the local context. The interviews were recorded with formal authorization of the interviewees.

3. Results

The results analysis aims to examine how social actors interact within the region and what actor-specific interests and relations are pursued. Furthermore, it includes to what extent the actors participate in decision-making processes concerning the protected area as well as what capacities and limitations each respective actor has in order to govern, manage the area, foster sustainable use, and protect biodiversity. This section is divided in two parts: (a) actors; and (b) interactions and power relations. Both parts provide the current scenario and information that allow for assessing the performance of the protected area and for discovering the scope for improvements; this latter point is specifically discussed in the following section.

3.1 ACTORS

"The entire region is characterized by the absence of the state." (PS3)

This statement reflects the challenging baseline across the entire district of Bahía Negra, a status deplored and lamented by the majority of the actors, including civil society and public sector representatives. The state absence in this remote area is evident in many respects, such as the lack of infrastructure, disrupted electricity supply, poor public transport connection to larger cities, a lack of medical services and hospitals, and no higher education institutions. The public sector is strongly influenced by the prevailing two-party system (either Liberal or Colorado).

Nationally, the government provides political guidelines for environmental policy and establishes the legal basis for the declaration and safeguarding of land tenure rights for protected areas in Paraguay. However, according to experts from national NGOs and academia, a lack of political will to develop and support a national environmental agenda has been, and continues to be, evident as the central government primarily pursues economic goals, focusing mainly on the private sector.

"The economic incentive to take and implement environmental measures is part of the weakness of the whole system." (CS4)

This sole orientation toward economic interests, decoupled from national measures to improve biodiversity protection, is severely criticized and reflected in the national budget distribution. Currently, only 0.08% of the national budget (GOVERNMENT OF PARAGUAY 2018) is allocated to the environmental authority – the Ministry of the

Environment (SEAM) – that uses these funds not just to implement national environmental policies but also environmental and nature conservation concerns (GOVERNMENT OF PARAGUAY 2000a). Up to and including June 2018, SEAM was only a secretariat affiliated to the Ministry of Agriculture; thereafter it became an independent ministry. In the logic of BORRINI-FEYERABEND ET AL. (2013), SEAM has the role of a rightsholder, as it disposes *de jure* management authority over national protected areas and is the main institution responsible for carrying out activities in this context (PS1). Experts stress that the current institutional development of the Secretariat is underpinned by a general "disempowerment of the institutionalism of the SEAM" (CS3). Its *de jure* management responsibility is not reflected in *de facto* management for several reasons. Various experts recognize and emphasize the scarce personnel situation, both in the capital and on site within RNNP, including the lack of a permanent park ranger or other park personnel, as well as the lack of financial security. This is reflected in the following statement:

"The national system of protected areas is quite weak, starting with the institution that manages these areas." (CS4)

Even if the employees are highly committed to conservation, dependency on the national government impedes the implementation of measures that serve to ensure conservation of its protected areas, thus limiting its scope for action.

In addition to the Ministry of the Environment, the Secretariat for Tourism (SENATUR) is a rather new actor in the region. This latter participation is in the context of the 2018 application to UNESCO to declare the Paraguayan Pantanal as a natural World Heritage Site. Due to the lack of infrastructure and the difficult access to the region, tourism does not play a major role in the economy. Interviews show that the application reflects an effort improve the visibility and network of this neglected territory:

"The project of the UNESCO declaration has a chance to move forward in terms of building and strengthen a network among the different actors." (CS5)

Their interest is both economic and ecological, as SENATUR aims to increase the number of tourists in the region, thereby creating new income opportunities for the local population while maintaining the protection of the Paraguayan Pantanal (PS3). As in the case of SEAM, the national budget for the tourism sector is small, thereby severely restricting SENATUR's scope for action (GOVERNMENT OF PARAGUAY 2018). At the national level, another actor is the military, whose presence in the region is based on national sovereignty and border protection purposes along the river. Although it has military bases in the buffer zone, in the immediate vicinity of the protected area, there is not a direct overlap between the protected area authority and the military. The fact that the military has been active in the region for many decades positively affects the relationship between the military and the rural population, especially as the national government is otherwise absent from the region. However, this does not apply to the relationship between the indigenous population of the Yshir and the military, which is burdened by past territorial conflicts (SEAM 2011).

At the regional level, the government of the department of Alto Paraguay is responsible for regional development planning and assumes an important role on the strategic level. Development planning is an essential activity of the government, which precedes action and guides the efforts of the Departmental Government Administration, facilitating the achievement of objectives and, consequently, the fulfillment of its objectives. Its focus is

primarily on regional economic development. Although environmental issues are a part of the regional development plan, Río Negro National Park (RNNP) is not included (GOVERNMENT OF ALTO PARAGUAY 2016).

Locally, interest in environmental issues and knowledge about the importance RNNP for the protection of the Pantanal is perceived as very limited in interviews with administrative representatives of the municipality. Their main interest is economically driven, mainly on livestock production, which promises higher incomes and increased tax revenues. The local administration seems to have little intention to enhance environmental protection: although an environmental council within the municipality is supposed to exist, it is not perceived as active.

In summary, for the key public sector actors, the limited budget, the low human resource capacities, and the often politically motivated change of staff due to the two-party system, have weakened the concerned institutions.

A consolidated **civil society,** as a social actor that can complement public institutions in the field of environment and nature conservation, is highlighted in interviews with various experts.

"The complement comes from the civil society organizations, which in my opinion, must cooperate with the state institutions, which are really very weak in terms of environmental aspects, in the form that state measures to protect the environment are supported by the environmental civil society." (A1)

Three key actors in civil society are identified (the indigenous community of the **Yshir**, the **rural community in Bahía Negra,** and the locally active NGO **Guyra Paraguay**) as working closely with other actors. In addition to consolidated groups, there are other actors working in the field of nature conservation, which are also presented briefly.

In the Bahía Negra district, the indigenous community of the Yshir and the rural community are the two most important population groups and rightsholders, whose relationship is marked by conflict and mistrust. The indigenous community of the Yshir is identified as a key actor and rightsholder in the region, which is closely linked to the Pantanal and its natural resources. As they have been using and living in these resources for several centuries, the Yshir possess a profound knowledge of the flora and fauna of the region, as well as their ecological connections. The Paraguayan Pantanal is of great cultural significance for this group and they pursue cultural and subsistence-oriented interests. In 2001, leaders and community members of the Yshir founded the Union of Indigenous Communities of the Yshir Nation (UCINY), aiming to promote the land tenure rights of the indigenous population and to increase participation of indigenous people in decision-making processes. This self-institutionalized group receives support and legal assistance from Tierraviva, a national NGO that is committed to promoting and defending the human rights of indigenous peoples in Paraguay, with a focus on territorial restitution of ancestral territories (EUFEMIA ET AL. 2018). The Yshir have land tenure rights in the immediate vicinity of the core area of the National Park, as well as in the buffer and expansion zones. Currently, many conflicts over land exist in the region and their access to culturally important ceremonial sites is often denied by current landowners. Today, the community of the Yshir lives in different communities along the Pantanal. The largest is Puerto Diana, about two kilometers south of the municipality of Bahía Negra.

"*There is little knowledge and interest of natural resource management and administration among the rural population.*" (PS 5)

Additionally, the major projects by international donors in the region were classified negatively:

"*Many government and NGO projects in the past have failed and had no impact on the community and its wellbeing, thus not benefiting the community. This creates a great lack of trust on the part of the community.*" (PS 5)

The rural community in Bahía Negra is the second one. Due to the remoteness and distance of RNNP, the connection of this population to the protected area remains low. Nature conservation measures are not a priority for them. As they often live in precarious situations, the interviewees highlighted the state's obligation to take measures to create new income opportunities, thus sustainably improving their living conditions. The commitment of this population group can be classified as low; only a few institutionalized groups exist, such as some producer groups, which usually only serve as a platform for selling products and are less interested in political participation or exerting influence. However, the Asociación Eco Pantanal is worth mentioning: it comprises young rural community members who are committed to the protection of the Paraguayan Pantanal. Nevertheless, the organizational strength of this group cannot be further analyzed because their interest in cooperating with the study was very low. For this reason, a more in-depth analysis of this actor cannot be carried out.

Nationally, there are two environmental NGOs playing a significant role: Association Guyra Paraguay and the World Wide Fund for Nature (WWF) Paraguay. Cooperating closely with each other, both organizations have very well-trained personnel with diverse knowledge of the region.

The Association Guyra Paraguay has been present in the region for a long time and maintains an ecological research station with an associated ecotourism project in the buffer zone of the RNNP. The protection of natural resources and scientific research in the region are its main objectives. As part of its ecotourism project, Guyra Paraguay is, so far, the only actor in the region able to receive national and international tourists. The organization is in constant dialogue with the various civil and public sector actors.

Committed to the protection of the Paraguayan Pantanal, the international environmental organization WWF plays one of the most important roles at the macro level. Within the framework of its Chaco-Pantanal Program, WWF Paraguay, in collaboration with the Technical Secretariat for Economic and Social Planning (STP) of Paraguay, has drawn up a plan for joint actions for the development of programs in various fields, such as cooperation for sustainable development and technical cooperation. In this context, both institutions are striving to strengthen the strategic planning of the municipality of Bahia Negra, for which an Urban and Territorial Planning (POUT) of the municipality is, as of 2020, in development. The aim is to initiate an inter-institutional participatory planning process involving all actors living in the municipality.

Private sector actors in the region around RNNP are mostly large landowners, who mainly operate extensive export-oriented livestock farming and, thus, primarily pursue economic interests in the use of regional natural resources. They possess partly secured land rights in the expansion and buffer zones of RNNP, which is often directly linked to non-transparent and corruption-related land acquisition processes. Land-use change due to extensive livestock farming poses a concrete threat to environmental protection, as the

ecosystem is severely disturbed by large-scale, partially illegal, deforestation, which often takes place without permission from SEAM, the competent authority. In addition, land rights conflicts with the indigenous population of the Yshir are increasing, as cattle ranchers further clear forests to secure access to their farms, often illegally.

"*This is one of the many violations that a cattle rancher with his class power and economic power can do, he opens a path without communicating to any Paraguayan institution and without consulting the people.*" (CS6)

The claim to the same territories is the main cause of conflicts between local indigenous groups and large-scale cattle breeders, in which two contradictory concepts of land law dominate the collective customary law of the indigenous peoples and the private property law of the agricultural lobby. Private sector actors have a very well-established representation of interests in the capital, institutionalized in the form of the Rural Association of Paraguay (ARP) and, thereby, can directly influence decisions concerning the use of the expansion zones of the protected area, which is strongly criticized by many civil society actors.

"The power of agribusiness in Paraguay is incredibly high, ..., they are the ones who rule, establish public policies and economic infrastructure, these people are very influential in all institutions." (CS6)

These unequal power constellations between private sector actors and the local population represent a challenge not only in the Pantanal, but throughout Paraguay.

"*The rural association of Paraguay, representing large-scale soybean producers in the western part of Paraguay, and cattle farmers in eastern Paraguay, are the ones who influence and command the politicians all over Paraguay.*" (CS3)

On the other hand, the Urban and Territorial Planning process is identified as an important opportunity to increase social capital in the research area, thereby creating trust and improving cooperation mechanisms among the local community. Therefore, it constitutes a potential tool to empower these groups.

"Communities are strengthened as they learn from other communities. Socialization mechanisms are what matter." (CS5)

3.2 INTERACTIONS AND POWER RELATIONS

In the current governance system, power and interest imbalances between the various public, civil-society and private sector actors, which directly or indirectly influence the protection and use of the natural resources, prevail throughout the study area (compare Figure 4). The three sectors count with platforms, groups or institutions of varying degrees of consolidation, which positively or negatively influence their participation in decision-making (Figure 4: size of bubbles). Additionally, inter- and cross-sectoral collaboration between the different groups and institutions varies significantly. In this sense, both initiatives of inter- and cross-sectoral collaboration (continuous lines: e.g. between the nature conservation authority SEAM and the NGOs) and profound conflicts between actors (dotted lines: e.g. Agribusiness and UCINY) are identified.

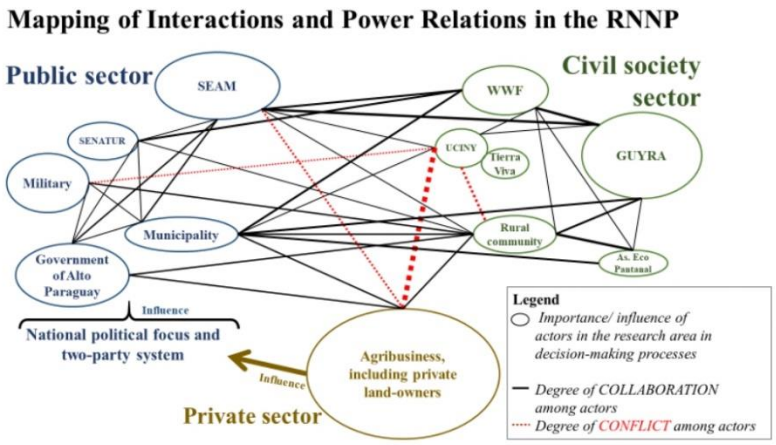

Figure 4: Mapping of interactions and power relations (Author's own elaboration)

Although the civil-society sector counts with a few well-equipped NGOs, the local and indigenous population is marginalized and only partially consolidated into groups, which severely impairs their participation in decision-making; intersectoral conflicts further weaken the sector. They are diametrically opposed to the large private sector with its powerful agribusiness lobby, which exerts a strong influence on public institutions and public policy-making, links purely economic interests with the region, and poses a concrete threat to biodiversity protection and conservation, especially through the large-scale deforestation for extensive livestock farming. The public PA authority SEAM, even though it represents the institution with the official mandate to protect nature, has neither the human, financial, and technical capacity to counteract the strong agricultural lobby not to develop and effectively implement conservation measures, thereby it cannot secure a sustainable environmental agenda. The national and international civil society organizations active in the region are perceived as important complements to the public institutions.

In the context of the interviews, the lack of political interest on the part of the national government for a national environmental agenda is highlighted.

"The disempowerment of SEAM is a direct consequence of the government's understanding of the country's future, which is not based on sustainability, but on the commodification and financialization of public goods and nature." (CS3)

Civil society actors are critical of the national government's clear focus on the country's economic development, which is completely decoupled from the environmental agenda. Consequently, the economic sector and the environmental sector are polarized, and there is a lack of bridging institutions in this context.

"We want the Paraguayan state to understand that its constitution defines Paraguay as a pluri-ethnic and multicultural state. We indigenous people, we Yshir, are part of this nation. We are part of this region." (Community member FGD)

This quote clearly reflects the lack of inclusion and the lack of embrace of indigenous culture in Paraguay in general. The awareness and understanding that people of different identities, cultures, and values, who live in the environment of the protected area, can make an important contribution to the protection and conservation of RNNP is fundamental. To this end, mechanisms guaranteeing the inclusion of the various population and interest groups among different sectors should be fostered by the PA authority, however,

*"SEAM has no policy or vision for the indigenous people, and it does not have even a minimal focus on the knowledge of indigenous people." (*CS6).

This lack of a vision and lack of inclusion of indigenous cultures is not seen as an isolated case just for SEAM; rather it is inter-institutional, deeply rooted in society, reinforced by the media and public education.

"There is a disconnection and disinformation in Paraguayan society that comes from the structure and from the system itself and how the press and the media touch on the issue of the indigenous. ... Talking about indigenous people is talking of assistance, how to do it to equal them to us, as when we are looking to respect differences and diversity because we are different. This is what would enrich Paraguay, to have a community that has a cosmovision, a community that protects the forests that we need to live." (CS3)

The protection of the environment and the right of the population to a healthy environment are guaranteed in the first part of the Paraguayan Constitution (Paraguayan Constitution, 1992) and is mandated to the SEAM (Law No. 1561/00). However, the safeguarding of environmental protection in the Constitution is facing great difficulties in Paraguay.

"Conservation and environmental protection guaranteed in the Constitution does not work when the actual implementation does not favor nature." (A1)

In this context, on the one hand the institutional fragility of SEAM constitutes a major challenge and, on the other hand, land tenure rights for safeguarding integral environmental protection of the national protected area and the guaranteed legal status of the protected area, both significant for a functional protected area, are not ensured. While the RNNP core zone is state owned, land tenure rights for the two expansion areas that contain private properties of various owners, including large national and foreign landowners, are not secured. The legal status of the PA is not legally binding, as its establishment is based exclusively on a presidential decree and not on a decree or law adopted by Parliament; thus it can be revoked or amended without parliamentary assent.

4. Discussion

The insufficient human, financial, and technical capacity of the PA authority to develop and implement protection measures for RNNP further endangers the protection and sustainable use of the Pantanal's natural resources. This is compounded by the lack of cooperation between the various actors and sectors to find common strategies for coordinated protection. The participation of the local population in protection and planning processes is perceived as very low. The local population is marginalized, especially the indigenous community, and has only limited access to education and health. Conflicts of interest between the local population and the agricultural lobby are significant: uncertain land use rights, inequality, and lawlessness result in social conflicts. In such an environment, it is justified to question how current PA governance approaches can be improved to promote good governance, contribute to the conservation of biodiversity, and to improve the livelihoods of the local population.

PA experts emphasize that there is no "*best PA governance model*" (BORRINI-FEYERABEND ET AL. 2013). However, due to the complexity of conservation problems, many authors doubt that exclusive government-led approaches to govern protected areas can succeed (ARMITAGE ET AL. 2012; BORRINI-FEYERABEND ET AL. 2013; STANCIU AND IONIȚĂ 2014; KOTHARI ET AL. 2015). The current governance-by-government approach in Paraguay, in which the sole responsibility for PA lies with the national ministry of the environment, SEAM, must be questioned. Especially in the context of low-income countries that "*lack sound, stable, and supportive legal and political frame*" (STOLL-KLEEMANN ET AL. 2006) favoring biodiversity conservation the, implementation of consistent protected area policies is threatened (BARRET ET AL. 2001). In the Paraguayan context, this is also perceived as critical, since environmental aspects are not anchored in the national political agenda, cutting across all sectors.

The polarization of the environmental and economic sectors as well as the national government's strong focus on Paraguay's economic development that is completely decoupled from any environmental aspects is the baseline for the institutional weakness of the PA authority in the Paraguayan context. These contradictions are common in other Latin America countries (RIVAS 2006) and is evidence of the lack of cross-sectoral cooperation in the public sector.

Consequently, budget restrictions in the environmental sector are narrowing, hindering SEAM's policy-making options in favor of biodiversity conservation, limiting its ability to develop and effectively implement environmental protection measures on-site in the national PAs. This limited institutional capacity, in the form of insufficient human, financial, and technical competence, constitutes the main barrier preventing the fulfillment of its tasks and responsibilities, thus severely impeding the concept of overall good governance in the study area.

Unequal power constellations among public, civil, and private actors, along with insufficient exchange and cooperation between these sectors, further compound general difficulties in promoting biodiversity conservation and, specifically, the protection of the RNNP and its expansion zones. In this regard, well-consolidated agribusiness lobby groups strongly influence the national legislature, increasing pressure on PA through severe land-use changes for extensive export-oriented livestock production, often in the form of illegal deforestation activities in the expansion and buffer zones.

In a context in which the environmental authority is unable to ensure that national PAs are managed effectively, providing long-term protection, multiple studies highlight the

importance of strong actors in civil society that play a key role in building institutional capacity (HOROWITZ 1998; BOWLES AND GINTIS 2002; ADGER, 2003; PRETTY 2003; ANDRADE AND RHODES 2012; KONING ET AL. 2017).

4.1 Finding ways: Inclusive and empowering governance system

To avoid ineffective, top-down management, community participation is required as part of a successful SES system (OSTROM 2010, 2015). One key component for improving PA performance is an inclusive governance system that guarantees local community involvement in PA planning and management, then empowering them (PRETTY 2003; ANDRADE AND RHODES 2012). Yet, under the existing Paraguayan top-down governance approach, cooperation and participation opportunities for local communities are limited. The RNNP, along with its expansion and buffer zones, are severely threatened by the inability of SEAM to develop and establish participatory policies that actively involve the local population in decision-making processes that enhance its protection and the sustainable use of its natural resources.

To not just ensure that democratic rights and responsibilities are practiced, but that all community members are empowered and have a fair chance to participate in decision-making, management of RNNP and its buffer zones must incorporate a participatory approach.

The absence of participatory decision-making processes within the current governance system and the lack of appropriate empowerment mechanisms for the indigenous and rural communities are critical. The current approach severely restricts opportunities for the local population to be active in decision-making processes and limits incentives to assume responsibility for the protection and the sustainable management of the protected area and its natural resources.

The financial and human resource deficiencies of the PA authority can be compensated for by enhancing the inclusion of the local community, not only in decision making processes, but also in creating forms of cooperation (HOROWITZ 1998, ASWANI AND WEIANT 2004, PRETTY AND SMITH 2004) where local people can act as law enforcers on a voluntary basis, inhibiting and reducing outsiders' illegal activity in and around PAs (ANDRADE AND RHODES 2012). Including local actors in decision-making processes may create a sense of stewardship and ownership in which residents collaborate with PA managers and act jointly to conserve biodiversity in PAs (HOROWITZ 1998). By doing so, the effectiveness of environmental policies for the protection of areas with high biodiversity value will be greatly enhanced (JONES ET AL. 2012).

An inclusive decision-making process has further potential, as discussed by ANDRADE AND RHODES (2012). They show that community participation in PA management is one of the most important general strategies for developing local community acceptance of PAs, thus fostering their willingness to comply with PA policies and rules.

4.2 Finding ways 2: Social capital and collective action

An essential pillar of participatory approaches is the creation of a cooperative relationship with all community actors, thus enabling the creation and formation of consolidated groups and new networks (LANE 2001; MASCIA 2003). However, the emergence of cooperative arrangements is threatened in a society where distrust and conflict are pervasive (WADE 2008), which constitutes a central problem in the research area. In this context, social capital is related to "*features of social organizations such as networks, norms and trust that facilitate coordination and co-operation for mutual benefit*" (PUTNAM 1993). This is paramount, as social capital creates trust and fosters the

construction of networks and cooperation within, between, and beyond communities, as "*people have the confidence investing in collective activities, knowing that others will also do so*" (PRETTY AND SMITH 2004).

Three different types of social capital are identified as important for constructing and ensuring networks: bonding, bridging, and linking (WOOLCOCK 2001). Bonding social capital, the existence of "*links between people with similar objectives and manifested in local groups*" (PRETTY 2003), can only be partially identified in the research area, varying greatly within the local communities of the Bahía Negra district. The actors' analysis shows that, in the regional context, bonding social capital within the indigenous community is identifiable in the form of UCINY. However, it represents a significant barrier for the majority of the rural community, which has only limited organizational strength and is usually represented by a lightly connected group that is not necessarily committed.

Bridging social capital is the capacity of those groups to establish links with others that may have different views (ibid.). It poses a further challenge, since no exchange mechanisms could be identified among the local communities. The lack of trust plays an essential role not only between the two communities, but also in the relationship between the community and the consolidated civil society actors, including large NGOs and public international institutions.

As pointed out by the interviewees, in the past, there were major projects by international donors in the region. Based on this experience, a large part of the local population finds the impact of international initiatives to be low, including projects within the framework of the Global Environment Facility (GEF), and their confidence in these institutions is severely impaired.

Lastly, linking social capital is the "*ability of groups to engage with external agencies, either to influence their policies or to draw on useful resources*" (PRETTY AND SMITH 2004). This must also be questioned, as cooperation mechanisms between the communities and SEAM, the protected area managing authority, are limited.

The main challenge to the implementation of participatory mechanisms is the fragile social fabric, including insufficient community cohesion, a lack of organizational capacity among community members, as well as distrust among the rural and indigenous community members.

In this context, the crucial question is how social capital can be enhanced to improve collective action, thus creating and fostering the cooperation of networks within the region. Three key factors are described below.

Participatory government-initiated processes

Research by TOMPKINS ET AL. (2002) examines the role of government-initiated processes in PA management to increase cooperation with community actors and enhance their commitment to participate in biodiversity conservation and protection measures. This process sought to develop a new management plan for a protected area in Tobago through a participatory discourse on co-management opportunities with different actors. An important finding of the research was that positive learning relations among the participants, developed in the process, created linkages among the different sectors and actors, forming a platform that served as a basis for future initiatives. In addition, inclusive and participatory processes are identified as important tools that create social trust and reinforce reciprocity among community members, thus contributing to the

development of long-term obligations between people, which helps achieve positive environmental outcomes (PRETTY 2003).

In the context of the case study, two main initiatives to facilitate the development of social capital are identified. These could provide a baseline not just for creating platforms and enhancing linkages and trust within the local community but also between the different actors and sectors (community, NGOs, government, and private sector).

Network creation through participatory territorial and land-use planning

Under the auspices of the Technical Secretariat for Economic and Social Planning (STP), the strategic planning of the municipality of Bahía Negra is to be strengthened and, for this purpose, an Urban and Territorial Planning (POUT) plan is to be drawn up, for which WWF Paraguay is jointly responsible as the implementing organization. Engaging rural and indigenous communities with local authorities in territorial planning is highlighted by the international guidelines on Urban and Territorial Planning of the United Nations Human Settlements Program (UN 2015). Therefore, this process requires a well-coordinated methodology that uses participatory and coordinated planning tools to promote sustainable land and resource use in combination with development interests. The successful involvement of the local actors in this process will also determine if the plan will be accepted by the local population in the future.

Further, this process has the potential to enable the development of bridging and linking social capital, as the establishment of participatory mechanisms in this process can strengthen dialogue among the actors from all sectors, thus providing scope for network creation and cross-sectoral cooperation in the future. In order to ensure its sustainability in the future, the institutionalization of this process must be fostered, for instance, within the framework of an inclusive and cross-sectoral council in the local administration.

Empowerment through alternative income sources

The empowerment of local communities is critical, in the way that they have the capacity and support they need to play an active role in decision-making (SPRINGER 2016). In this sense, it is of particular importance that mechanisms exist, or are created, to sustainably ensure livelihoods for those marginalized groups that are to participate in the processes and networks. This implies that alternative income sources are guaranteed, which ensure both the sustainable use of natural resources and of livelihood security (DE FRIES ET AL. 2007). Inclusive approaches can be promising by strengthening communities through the creation of alternative sources of income, thereby securing their livelihoods and enabling immediate local participation for the protection and sustainable use of natural resources. In this context, the application process for the UNESCO World Heritage Site designation may play a crucial role.

A declaration has the potential to increase international interest in the Paraguayan Pantanal. This could lead to increased tourism, from which the local population could benefit directly through new sources of income, thus constituting a tool for their empowerment. In addition, creating economic benefits that can be directly linked to Pas is a way to promote positive changes in attitudes toward conservation strategies and create commitment among the population (PRETTY AND SMITH 2004), thus reinforcing the potential of such a declaration. Nevertheless, the extent to which increasing tourism will positively affect the livelihood of the local community cannot yet be assessed.

At the same time, the declaration has further potential, as it may not just generally increase the national government's awareness of the region, but also the specific need to protect

and sustainably use the natural resources of the Paraguayan Pantanal. This may positively influence policy making to better address environmental issues.

5. Conclusion

By researching on how PA governance can be improved in order to sustainably protect the natural resources of Río Negro National Park and its surroundings, while simultaneously striving for sustainable development of the local communities, this work focuses mainly on inclusion and cooperation among the public and civil society sectors as key components for improving PA governance performance, as highlighted in several studies (STEINER ET AL. 2003, ANDERIES ET AL. 2004; CBD 2004; BORRINI-FEYERABEND ET AL. 2013; METCALF ET AL. 2014; CASTRO, URIOS 2016). However, private sector actors play an important role in the research area. As their extensive livestock production increases pressure on the PA, the possibilities for involvement and dialogue with these actors must be considered. In this sense, further studies are needed to explore in greater detail the role of private sector actors in PA governance, thus providing a baseline for an inclusive approach that not only considers the local communities and civil society actors in the region, but also seeks dialogue with private sector actors. At the same time, this analysis does not include strategies or market mechanisms that could support the process of sustainable land-use and the expansion and buffer zones through sustainable extraction patterns. Thus, further studies focusing on market mechanisms are necessary.

From the results, it is possible to conclude that in areas where there is a complex set related to the influence of several actors, a 'governance by government' approach is shown to be inefficient at ensuring social rights and ineffective for governing global biodiversity pools. An way to meet this challenge could be **inclusive and participatory decision-making processes**, which enable cooperation among all actors and across sectors directly or indirectly affected by a protected area. To secure the future of Río Negro National Park, opportunities to facilitate communication between all rights- and stakeholders and to build partnerships and cooperation must be sought. Currently, the lack of collective action mechanisms hinders the active participation of the poorly consolidated, marginalized, local community in the decision-making processes of the region in general, and especially those regarding the protected area.

In this sense, social capital is identified as playing a decisive role, such that increased participation of the local community in the decision-making processes can build trust and awareness among the community, enabling them to take responsibility and facilitating networking between them. Interactive processes among all actors are of vital importance as they strengthen trust and foster **bonding, bridging, and linking social capital** between local community groups and with public and private actors.

On this basis, existing governance performance can be improved by institutionalizing those platforms that create mechanisms for the implementation of co-planning and co-management agreements between the local community and the environmental authority, thus promoting the functioning and protection of the park in the future. Consequently, '**shared governance**' **can be understood as a response** to the 'governance by government' model, in which an empowered local community complements the environmental authority, creating a cooperative approach that better reflects the diverse socio-economic and environmental context in which the protected area is embedded.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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Figure

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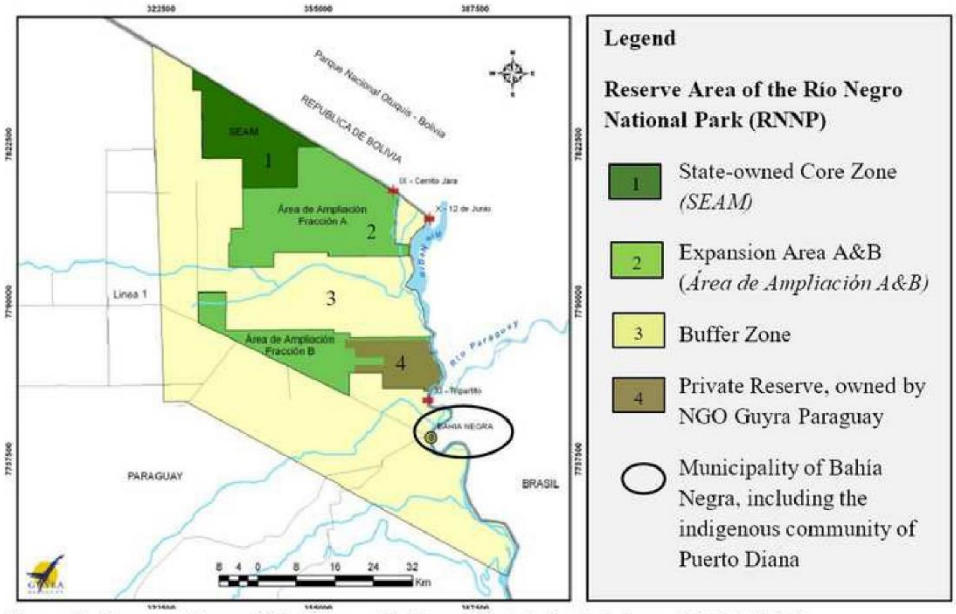

Figure 1: Reserve Area of Río Negro National Park (adapted from SEAM 2011)

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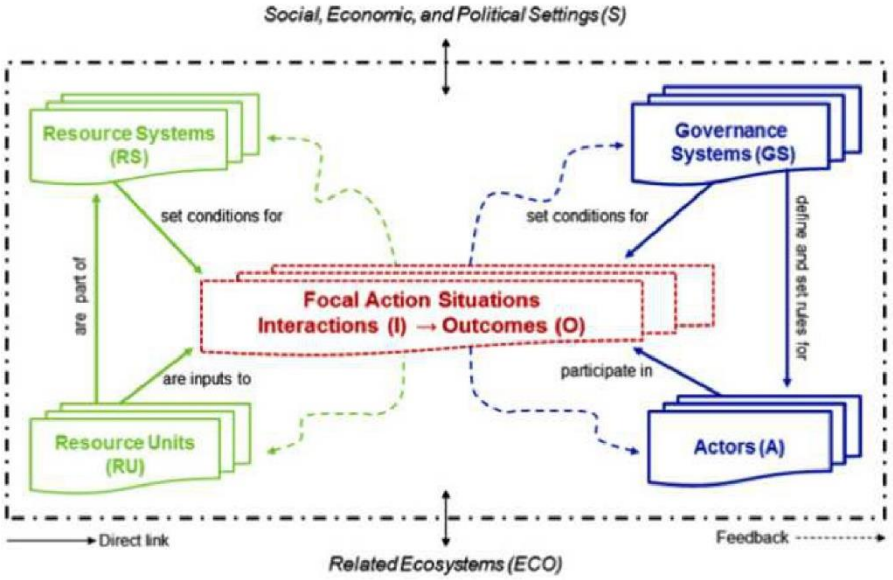

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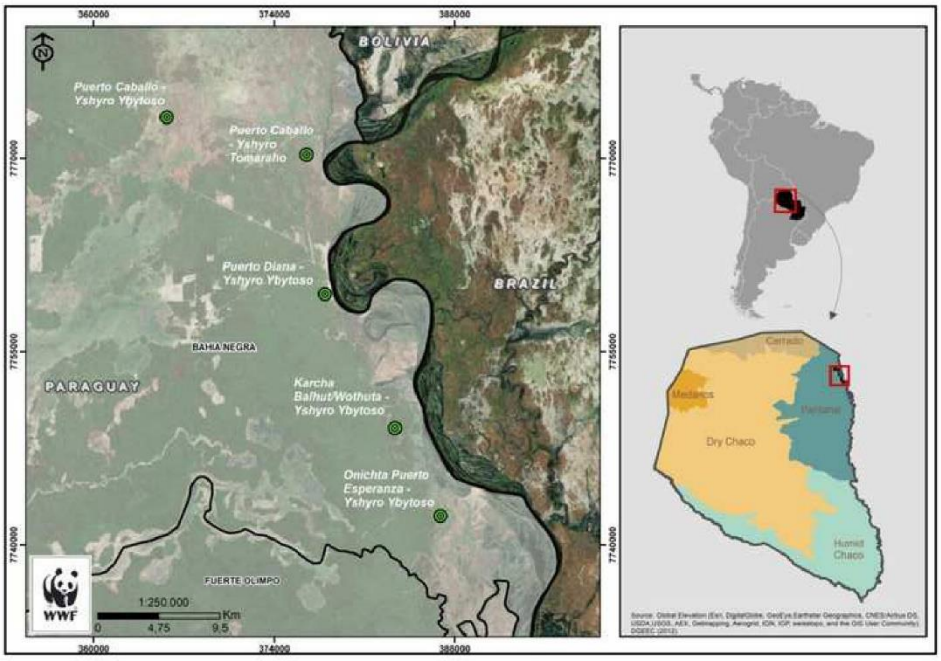

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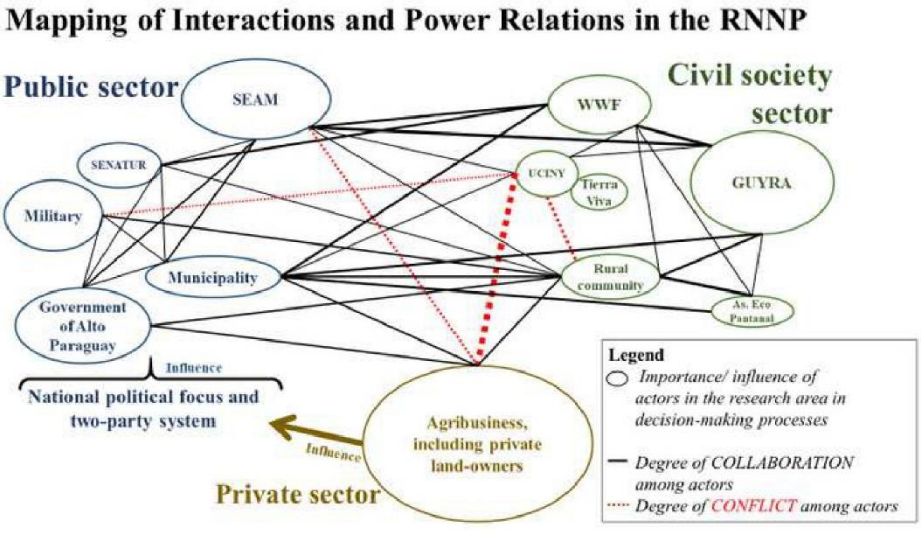

Conflict of Interest

This manuscript has not been published and is not under consideration for publication elsewhere. We have no conflicts of interest to disclose.

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Peacebuilding in Rural Colombia—A Collective Perception of the Integrated Rural Reform (IRR) in the Department of Caquetá (Amazon)

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Abstract: The 2016 peace agreement between the Government of Colombia and the FARC-EP created institutional space for an effective implementation of needed rural reforms. However, the change of power structures also contains risks, like the deterioration of natural resources and the strengthening of other armed groups. By addressing collective perceptions regarding the Integrated Rural Reform (IRR), this paper shows the consequences of the peace agreement for the rural population in the department of Caquetá. Additionally, it presents the main challenges for further departmental development. The case study approach uses both semi-structured expert interviews of rural development stakeholders in different sectors based on three sampling strands, as well as participatory observation in the field. The main findings show an increase of general physical security and (economic) interest in the department since the signing of the agreement, while the deforestation rate, homicides, and threats against social-environmental leaders were all highly increased. The study also derives recommendations of departmental actors in rural development for a more effective peace implementation process, like the change from cattle driven to a more conservational economy with agri-silviculture and ecotourism, led by local civil society. To create a stable peace, it is crucial that the current government effectively implements the IRR, while also considering departmental perceptions of sustainable development. If the implementation process and departmental recognition is not enforced sufficiently, then peace might only be possible at the cost of the Amazon and its nature.

Keywords: peacebuilding; environmental peacebuilding; Colombia; Caquetá; peace agreement; rural development; natural resource management

1. Introduction

After more than half a century of violent conflicts, Colombia commenced an exceptional process toward peace following an agreement between the state and FARC-EP, the leading guerrilla group, that was signed and approved in November 2016. The resulting change in power relations opens new governance spaces for land management in rural areas, which have always been leading cause of disputes in the country [1]. However, as state presence in many conflict regions and sectors is still weak, the development of governmental land use planning also comprises risks for uncontrolled and illicit exploitation of natural resources [2–5].

Since the early 1960s, more than seven million people had to flee their homes and between 1985 and 2015, approximately eight million citizens were victimized in Colombia [6,7]. The presence and actions of armed groups caused land abandonment, but also "erosion of civil rule and the almost absolute lack of justice adjudication in the Colombian countryside" for those who stayed [8] (p. 61).

Starting in the 1980s, many peasants had to pay protective duties to occupiers and were forced to produce coca. In the 1990s, small-scale agricultural production increasingly changed to cattle ranching, thus converting former agricultural fields to extensive pastures [8]. Such land use changes, including shifting forestation patterns, like deforestation in former virgin woodlands, are presented as armed conflicts' outcomes [9–11]. However, forest conservation and wildlife protection enforced by the FARC-EP was observed between 2001 and 2010, during the conflict [8,11,12].

The leadership of natural resource governance profoundly impacts peace building and maintenance on national level [13,14]. Further, the importance of operative institutions for local development is widely discussed and demonstrated [15,16]. However, in Colombia, many studies show that local population needs in rural territories are poorly addressed institutionally [17,18], thereby identifying a general lack of guidelines and weak implementation as well as the application of instruments regarding regional development, land planning, and land use, which threaten national integrity, human livelihoods, and climate change mitigation measures, hence undermining the sustainable development of the country [2,3,19–21].

Studies from the United Nations claim that the cause of the "disruption of state institutions, initiatives, and mechanisms of policy coordination" are violent conflicts [22] (p. 15), whereas other studies see the source of conflict in weak capacities and "institutional failures in dealing with land issues" [23] (p. 99). Hence, weak institutions are a result of armed and violent conflicts but can also be considered as a catalyst for the emergence of armed groups.

Colombia is a centralized state, where policies are developed on a national level, including those operational on the departmental level, even though departments possess a certain degree of autonomy. According to several Colombian scientists, in the post-conflict period, coordination is needed to improve communication within the state across sectors and governance levels, information gaps need to be closed, while national and local institutional capacity must be built. This is considered as crucial not only for stimulating economic growth, but also for protecting ecosystems [2,24]. Strict norms concerning conservation and ecological restoration must be developed to generate control over the most affected and vulnerable regions of the conflict, like the Pacific region, Orinoquía, and the Amazon [25], which involves a challenge to simultaneously integrate local citizens' interests and needs [2,26–28]. In order to create peace and to prevent a relapse into violent disputes, it is equally important that the state considers "the nature as another one of the victims of the 50 years of civil war" [25] (p. 169).

The current peace agreement and peacebuilding efforts are "increasingly compatible with both development and forest conservation" [29] (pp. 2–3). The Integrated Rural Reform (IRR) addresses access and land use, infrastructure and adaption, social development, and encouragement of productivity. It represents the first point of the agreement and was chosen as the unit of analysis (see Table 1). Furthermore, it entails one part of development programs (PDETs) with a territorial focus on particularly conflict-affected rural areas [30]. According to the peace agreement, these programs incorporate municipal as well as departmental authorities for the development of sub-regional planning, as well as proposal development, execution, and monitoring [31].

Table 1. Components of the Integrated Rural Reform, part one of the Colombian peace agreement between the government and FARC-EP.

Access and Land Use	Infrastructure and Adaptation	Social Development	Encouragement of Productivity	PDETs—Programs for Development with a Territorial Focus
fund for land; integral access; formalization of property, restitution of land, rural land registry, agricultural jurisdiction, land suitability, closing of agricultural frontier and environmental protection, peasant reserve zones	country roads, irrigation districts, electrification, and connectivity	health, education, dwelling water	solidary economy and cooperative technical assistance, technology, research on peasant economy, financial capital, social security, food and nutrition security	poverty, illegal economies, major institutional debility

Source: author elaboration, input: reference [30].

The Colombian constitutional court legally compels the future three national governments to realize and execute the peace agreement [32,33]. The aim throughout this period of the peace process is to design plans on a departmental and local scale, which are developed by three governance authorities on national, regional, and local levels, as well as to implement first measures to develop rural territories in the post-conflict era [34,35].

As a matter of fact, the theory of environmental peacebuilding finds the environment to be a substantial driver of conflicts, but also of conflict resolution and peacebuilding. Environmental peacebuilding is considered a further developed theory out of conventional peacebuilding concepts. Early publications discussing the relationship between the environment and conflicts include GALTUNG [36] and LEDERACH [37]. In the 1987 Brundtland Report, the environment is discussed as a source of conflict. More precisely, environmental related stress is identified as a root of conflict. According to DRESSE et al., natural resources entail diverging interests and values in terms of use, availability, and market value, which makes them a target for politicisation and can lead to disputes and violent conflicts [22,38,39]. Apart from having the ability to trigger or contribute to the escalation of a violent conflict, for instance through a settlement strategy for valuable territory and an accompanied coercion for other parts of the population, natural resources and the environment also can become a target (direct or indirect) during violent conflicts. Thus, the environment becomes a weapon, victim, or beneficiary that helps to finance and sustain the conflict [22,38]. Furthermore, conflicts and their outcomes can also beneficially affect the environment. Demilitarized zones, for instance, may facilitate conservation of its biodiversity, creating "ecological heavens" (ibid).

However, studies by Conca and Dabelko [40] or Maas et al. [41] also emphasize features of the environment and natural resources that can help to resolve conflicts and to build sustainable peace. In this sense, the environment possesses a high potential to encourage and enable a dialogue between conflicting parties about shared environmental issues, thus resolving conflict and creating cooperation. Further, environmental cooperation can be the point of origin for the resolution of conflicts as a peacebuilding tool through its official institutionalization. In other words, not only can the environment promote initiatives for improved intergovernmental relations, it can also build societal linkages, as it produces interdependences that can create a regional identity. Here, the environment needs to be governed cooperatively. Only then, if institutions concerning natural resource cooperation are strengthened, can the environment act as a prevention tool against future conflicts [38,40,41].

It is not just Conca and Dabelko who consider the institutionalization of environmental cooperation to be the most important aspect of the concept's success, but also Van Leeuwen and Van Der Haar, who claim that, "In the aftermath of the civil war, many analysts highlight the role of institutions in land disputes" [23] (p. 99). This includes the United Nations, which argues that natural resources can only solidify post-conflict societies and their economy, "if they are managed well" [22] (p. 29). In this sense, environmental cooperation concerning its protection is seen as one pathway toward sustainable peace.

Studies relating to armed conflict, land-system change, and resource issues are rarely proven empirically, or the topic is insufficiently addressed [23,42,43]. Further, there is a lack of studies in areas where armed conflicts are frequent [42]. While there are investigations into the intensification and recurrence of (armed) resource conflicts, led by circumvention of local institutions [39,44], few address the nexus between natural resources and post-conflict peace in practice as well as its enhancing factors on the interface of local perceptions and institutional governance [45]. Dresse et al. argue that "although recent research strongly suggests that shared natural resources can effectively contribute to building sustainable peace, the question of whether and how this can be effected remains open" [38] (p. 15).

Reinforced through upper research gaps, this research seeks to understand the peacebuilding process and interrelated land-use factors by analyzing the peace agreement implementation process and the concomitant consequences for the rural population of Caquetá. It investigates possible solution paths for sustainable rural development with the environment as a possible peace vector. Therefore, we investigate the perception of the Integrated Rural Reform (IRR), the first point of the agreement among departmental actors in the policy fields of rural development, focusing on the questions:

(1) What effects does the Integrated Rural Reform (IRR) of the Colombian Peace Agreement have on the rural population?
(2) What are resulting key challenges for successfully implementing the IRR?
(3) What are departmental recommendations for rural reform and how do they relate to the IRR?

2. Materials and Methods

2.1. Study Site

The field research was mainly carried out in Caquetá, as departmental investigation unit. Caquetá was chosen for the following reasons:

(1) It is located in rural Colombia, with a low population and low density [46]. Caquetá covers 88,965 km^2 and is the third largest department of Colombia, but only home to half a million inhabitants, representing roughly one percent of Colombia's population. It is located in the occidental part of the Amazon Basin of Colombia, covering roughly one-third of the country's total area. The department's population and infrastructure decline moving eastward, from the Andean piedmont toward the Amazon plains. The highest incomes are generated by the exploitation of land and its natural resources.

Caquetá is Colombia's fifth largest milk producer. The main income sources in the department are generated though large-scale, extensive cattle farming for dairy products, but also meat, where 60% of the trade is dominated by 250 farmers, causing the most critical conflicts of land use in the Amazon region [47]. Furthermore, agriculture depicts a very important source for income, like the cultivation of African palm, rubber as well as various vegetables and fruits, namely cacao, coffee, rice, beans, corn, watermelon, or yucca. Most products are destined for international exportation [48–50]. Another growing pillar of Caquetá's economic income is extraction of fossil fuels and minerals, such as coal and gold, as well as hydropower plants and catchment lakes [51]. The illegal cultivation of coca (*Erythroxylon coca*) was a formative phenomenon of the Colombian economy, especially in areas close to the Andean foothills [51,52].

(2) Not only did Caquetá suffer significantly from the civil conflict, it simultaneously lacks national state recognition [53]. Caquetá was marked by forced displacements, expropriation, migration, and victims through the civil conflict (see Figure 1), especially in the 1960s and 1980s. The department was one of the most affected regions during the long-standing armed conflict [54]. Its location between the wetland department Meta in the north, the impenetrable eastern departments of the deeper Amazon, the proximity to the Ecuadorian border vía Putumayo in the south, and the rugged eastern Andean Cordillera in the west, paired with its concurrent provinciality made Caquetá strategically very important for the guerrillas [4]. Accordingly, drug trafficking between the Amazon and the Pacific ports of Tumaco in Nariño or toward Cauca became a main economic activity for the guerrillas. FARC-EP

were also involved in social, military, and economic control, especially in rural parts, where they even fulfilled judicial responsibilities. Furthermore, they controlled income to rural zones [51].

(3) It includes large and highly important ecological regions. Four national natural parks safeguard approximately 25,000 km^2 of the rich biodiversity, including large parts of the Cordillera de los Picachos in the Andes and Serranía de Chiribiquete, which hosts important indigenous petroglyphs and pictographs. However, in 2018, one quarter of Colombia's deforestation, which depicts a loss of 46,765 hectares of rainforest, occurred in Caquetá only [55]. The deforestation is driven by illegal urban settlements and increasing logging activities in the deeper Amazon [50].

(4) There is a lack of scientific knowledge about this region, in both the natural and social sciences, as the research site has been difficult to reach in recent decades.

Therefore, it represents a unique measurable and valuable unit of analysis.

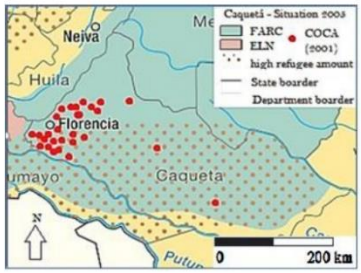

Figure 1. Guerrilla presence and refugee activities (2005) as well as coca production (2001) in Caquetá. Source: reference [33], modified with data from reference [54] (p. 33).

2.2. Study Design

In the actualization of the peace agreement implementation process, there is a strong diversity and non-transparency of actors and actions in the field of rural development and its governance, as several new peace agencies have been founded. As a result, a stakeholder and person related approach was chosen to acquire the necessary primary data, framed in a case study design [56,57]. To obtain in-depth understanding of local citizens' interests and needs [2,27,28], the IRR implementation process in Caquetá was analyzed using a qualitative methodological approach, which can be best described as abductive, based on the Grounded Theory developed by Glaser and Strauss [58]. Here, the main objective is not the validation of existing theories, but rather the discovery of innovative theoretical concepts in a processual research approach.

Data collection is based on two qualitative methods: (1) semi-structured interviews and (2) participatory observation. For (1), a total of 17 expert interviews with representatives of major bodies of the public sector (international, national, departmental) and social groups (universities, chamber of commerce, NGOs) in the field of rural development were held. Seven interviews were organized in Bogotá to verify and refine the research question and focus. Subsequently, twelve interviews with in-situ rural development stakeholders in Caquetá were conducted (see Table 2). They were recorded by permission, each taking an average of about 45 min. The questions were formulated openly and were grouped in three categories that align with the main research questions of this paper: (i) effects of the IRR on the rural population; (ii) resulting challenges for its successful implementation; and (iii) recommendations from the departmental level. In accordance with the study design, theoretical sampling was applied to approach persons or groups with diverging positions to the research issue, in order to reach a "theoretical saturation" [59] (p. 164). This open sampling strategy helps to discover relevant aspects of the research field and simultaneously prevents misperceptions of the researcher through ex-ante determinations [60]. In detail, three sampling methods were applied:

Availability sampling: Here, the most easily accessible interview partners were approached and utilized. Initially, ZALF and further research institutions in the field of land use, rural development, and post-conflict were contacted either by e-mail or via telephone. In this way, primary interviews could be conducted on the national level in Bogotá, mostly entailing universities.

Purposive sampling: In this step, the researchers independently selected relevant interview partners, in this case in Florencia and San Vicente del Caguán with the help of a local "gatekeeper" [59] (p. 164) provided by the International Center for Tropical Agriculture (CIAT).

Sampling using the snowball system: Through this approach, interview partners refer to other important and relevant actors outside of their point of view, which helps with unveiling the non-transparent and rather delicate research field in Caquetá [61].

Table 2. Interviewed actors of rural development and occasions for participatory observation.

Interviewed Actors through Qualitative Inquiry		
Organisation, Location, Date	**Type of Organisation**	**Function of Interviewee(s)**
Universidad Nacional, Faculty of Agricultural Sciences, Department of Agronomy, D.C., Bogotá, 21.09.17	Education and research, public	Professor
Universidad de los Andes, Interdisciplinary Centre for Development Studies, D.C., Bogotá, 25.09.17	Education and research, private	Professor
Universidad de los Andes, Faculty of Economy, D.C., Bogotá, 29.09.17	Education and research, private	Professor in the field of organisations and management
World Wide Fund For Nature Colombia, D.C., Bogotá, 27.09.17	NGO	Specialist in agroindustrial policy and commodities
International Center for Tropical Agriculture, Valle del Cauca, Cali (CIAT campus), 03.10.17, 24.11.17	Research institute and field work	Senior expert for market and value chain; expert for sustainable food systems
Fundación Picachos, Caquetá, Florencia, 18.10.17a	NGO	President
Universidad de la Amazonia, Faculty of Agricultural Sciences, Caquetá, Florencia, 18.10.17b	Education and research, public, autonomous	Professor
Universidad de la Amazonia, Agroecological Engineering, Caquetá, Florencia, 18.10.17c	Education and research, public, autonomous	Professor
Departmental Government, Ministry of Planning, Caquetá, Florencia, 19.10.17	State	Minister
Corpoamazonia, Caquetá, Florencia, 20.10.17a	State	Director
Chamber of Commerce of Caquetá, Caquetá, Florencia, 23.10.17	Private, corporative character, non-profit	Executive president
Military (Army) of Colombia, Caquetá, Florencia, 20.10.17b	State	Brigadier
Departmental Government, Ministry of Agriculture, Caquetá, Florencia, 20.10.17c	State	Ex-minister, member of ministry
Regional technical office for cattle and dairy economy in Caquetá, Caquetá, Florencia, 21.10.17	State	Technician and expert in cattle value chain
National Natural Park Sierra de Chiribiquete, Caquetá, San Vicente del Caguán, 02.11.17	State	All employees
United States Agency for International Development, Caquetá, San Vicente del Caguán, 25.10.17	International corporation agency	Associated employee
Agency of Territorial Renovation, Caquetá, San Vicente del Caguán, 24.10.17	State	Person in charge
Participatory Observation		
Title of Meeting/Occasion	**Place; Date**	**Type of Participants**
Conference between farmers' cooperations and a Colombian food production firm	Campo Hermoso, San Vicente del Caguán, Caquetá; 24.10.17	Local dairy farmers with approx. 30–60 head of livestock (Ø one head of livestock per ha), a local farmer's cooperative, a cooperative from Florencia and Bogotá, representative of Colombia's biggest dairy producer
Monthly meeting of regional NGO and local community for peace building actions in the municipality	San Vicente del Caguán, Caquetá; 27.10.17	RED Caquetá Paz, JUNTA de Acción Comunal, representative of Colombian Army
Monthly meeting of the municipal peace council	San Vicente del Caguán, Caquetá; 02.11.17	Mayor, representatives of USAID, UNDP, Colombian Army, local civil society groups (youth, women, afrocolombians, indigenous people, Colombian peace commission, church)

Source: author elaboration.

(2) Data collection through participatory observation is especially helpful to understand "processes, organizations, relations, courses of action or patterns of interaction" [62] (p. 855), especially in complex settings, like those in the case of Caquetá. The current situation was observed during three separate research visits to rural Caquetá (see Table 2). As this is an explorative study in a still fragile context, it can be rather difficult to conduct observations at events of rural importance. Nevertheless, this approach aimed to involve one gathering of the most important private sector in Caquetá, one meeting with local civil society representatives, as well as one broader political council addressing the circumstances of peace. This helps to better comprehend the current state of rural development from another, amplified angle.

The analysis of the gathered data follows the approach of Flick [63]: Perceived issues of the implementation process of the peace agreement as well as problem solutions are categorized with umbrella terms which organically evolved through the screening of the transcripts, ranked according to frequency and set into relation with the research objectives. Through this, not just are bottlenecks of prevailing negative issues identified, but also limiting factors and objectives or measures for their resolution are developed [64,65].

3. Results

The presentation of the results corresponds to the three leading research questions of the paper. The first and second questions are grouped together, as changes and challenges through the IRR of the peace agreement are closely intertwined. Research question three is presented separately.

3.1. Effects and Challenges of the Integrated Rural Reform on the Rural Population

Based on this paper's research, a multitude of positive and negative implications of the peace agreement process are identified, which are summarized in the Table 3.

Table 3. Positive and negative perceptions from the peace implementation process (numbers in brackets show the number of interviewees who mentioned this aspect).

Policy Fields	Positive	Negative
Social Changes	• Physical security (12/12) • Higher emotional stability (4/12) • Better and more transit (3/12) • Better conditions for victims (2/12)	• Little sympathy for the peace agreement • Higher amount of assassinations of social leaders (2/12) • Numbness of population (2/12)
Economical Changes	• Hope for more productive and prosperous economy (6/12)	• Foreign interest in land • Still not many multinationals
Environmental Changes		• Strong deforestation growth since peace agreement (3/12)
Political/institu-tional changes	• Space for institutional-building to start	• Institutional strength is getting worse (6/12) • Not much advance of peace agreement implementation yet (4/12) • Other groups have taken space of FARC-EP
Other	• Former great stigmatization of Caquetá is diminishing/diminished	

Source: author elaboration.

The most striking finding entails an improved perception of physical security since the peace agreement was signed. All interviewees reported improvements of all-encompassing physical security across Caquetá, especially in rural regions. The violence against civilians and state bodies, prominently

the military, ceased. The formerly ubiquitous blackmailing similarly stopped. However, despite the improvement of physical security, half of the interviewed stakeholders see a risk for a continuation of violent actions through other autonomous groups, if resocialization and rehabilitation processes of ex-combatants fail. Further, contrary to this positive aspect of social development, two actors clearly spot a much higher quantity of assassinations of social leaders, like those of indigenous origin or of municipal mayors (20.10.17b, 18.10.17b). The forces behind these attacks were not further elucidated on by the interviewees.

As a result of the renewed stability, mobility patterns also drastically improved. Throughout the conflict, roadblocks and armed assaults on vehicles by guerrillas regularly impeded the free transit of persons and goods, if not making transit outright impossible. Now, even transit in darkness is safely possible. Interviewees report that they are able to reach land that was previously inaccessible or occupied by guerrillas (18.10.17a). Developing Caquetá into a safe and penetrable space also brings foreign transit to the department. Improved accessibility to rural Caquetá raises hope that it will develop a more productive and prosperous economy. Present conditions enable free trade and transport for many products like dairy or fruits, which was not possible during the FARC-EP occupation. The observed activities of Colombia's biggest dairy producer in rural Caquetá are a valid indicator for this development, as well as international corporation's involvement (25.10.17). Beyond that, the economic sector of tourism, which is basically undeveloped in Caquetá, is increasingly important to state actors (20.10.17b). However, an environmental NGO admonishes that, "if the integrated productive development will not work, the absence facilitates the dissidents" (18.10.17a). Four civil society representatives sense a higher emotional stability among the citizens, accompanied by hope in the fulfilment of the IRR.

Despite such positive developments, the confidence, belief, and trust in the government and its plans is still rather low. The transition period between conflict and final peace surprised many people in Caquetá, resulting in a "numbness of the population" (18.10.17b), as a university professor termed it. The population's ongoing doubt is not just directed toward the new living circumstances but also towards the national government and its potential future actions (ibid.).

3.1.1. Environmental Changes

All aspects of the environmental changes, mentioned by the interviewees, entail negative environmental development in the post-conflict era, led by strong growth and its resulting "explosion of deforestation" (18.10.17b, 18.10.17c), denounced by professors at the University of the Amazon. Civil society actors recognize an ecological devastation process in Caquetá, which accompanies the rise of deforestation, entailing threats for wildlife, water bodies, and the general biodiversity of the Amazonian rainforest. According to most interviewed stakeholders in rural development in Caquetá, armed groups played an important role in forest area management. In most parts of Caquetá, they controlled the agricultural frontier, hence controlling the size of forest to be used, wildlife protection, and even the management of soil. These elements were determined in local constitutions and monitored at the household level. In addition to conservational control, armed groups were also responsible for the illegal coca production and illegal mining, which led to local exploitation of natural and geological resources with negative impacts on the environment, as pointed out by state actors (20.10.17a, 20.10.17b). In addition, the production of staple foods, like yucca or beans, was under the control of armed groups. With focus on only the armed group's influence on natural resources, it can be noted that all interviewed actors for this topic held that the groups' impact on the environment during the conflict was rather positive because it limited deforestation in the Amazon, which is now intensifying, after the conflict and guerrilla occupation has ceased. One-third of mostly state actors argue that armed groups contributed to the exploitation of the environment in a negative way. Thus, future challenges represent developments in accordance with nature, especially regarding the importance of cattle culture in Caquetá and the growing interest in cattle production and expansion since the

peace process commenced. The main identified causes here represent extensive cattle ranching and the expansion of road infrastructure. Minor impacts are caused by illegal cultivations and timber cutting.

3.1.2. Political and Institutional Changes

Several political and institutional trends can be ascertained, however, most are negative. Half of the interviewees perceive a worsening of institutional structures since 2016. The institutional space that was opened by the withdrawal of armed groups, most importantly FARC-EP, ought to be filled by official public entities; but progress on this point is slow. Hence, state management for many policies is not present, and the operational implementation of the peace agreement stagnates, for instance, for the substitution of coca. There is practical ambiguity between national authorities, with specific competences remaining unclear. This is apparent through agencies that deal with the peace agreement implementation, as well as several development plans, mostly on the national scale, but that overlap in many respects (21.10.17). Additionally, as apparent from observation of the monthly municipal peace council in San Vicente del Caguán, there is inconsistency between local politicians and civil society. The mayor argues that much of the IRR has already been achieved, whereas farmers perceive a lack state support and demand a "peace, that has to be more real."

Furthermore, the national government distrusts municipal development plans, wherefore more time is needed to agree on the peace agreement implementation plans, the PDETs, between national agencies and municipalities (21.10.17). While the process of institutional change is being prolonged, other groups take or have already taken the space of former guerrilla groups (20.10.17a, 20.10.17c, 19.10.17). That is why the challenges for the IRR, according to nine of twelve respondents, represent the improvement of institutional structure settings and political actions. More precisely, better coordination mechanisms and communication, more financial support and non-military state personnel is required. The observation at the monthly meeting of the regional NGO RED Caquetá Paz shows that there are immediate efforts being undertaken by the local rural civil society to support the state in the realization of the IRR by creating a link to the population.

Moreover, the previously poor reputation of the department due to its former violent risks during the intense conflict is now undergoing a substantive change (18.10.17a).

3.2. Departmental Recommendations for Rural Reforms in the Peace Process

Three key departmental attempts for more sustainable rural development were ascertained through this study: (a) a change of economic production focus, (b) conservation and economic use of the environment, and (c) civil society empowerment and international support. Two-thirds of the interviewees stress the importance of shifting the economy to focus away from the cattle industry toward alternative forms of production, like silvipastoral systems (02.11.17, 18.10.17c), and intensification instead of a further extensivation of cattle production to limit the deforestation impact of ranching activities (19.10.17), or the intensification of marginal sectors to "embrace the possibility of agriculture" (18.10.17b). Consequently, augmented national state long-term financial investment is required in all production sectors, as noted by several interviewees (20.10.17a, 23.10.17, 18.10.17a).

Furthermore, five actors consider the environment to be an important asset for future development in Caquetá. Representatives of the National Park Chiribiquete underline the need for the official step to close the deforestation line and to reconvert already deteriorated land in order to achieve the sustainable development of Caquetá's natural resources (02.11.17). Based on a conservational treatment of forest resources, actors emphasize other possibilities of economic exploitation, such as non-timber forest products, payment for forest use, or the possibility of (ecological) tourism to its waters and rainforest (20.10.17a, 19.10.17).

To achieve these goals, the influence of civil society and international corporations is crucial, as the peace agreement does not cover departmental concepts explicitly (23.10.17). Here, actors from civil society, international corporations, and national environmental agencies could depict nodal actors for an integrated institutional management and surveillance of natural resources, including the Amazon.

4. Discussion

Certain issues posed by the interviewees, like specific tools for civil, local, and departmental empowerment, sustainable production pathways, or the issue of corruption are not embodied in the official peace agreement document. Despite increased physical security and transit improvements, considerable threats and violence against social leaders and human rights activists increased concomitantly, as stated by interviewees in Caquetá, but have also been observable at the national Colombian level [2]. In 2017, there were 45% more murdered activists and ex-FARC-EP members than in 2016 [33,66].

A study by BORON et al. [67], discussing landscape changes and their effect on rural development in Colombia, recognizes that, within a business as usual scenario, inequality, biodiversity and natural resources as well as food security are negatively affected. Regarding the impacts of the peace agreement and its implementation process in Caquetá, even an intensification of cattle activities, indicated through the interest and presence of the big national dairy product manufacturer Alpina, is perceptible. This differs from interviewee's preferred sustainable production pathways and therefore depicts a symptom of unclear statements in the peace agreement. Additionally, rather weak institutional control capacities in this economic branch might favor further expansion. Moreover, Cheng and Zaum [68] consider economic liberalization during post-conflict transitions to be a supporting instrument for aggravated corruption, which is also a problem mentioned by interviewees (e.g., 18.10.17b).

As concluded by the actors of rural development in Caquetá, the peace process also entails large environmental threats, especially accelerated deforestation and exploitation of the cleared land. Studies and developments show that those perceived effects are real phenomena [7,55]. In this regard, environmental protection as one item within the "Access and Land Use" section of the IRR is not ensured.

In 2003, a study by Alvarez [8] mentions the difficulty of forest management in Colombia, as only armed groups form a way of coercive conservation. Further, threats concerning accelerating natural deterioration are identified [4]. Research since signing of the peace agreement finds that since the absence of FARC-EP in rural areas, various legal and illegal industries filled the resulting vacuum, engaging in logging, gold-mining, and increased cattle-grazing [7,33,69], including in Caquetá [70]. The overwhelmingly positive responses of the interviewees regarding the environmental conservation function that FARC-EP provided during their activity can be, consequently, verified through qualitative data.

A lack of formal institutional spaces not only intensifies environmental degradation but also promotes the strengthening of other armed groups, like neo-paramilitaries, ELN or FARC-EP dissidents. This is one effect of insufficient accommodation and reintegration of ex-guerrilla members, who are known to operate in Caquetá [33,71].

Although positive changes are perceptible since the peace agreement was signed, only five percent were implemented within one year [72]. A slow advance of the process was noted by interviewed stakeholders. Further, several investigations show that the institutional positioning of the state is neglected [33,73]. A demonstration by coca farmers in San Vicente del Caguán during the research stay that criticized the weak state enforcement of substitution support, indicates such official non-compliance, including weak social development.

The key challenges for successfully implementing the peace agreement rest upon the government's commitment to effectively implement it. Therefore, the Colombian state must show its presence, reconstructing and reinforcing its governance to overcome its historic institutional fragility [65,74]. Equally important is the re-establishment of civilian confidence and trust in official institutions, like the peace agreement. A study by Kurtenbach [75] concludes that Colombian trust in political institutions, like the government, judiciary, and congress, is lower than in their armed forces. Better measurability and visibility of the peace agreement implementation can help to enhance trust, as would focusing on long-term solutions instead of just short-term results [33].

Even before the peace agreement was signed, scientists warned against "full-blown, large-scale, unplanned exploitation" [8] (p. 64) on the formerly protected woody areas through guerrillas by the initiated development in the post-conflict situation [11]. As other studies and the results of the present study show, deforestation accelerated enormously, especially in officially protected areas [7].

At the beginning of 2018, President Santos declared the creation of the National Agricultural Frontier (NAF), which involved the opening of 35% of the national territory for interventions, like agroeconomic, cattle industry, forestry, or fisheries. Currently, 7.6 million ha are cultivated in Colombia, which represent 20% of the NAF, with 80% remaining to fill the 35% of the country's national territory [76]. However, there are no specific regulations in the peace agreement for sustainable land use, like traditional or agroecological farming. This, in turn, facilitates more intensive and competitive forms of land use, further encouraging deforestation, which, paradoxically, should be monitored and restricted through the IRR [30]. These circumstances threaten its successful implementation, not only in Caquetá, but throughout the whole of Colombia.

A study by the United Nations, which derives factors for successful peace construction from lessons of Guatemala, El Salvador, and Rwanda, argues that the stabilization of the agricultural frontier represents an especially important step, as well as the accompanying equal (re)distribution of land [2,7,11,77]. In the case of Caquetá, the historical process of land access has its origins in the titling of vacant lots in the forest made by the government throughout the 20th century. The titling process occurred under historical milestones of the armed conflict and led to disputes of land use. Currently, despite the predominance of medium-sized properties in Caquetá, there is still an unequal distribution of land in vacant lots, with large properties representing 1.6% of the total number of lots awarded and controlling 14.2% of the total area awarded, while small properties represent 24.7% and control only 3.1% of the total area awarded [78]. Thus, the implementation of the IRR is important in order to grant more equal access to land, especially through the enforcement ability by state agencies and their technical capacities to at least secure the NAF [2,24].

In contrast to these rather anxious voices arguing that environmental deterioration consequently threatens successful peace agreement implementation, Alvarez [8] underlines that post-conflict reconstruction "will necessarily involve the country's forest and biodiversity resources" to build peace (p. 65, emphasis in original). This opinion queries the theory of environmental peacebuilding, which sees nature conservation as an instrument to create a common understanding and cooperative usage, thus, in turn, peace. Furthermore, this viewpoint poses another question, regarding accelerated deforestation in the post-conflict of Caquetá: does the environment need to be sacrificed to a certain degree (for instance, within the scope of NAF), so that peace enhancing development steps take place?

According to Reardon [7], conservation objectives must be brought together with addressing the social issues which emerged from the conflict. The challenge, therefore, is to "clarify and secure rights of land tenure and resource access" [77] (p. 63), which is also mentioned by interviewed stakeholders. Namely, landowners, who want to return to their lands, face severe problems because much of their former land was transformed into protected areas. Further challenges for sustainable peace, include delivery of basic services, like energy, health care, and education, as well as equal structural change actions for all inhabitants [11,74]. These points are officially incorporated in the IRR, but are not yet practically enforced, as demonstrations and stakeholder statements illustrate. SCHWARZ and HUCK [33] indicate that a lasting and successful peace depends on the right-wing government of Duque, which agrees with the interviewees' perceptions. Although the Colombian constitutional court legally compelled the government to implement the peace agreement, it can still change items of the document and/or decelerate its process, as the weak promotion of peace talks with other, still existing, guerrilla groups, like ELN, show.

Three action proposals for the improvement of future and current rural development in Caquetá were identified through stakeholder inclusion. Similar to the present research outcomes, other studies on peacebuilding in Uganda and Colombia find that e.g., a change away from cattle ranching as the main source of economic income can generate more jobs in rural areas and, additionally, can consolidate peace

if the potential of commercial agriculture is taken into account during the process [2,79]. Encouraging the cultivation of global commodities, like coffee, cacao, and tropical fruits can be part of the solution, additionally promoting biodiversity and more forest-friendly land use in rural Colombia [80]. Within Caquetá's development plan from 2016, coffee and cacao were considered as having high potential for the region [81]. Two out of three interviewed stakeholders are open to a change in production, toward the intensification of cattle ranching in order to reduce further expansion, willing to embrace the possibility of agriculture or (agri-) silvicultural systems. BAPTISTE et al. call these rather forest-friendly production methods "the best peacebuilding strategy that Colombia has" [80] (p. 2).

Further, the government of Caquetá recognizes its environmental potential, including its biodiversity of natural landscapes for economic usage, such as ecological tourism [81]. However, the widening of the NAF, weak environmental control mechanisms, as well as interest in cattle industries by large firms indicate a further expansion of cattle ranching. This would mean rather one-dimensional economic growth, which leaves out alternative production and economic conservation possibilities, which are not, or unclearly, formulated in the peace agreement. Such progress can threaten a stable peace and, furthermore, "facilitate the dissidents if the integrated productive development will not work" (18.10.17a).

A 2015 study by the United Nations found that civil society and its organizations, like universities, NGOs, and local communities, are important for determining opportunities for sustainable development by incorporating the natural offer of the locality, hence filling the institutional vacuums left since FARC-EP retrenched [11]. A strengthening of civil society organizations and international corporations is officially anchored in the IRR. As observations in Caquetá show, such development can enhance the empowerment of peasants struggling with insufficient governmental support.

5. Conclusions

This paper investigates the effects of the Colombian peace agreement, signed between FARC-EP and the Colombian Government, on the rural population in the department of Caquetá. A number of positive developments occurring since the peace agreement was signed were identified, such as improvements in physical security and prosperous outlooks for economic development in Caquetá. At the same time, shortcomings are also extrapolated by this study: assassination attempts on social leaders increased, deforestation strongly exploded after FARC-EP left, and, in general, the agreement's implementation by the national state lacks sufficient progress. This shows that despite remarkable efforts carried out to create a formal agreement that promotes the nexus between natural resources and peacebuilding, its effective implementation is a complex process that demands augmented inclusion of the interests of local actors.

The resulting challenge is primarily the commitment of the government to effectively implement the agreement. Therefore, simultaneously discovered institutional deficiencies in peace policies need to be tackled on the national level, as weak enforcement exacerbates current problems, especially deforestation. To overcome these shortcomings, this survey extrapolates departmental development paths, entailing alternative small-scale agri-silvicultural production and environmental conservation approaches. To achieve these goals, the influence of civil society and international corporations is crucial, as the peace agreement does not cover departmental concepts explicitly.

Additional case studies addressing the matter of environmental peacebuilding are needed specifically to tackle the question of whether and how shared natural resources can effectively contribute to sustainable peace, as this study shows diverging outcomes to the prevailing view of this theory. It is hoped that the current government will enforce the implementation of the IRR and limit deforestation to prevent peace at the cost of the environment. Further, cooperation among stakeholders is needed in order to achieve widely supported sustainable development in rural Colombia. Otherwise, inadequate land management could create new conflicts.

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2. NON-PEER-REVIEWED PUBLICATIONS RELEVANT TO THE TOPIC

Eufemia, L., Bonatti, M., & Lana, M. A. (2018). Colombia's rural development must honour peace agreement. *Nature, 560*(7716), 29.

DOI: 10.1038/d41586-018-05847-x

Eufemia, L., Bonatti, M., Castro-Nunez, A., Lana, M., Morales, H., & Sieber, S. (2019). Colombia's inadequate environmental goals. *Science (New York, NY), 364*(6439), 444.

DOI: 10.1126/science.aax3494

3. FIELD RESEARCH PHOTOS

Ph. 1. Flooded Savannas, Colombian Llanos - 2017 (© Jorge García, Courtesy WWF Colombia)

Ph. 2. Landscape, Paraguayan Pantanal - 2019 (© Luca Eufemia, ZALF)

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I hereby declare that I completed the doctoral thesis independently based on the stated resources and aids. I have not applied for a doctoral degree elsewhere and do not have a corresponding doctoral degree.

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