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Causality and Institutional Distance in International Conservation and Development:

A Telecoupling Approach

Ph.D. thesis

Louise Marie Busck-Lumholt

Doctorate Program in Environmental Science and Technology

Institute of Environmental Science and Technology (ICTA)

Universitat Autònoma de Barcelona (UAB)

Supervisor: Esteve Corbera

Co-supervisor: Ole Mertz

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Abstract

Critical development research keeps receiving renewed momentum as a response to the increasing awareness of the challenges related to project interventions in the global South, often facilitated by transnational and international actors. A vast amount of research documenting problems with participation and conservation outcomes of such development interventions mirrors a situation of limited improvement or status quo. From a critical realist standpoint and based on data from fieldwork, qualitative interviews, and literature review, this thesis explores new ways to illuminate the causes behind this phenomenon using a telecoupling lens and focusing on Integrated Conservation and Development Projects (ICDPs). Specifically, the research asks: How can telecoupling be operationalized to shed new light on the management and sustainability of ICDPs? How are actors positioned to influence the design of ICDPs? And which logic dominates among the actors who have the power to define the design of ICDPs?

I answer these questions in the following manner. First, I introduce three collective writings, including two collective reports and a book chapter, which jointly review and expand the theoretical framework of telecoupling while serving the preparation and development of research articles 1, 2, and 3. The two collective reports highlight knowledge gaps in actor identification and causal analysis, while the book chapter illustrates how the telecoupling framework can improve by integrating an environmental justice approach.

Building on these insights, I demonstrate how such theoretical integration, together with a direct empirical application, represents the most significant potential for telecoupling to improve causal attribution in Land System Science (LSS). The analysis shows how telecoupling has the potential to support an integrated analysis of various sustainability challenges and cause-effect relationships over distance. Next, I show how this potential can be applied to shed new light on an apparent status quo of Indigenous Peoples and Local Communities' (IPLCs) role in development interventions, specifically in ICDPs. This discussion unfolds by examining the institutional structure of project actors' roles and responsibilities in a case study of a World Bank-financed Forest and Community project in Salta, Argentina. The research demonstrates that project actors are relatively detached and operate in different design and implementation systems, resulting in a limited engagement with and participation of IPLCs in the project. Third, and motivated by the last remark, I test the hypothesis that an analysis of the institutional logic of development professionals working in some of the top international development banks and aid agencies can contribute to explaining why IPLCs do not form part of key decision-making processes. The thesis concludes by highlighting key scientific contributions and by suggesting future research avenues in the field of telecoupling research and international conservation and development.

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List of abbreviations

CBNRM	Community Based Natural Resource Management
FAO	Food and Agriculture Organization
FAG	Forest Advisors Group
ICDP	Integrated Conservation and Development Project
IDB	Inter-American Development Bank
IFRC	International Forest Regime Complex
IPLC	Indigenous Peoples and Local Communities
LSS	Land System Science
NFAP	National Forest Action Plans
NGO	Non-Governmental Organization
PFM	Participatory Forest Management
TFAP	Tropical Forest Action Program
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forest
USAID	U. S. Agency of International Development
SFM	Sustainable Forest Management
WB	World Bank

1. Introduction

Over the past decades, transnational actors have increasingly been defining concerns about the sustainability of social-ecological systems (Hale, 2020). After the Rio summit in 1992, most countries in the world committed to environmental standards and manifested official sustainability goals. However, it has almost become a universal narrative that these environmental standards are too costly for developing countries to comply with on their own. As a result, competing bureaucracies in developing states often seek political coalitions with other countries and international organizations to enhance their power and get financial aid to meet environmental standards without compromising the often impoverished national economies (Burns et al., 2016b).

From acknowledging such interconnectedness and the general role of globalization in the climate crisis, holistic approaches to understanding sustainability problems and associated solutions have gained popularity amongst scientists and organizations working with international environmental policy, international conservation efforts, and aid delivery. This thesis departs conceptually from this acknowledgment and operationalizes and expands the telecoupling framework as a systematic approach to addressing relationships between distant actors and the social-ecological systems they are embedded in and committed to working with. Telecoupled systems are characterized by the network of flows between actors, of which the focus in this thesis is on financial flows (Galaz et al., 2018) and informational and discursive flows (Persson & Mertz, 2019).

A phenomenon that mirrors key challenges of power and information asymmetries in institutional telecouplings of environment and development interventions is the development of Integrated Conservation and Development Projects (ICDPs). ICDPs typically represent multiple objectives managed by a multitude of transnational actors in various financial and political relationships (Salafsky, 2011). Multilateral funding of such integrated projects increased since the 1980s (Miller, 2014) when ICDPs became a prevalent aid-based conservation approach. Generally, the increasing recognition of the need to conserve important biomes like forest reserves to mitigate climate change and the participation of local communities in such efforts has received widespread attention from the acknowledgment that the success of interventions depends on the actors living in or nearby the area that should be conserved (Dawson et al. 2021). In theory, ICDPs are grounded in a participatory and community-driven approach to development and environmental protection (Bank & Sills, 2014). However, the level of participation of Indigenous People and Local Communities (IPLCs) and the conservation effect of such projects is often limited (Wainwright & Wehrmeyer, 1998; Mutune & Lund, 2016; Bank & Sills 2014; Saguin, 2018), and when participation materializes it is frequently as

consultations and invitations to provide input in the implementation phase (Hulshof, 2019; Hampson et al., 2017; Aguilar-Støen & Hirsch, 2017; Pham, 2018; Gugerty et al., 2021; Busck-Lumholt et al., 2022b).

The reasons behind these challenges still represent a knowledge gap in Land System Science (LSS) and development research, to which this thesis strives to contribute. Some examples in the literature have addressed the possibility of addressing cause-effect relationships in LSS with a telecoupling approach (Meyfroidt, 2019; Carlson et al., 2018), but we still know little about how existing research has applied telecoupling to do so. Research article 1 strives to expand the understanding of causality in LSS and provide examples from existing literature on how the telecoupling framework can facilitate the identification of a variety of complex causes behind sustainability challenges in a more holistic way than previously attempted.

This analytical lens is applied to the study of ICDP management to illuminate embedded power and information asymmetries in telecoupled systems. Research articles 2 and 3 unfold the discussion of why power and information asymmetries between project actors persist despite long and growing evidence on the role of IPLC participation in ICDPs. Research article 2 does this by showing how actors at the receiving end of ICDP activities are subject to unidirectional, indirect, or missing financial, informational, and legislative flows from actors directly involved in macro-level decisions on ICDP design and management procedures. Following these findings, research article 3 explores the institutional logic of development professionals as the reason why development professionals do not collaborate directly with IPLCs. Moreover, the diagnostic tool presented in research article 2 meets existing calls for approaches to examine the behavior of development actors relative to where their position in existing power matrices (Hughes, 2009).

The following section presents the aim and research questions that have guided the thesis and the data collection for individual research articles.

1.1 Research questions

The overall objective is to explore the potential of telecoupling to illuminate new aspects of sustainability challenges and the complexity of their causes. Furthermore, the research aims to apply the insights of such investigation to uncover the often-limited participation of IPLCs in ICDP management. In this thesis, the term ICDP applies to international development projects with a combined rural development and natural resource protection component and, therefore, include cases with more indirect conservation objectives.

The following three research questions develops in a way that allows the answers from one to inform the other in an iterative process. The inquiry starts broadly with the conceptual discussion of telecoupling guided by the following research question:

1. *How can telecoupling be operationalized to shed new light on sustainability challenges and their causalities?*

This question is addressed in research article 1 (section 5.2.1) and investigates the applicability of the telecoupling framework in LSS by reviewing examples of how telecoupling literature approaches causality, conceptually and empirically. The article highlights how telecoupling can contribute to a better understanding of causality in land system science by engaging more directly with qualitative methods and temporality. The analysis draws on insights from the collective report 1 (Appendix B) on approaches to causes and impacts in telecoupling research, and the example unfolded in the book chapter (Appendix A) on integrating telecoupling with environmental justice. With the point of departure in the case study of an ICDP in Argentina and motivated by the discussion of telecoupling and environmental justice, the following research question asks:

2. *How are actors positioned to influence the design of ICDPs?*

This question is addressed in research article 2 (section 5.2.2), which develops and tests a telecoupling-inspired diagnostic tool to understand what drives institutional distance in ICDPs by identifying flows between project actors. The focus on actors at multiple scales is inspired by the research initiated in collective report 2 (Appendix C) on how telecoupling research can approach actor identification and analysis. This research provides direction for the final part of the thesis that zooms in on the issue of distance among actors in ICDPs, guided by the following question:

3. *Which logic dominates among the project actors that have the power to define the design of ICDPs?*

This question departs directly from the findings in research article 2, which show how IPLC beneficiaries are rarely involved in key decision-making on ICDP design. To shed further light on this tendency, research article 3 (section 5.2.3) conducts a broad qualitative survey that explores how the institutional logic of development professionals working with the management of ICDPs explains such an outcome.

The research questions represent the iterative movement from theoretical conceptualization to empirical explanation. Altogether, the research objective is met by an experimental engagement with the telecoupling framework, an analysis of the type of flows (financial, informational, discursive) dominating project design and management, the type of distances (social, economic, geographical) between sending and receiving systems, and the nuances of institutional logics explaining such distance.

1.2 Thesis outline

With the point of departure in the research questions raised in section 1.1, chapter two presents the theoretical background. The chapter includes an introduction to telecoupling, its relevance for causal analysis, the integration with aspects of institutional analysis, and the broader theoretical context of international development, participation, and institutional logic. The following chapter three presents the thesis' empirical context by introducing milestones of international forest and environmental policies, the background of integrated project approaches to development aid delivery, and the case of forest management in Argentina. Chapter four presents the thesis' philosophy of science, methodology, and applied methods and shares ethical reflections on researcher positionality. Chapter five presents the results starting with a section introducing joint research from where the operationalization of telecoupling departs. This includes a book chapter on environmental justice and represents an example of how to conceptually expand telecoupling to account for participation, distribution, and recognition issues. In addition, the chapter presents two collective reports (Appendix B, C) that review existing telecoupling research to identify approaches to the identification of causes, impacts, and actors. The chapter then presents the three research articles that address the research questions. This includes research article 1 on telecoupling and causality in LSS, research article 2 on the distance between institutions in ICDPs, and research article 3 on the institutional logic of development professionals. Finally, the thesis concludes in chapter six by summarizing its main scientific contributions and highlighting policy recommendations and future research avenues.

2. Theoretical background

2.1 Introducing telecoupling

Theory development in the field of LSS is increasingly challenging due to the complexity related to drivers and outcomes of dynamic flows and interactions over large distances. The idea of *telecoupling* facilitates analysis of this complexity. Telecoupling research is still a novel field, but there are already diverging definitions of the concept. Some scholars treat it as a framework, others as a theory or methodology. This thesis understands telecoupling as a heuristic that can become a useful analytical framework when operationalized through existing theoretical concepts and methodologies relevant to the research of interest. As discussed in research article 1, telecoupling contributes additional insight on causality only when clarifying the research problem in focus. The result is analyses that can inform policy in a more practical and context-specific way. Therefore, the broader telecoupling ‘toolbox’ must always be accompanied by specific recommendations for different disciplines and research topics.

Research article 2 offers a way to expand the telecoupling framework with elements from institutional analysis to understand better the management of conservation and development projects funded by international organizations. This contribution differs from the broader and more general attempts to operationalize the concept, but this does not mean it is less significant. As Hull and Liu (2018) put it, “telecouplings are linked to other telecouplings” (p. 41). Thereby, a telecoupling analysis should, on the one hand, be ‘small’ and concrete but, on the other hand, never be considered as a closed circle in that it always forms part of a bigger picture of multiply interconnected telecouplings.

The telecoupling lens demands a holistic view of a range of mechanisms at multiple scales while simultaneously requiring a high level of detail, focus, and context-specific information. Statements on the importance of capturing the whole picture are symptomatic for scholars advocating for the telecoupling approach. For example, Baird and Fox (2015) argue that telecoupling “(..) considers the complex connections between multiple places, and we should recognize that multiple factors related to political economy, ecology, politics, culture and individual agency are all important and highly variable.” (p. 442). In this approach lies a risk that the resulting analysis in the attempt to capture everything ends up with nearly nothing or at least a very superficial analysis. Therefore, scoping and setting the research boundary is simultaneously vital and challenging.

The system boundary in telecoupling research depends on the research problem and the analytical entry point. Following this understanding, the telecoupling analysis requires a multi-level approach because systems are hierarchically structured and entangled with different levels essential to consider. These

include the telecoupled system level (sending-, receiving-, and spill-over systems), the coupled system level (the structure of either one of these systems), and finally, the component level (the agents, causes, and effects nested in each system) (Liu et al., 2013).

The telecoupling interactions in focus in this thesis are development and conservation investments and knowledge transfers, conceptualized as institutional telecoupling through financial, information, and discursive flows. Analyzing these flows between actors in international conservation and development can reveal gaps between official intentions and actual incentives across scales. The development and conservation investments of particular interest are at project scale in the form of ICDPs and other environmental and development programs funded by international organizations. Knowledge transfers include but are not limited to theoretical concepts, management approaches, and political guidelines, which can likewise have different sustainability implications in sending, receiving, and spill-over systems (Liu et al., 2014).

Scholars have explored telecoupling through qualitative and quantitative research topics and methodologies, and various disciplinary perspectives continuously expand and challenge the concept. What these perspectives have had in common so far is a focus on sustainability. And that is how this thesis approaches telecoupling, i.e., as a holistic perspective on issues of sustainability that can complement existing frameworks and methodologies. On that note, the recommendations provided for telecoupling research in this thesis are most relevant for qualitative and mixed methods approaches, as seen in Friis and Nielsen (2017a), Oberlack et al. (2018), Yang et al. (2018) and Zhang et al. (2018).

2.2 Telecoupling and causal analysis

This thesis shows how a relatively simple idea like telecoupling can elevate causal understanding in LSS and provide new insights into causal mechanisms related to the reasons behind limited participation in ICDPs. In applying the telecoupling framework as a heuristic, the notion of what makes a cause and what makes an effect will change depending on the analytical entry point, i.e., which flows and actors one looks at and what is considered sending, receiving, and spillover systems. This argument speaks to the idea of observer-dependent truth.

Telecoupling should not be understood as a theory and cannot be verified or falsified as its components are methodological constructions that do not prescribe any specific information about the studied reality. Nevertheless, Telecoupling can support research in navigating the fuzziness of globalization in a structured yet flexible way. As goes for its ability to qualify causal understanding in LSS, explored in research article 1, a question arises whether causes are only real if they can be proven. This scientific

and philosophical question has occupied many theorists in both social and natural research throughout history and has motivated the conceptual telecoupling reflections in this thesis. Science has long started to attribute causality beyond what can be directly proven, but there are not many holistic analytical frameworks that manage this accepted uncertainty about causal relationships. This thesis argues that telecoupling contributes to addressing this gap by facilitating a systematic analysis of complex system interactions despite unknown or uncertain aspects of the studied process.

Telecoupling asks not what can be seen as a cause for the studied object but about what might have an interaction with the object of study. The framework guides the identification of the interaction, and once identified, it is up to the individual research inquiry if and how it should be measured or described. Thus, it is the analytical process that the telecoupling framework supports which can ensure a more nuanced understanding of causal mechanisms within LSS and beyond. One aspect of this is the argument for a flow approach to the analysis of sustainability challenges to take the researcher on a journey beyond what can be imagined with common sense (as advocated in critical realism cf. section 4.1). Since common sense is informed by everyday experience, what lies beyond our experience also lies beyond what we can imagine using common sense.

Scientific generalization and theory building can enhance and advance the knowledge base on causal attribution and causal mechanisms related to telecoupled land use and land use change. However, the character and de facto impact of more intangible drivers and causal mechanisms might only be revealed (sometimes by coincidence) when addressed through governance interventions. Thus, targeted and monitored actions in the science-policy interface are paramount to advance causal attribution further, and governance interventions can be a useful way to provide direction in cases where telecoupling analyses meet too many complex and uncertain variables to provide concrete insight on causality.

Overall, the theoretical background of this thesis' approach to telecoupling ties closely to critical realism and philosophical questions on the ontological implications of different research approaches. In the end, initiatives like telecoupling might erode the relevance of talking about one-to-one causality, as it keeps being empirically demonstrated that there are always multiple explanations behind a phenomenon and that we can only hypothesize about the individual contribution of each storyline. Therefore, the focus should be on which drivers are likely to have the largest influence on an observed outcome and, to bridge the science-policy interface by being transparent about which drivers are possible to regulate and how.

These theoretical reflections on telecoupling and causality are directly represented in research article 1 and have inspired research articles 2 and 3 to look beyond immediately observable drivers and effects and pay attention to more intangible and complex structures such as incentives among development professionals.

2.3 Telecoupling and institutional analysis

This thesis aims at expanding the applicability of telecoupling by engaging with aspects of institutional analysis to capture actor dynamics, institutional behavior, and their causalities in international conservation and development. In telecoupling literature, there has been a primary focus on trade and commodity flows. As a result, there are few but some attempts to assess pathways of influence, knowledge, and discourse between institutions that have been inspirational to this thesis.

Galaz et al. (2018) explore the links between financial giants and changes in biophysical ‘tipping elements’ in Brazil's Amazon rainforest and Boreal forests in Canada and Russia. They conclude that financial giants influence the forest biomes by financing extractive activities of companies (Galaz et al., 2018), but do not go into detail with analysis of the institutional mechanisms either facilitating or working against such influence or the official and unofficial agendas that fuel these different mechanisms. Oberlack et al. (2018) provide such detail in their polycentric perspective on telecoupled system governance. They argue that the lens of telecoupling provides an opportunity to

(1) systematically expand the scope of institutional analysis from nested levels of spatial scale (small to large resources; local to global institutions) to networks and connectivity among social-ecological systems; (2) advancing theories of polycentric governance systems; and (3) revealing how distant actors and connecting flows influence the sustainability of resource governance and use. (Oberlack et al., 2018, p. 2).

Their application of telecoupling enables analysis of the networks of actors and processes in social-ecological systems that influence the sustainability of land use (Oberlack et al., 2018). This connectivity is characteristic of the governance of international conservation and development projects. Combining telecoupling with a focus on institutions in ICDPs can reveal how, at different scales, actors, relationships, and flows influence management and decision-making. Institutions are dictating information flow pathways (Liu et al., 2013), and the telecoupling concept of flows is thus comparable to Ostrom's (2005) notion that institutional behavior is about the choices individuals make regarding constitutional, operational, or collective actions. Institutional behavior' and logic can either hinder or facilitate telecouplings (Liu et al., 2013).

Furthermore, the actor-network approach in Seaquist and Johansson (2019) and the schematic representation of telecoupling as a way to analyze governance by Eakin et al. (2014) inspire the institutional telecoupling approach operationalized in research article 2. As opposed to Eakin et al. (2014), who focus primarily on impacts and draw the system boundary around two or more social-ecological systems, research article 2 operationalizes the concept of a sending system to the studied empirical context of actors involved in project design and the receiving system as those involved with implementation. Such an approach implies a stronger focus on interactions between actors and their incentives. Building on Eakin et al. (2014) and Hull and Liu (2018), the concept of distance has inspired the analysis of flows in research article 2. As Hull and Liu (2018) argue, a system can be geographically connected to another, but if there are no or few shared institutional linkages, it becomes socially distant. This argument inspired the mechanism of the diagnostic tool that shows the distance as dependent on the direction and strength of flows between systems and vice versa.

Moreover, to fully understand the complexity of what drives this distance, it is necessary to look beyond the formal arrangements and pay attention to more informal incentive structures often affecting the implementation of environmental and development interventions (Ribot & Peluso, 2009; Pasgaard & Mertz, 2016; Lund & Saito-Jensen, 2013; Li, 2007; Burns et al., 2017). Regarding incentive structures, this thesis makes an association between informal, indirect, or missing flows and the concept of hidden institutions (Hobley, 1996), as will be elaborated further in section 2.4.

This thesis argues that more information about indirect, hidden, or missing flows between actors in social-ecological systems can be derived if acknowledging that there can be, and often is, a distance between their official mission and an actual interest. Research articles 2 and 3 show examples of how institutional behavior can be driven more by personality than organizational principles in cases where management procedures are not made explicit. Such cases tend to create a vacuum in the project machinery, enabling discretionary decision-making. Thus, the concept of hidden institutions is included in this thesis to discuss cases when actors try to fill a vacuum with those rules and procedures that best fit their underlying beliefs and priorities. While informal, such behavior becomes institutionalized if the practice is repetitive and culturally bounded.

Accounting for hidden institutions in more detail calls for more extended fieldwork and observation of social practice than this thesis provides, as it can be challenging to observe and measure from the outside and often requires access to sensitive information. Still, it is crucial to make an effort even if an exhaustive list of influencing mechanisms is infeasible because these hidden or underlying structures can be just as decisive as formal institutional rules and regulations (Bernstein and Cashore, 2012; Burns et

al., 2017). For example, personal relationships among project actors can be decisive for ICDP management approaches and outcomes. Moreover, the individual mentalities of actors with a high level of decision-making authority can define an entire organization regardless of whether the majority shares the priorities (Leftwich, 2010).

This call for attention to underlying mechanisms when analyzing institutional telecouplings is directly associated with the message in research article 1, that qualitative and integrated approaches to telecoupling can help illuminate the complexity surrounding causality in LSS. By supporting the identification of missing flows and detecting direct and indirect flows across scales and system boundaries, telecoupling can indicate how formal and informal behavior influences the connectivity (or disconnectivity) between sending and receiving systems. Combined with institutional analysis, it then becomes possible to assess which formal and informal institutional relationships are maintaining or dismantling telecouplings.

2.4 Development, participation, and institutional logic

In addition to telecoupling, the theoretical framework of the thesis is grounded in development and participation literature and theory on institutional logic. These conceptual pillars support the identification of power and information asymmetries among project actors, including individual mentalities, roles, and responsibilities. This thesis supports a critical lens on development and sees development projects in the context of discourse and power structures in society, mediated by actors, directly and indirectly, involved in their design and implementation. To unfold discussions on development, power imbalances, and information asymmetry, this thesis draws on flagship contributions in the field (Ferguson, 1994; Hobley, 1996; Li, 2007; Ribot, 2004) and more recent evidence (Reed et al., 2020; Fox, 2020; Siegel & Bastos Lima, 2020). In addition, specific literature on international development agencies has inspired the conceptual frameworks of research articles 2 and 3, including literature on the role of the World Bank (Burns et al., 2017; Ika, 2015) and the effect of development projects (Eriksen et al., 2021) and participatory efforts (Mutune & Lund, 2016).

On the issue of participation, this research is inspired by the framework of NORAD (2013) which, compared to other typologies of participation (Arnstein, 1969; Satyal et al., 2018), is a more explorative approach to participation, structured around key questions on the mode of participation across each phase of a project cycle. The framework motivated the data collection for research articles 2 and 3 to integrate aspects into the interview templates that support categorization and analysis of the various approaches to participation that different actors express concerning activities from early design to final evaluation.

This thesis argues that the participation narrative has become too entangled with patron-client relationships and a condescending approach to IPLCs due to the sending-receiving mechanism embedded in the aid and project delivery system. Theories of participation tend to discern between those who need help and those who can deliver this help through finance, knowledge, and capacity building. This thesis argues that it is more supportive of institutional change to work with collaborative management and IPLC decision-making concepts since the term participation presupposes an activity already decided in which actors can participate. Local decision-making across the project cycle is a prerequisite for local definition-making of sustainability problems and solutions. Limiting IPLC participation to later project stages in the implementation phase works against this ideal, as problems and solutions are often defined and prioritized in the earlier design phases while negotiating the distribution of loans or grants. Budgets frequently remain unspent simply because of this decoupling between the design (including the size of loan or grant) and the implementation system (research article 2).

The concepts of development and participation relate to the concept of accountability. This thesis addresses accountability issues when applying the management diagnostic tool in research article 2. In addition, perceived accountability towards local beneficiaries is part of the analysis of institutional logic among development professionals in research article 3. Winters (2010), who has inspired the theoretical understanding of accountability in this thesis, provides a framework to understand potential gaps between official statements and de facto behavior concerning donor responsiveness to end users in aid-receiving countries. He argues that this results from the sometimes multiple and conflicting accountability relations to end users, funders, taxpayers, and donor contributors, which is also a critical point in Martens (2002), as elaborated below.

The broader understanding of institutional telecouplings and the concept of institutional logic draws on organization theory (Galbraith, 1974), institutional economics (Martens, 2002), institutional analysis (Ostrom, 2005), and concepts borrowed from mental model research (Lynam et al., 2012). Galbraith (1974) conceptualizes organizational complexity and introduces the phenomenon of task uncertainty as a key aspect of this complexity. The greater the uncertainty of the task, the greater the amount of information that must be processed between decision-makers during the execution of the task. He argues that to reduce task uncertainty, one must either reduce the amount of information required or increase the amount of information processed (Galbraith, 1974). This idea inspired qualitative interviews in this thesis to reveal levels of awareness about roles and responsibilities. The analysis of roles and

responsibilities accounts for the perception of individual actors and the official statements of their respective agencies, as the two can diverge and lead to different behavioral outcomes.

The discussions on international development agencies and participation of local beneficiaries further build on Martens (2002) to understand some of the institutional economics defining the relationship between actors in the development aid delivery system. Martens (2002) speaks of a broken feedback loop between local needs and foreign aid decision-making as there is “no obvious mechanism for transmitting the beneficiaries’ view.” (p. 35). In turn, he argues that the decision-makers in aid agencies are more likely to make choices based on their constituencies' preferences than those of the aid recipients. Thereby, he shows how incentives in the aid delivery process can explain aid performance. Martens (2002) offers a way to focus on more micro-level decision-making rather than macro-level institutional analysis. This perspective inspires both research article 2 in terms of the breakdown of how institutions are included in macro- and micro-level decisions across project cycles and research article 3 by supporting a focus on the internalized bias of donors’ institutional logic regarding local beneficiaries.

Martens (2002) theorizes that part of the explanation for the broken feedback loop is that “the people for whose benefit aid agencies work are not the same as those from whom their revenues are obtained” (p. 14). Therefore, local beneficiaries cannot hold development agencies accountable by modulating payments based on performance. Martens (2002) argues that this fact influences the career concerns of development professionals and the incentives to demonstrate abilities through multiple tasks and easy-to-monitor tasks. In turn, it is related to the notion of task uncertainty in Galbraith (1974) as the geographical and political separation between international development agencies and local beneficiaries “increases the costs and decreases the benefits of information.” (Martens, 2002: p. 15). He further discusses the potential consequences of such dynamics, including a stronger focus on input activities (such as spending budgets, hiring of personnel, and awareness raising) than on the quality of the project or program results. In turn, he points to a bias regarding decisions that favor easy monitoring, the ability to demonstrate and measure results, and the ability to demonstrate budget spending (Martens, 2002).

Although Ostrom’s Institutional Analysis and Development framework (IAD) (2005) is not directly applied in this thesis, it has greatly inspired the development of the diagnostic tool in research article 2. Furthermore, it is also motivational for the focus on institutional logic in research article 3. The original purpose of the IAD framework is to predict and explain outcomes of interventions to enhance the sustainability of commons such as forests and fishery stocks. It addresses actors’ positions in macro-

and micro-governance structures and the formal and informal rule sets that make up such structures. Ostrom (2005) speaks against centralized natural resource management interventions and emphasizes that if biodiversity (emphasis on diversity) is to be protected, rich local knowledge about those ecologies and institutions that match the complexity of the systems involved is vital. It is about building multitiered systems at multiple scales rather than having a uniform top-down panacea that is predicted to cure everything but instead reproduces the status quo or worsens it. This argument echoes the need elaborated in this thesis to accompany the bottom-up trends in official development project designs with diagnostic tools that can reveal whether they are so in practice. Such diagnostic can, aside from revealing mismanagement, strengthen the documentation of real success, thereby motivating the political will to designate more land to sustainable and democratic common property institutions.

The concept of institutions underpins many of the theoretical discussions in this thesis. The relationship between individual agents and institutions is understood here as dialectic. As put by Friedland and Alford (1991),

(institutions) provide individuals with vocabularies of motives and with a sense of self. They generate not only which is valued, but the rules by which it is calibrated and distributed. Institutions set the limits on the very nature of rationality and, by implication, of individuality. Nonetheless, individuals, groups, and organizations try to use institutional orders to their own advantage. (p. 251).

The lack of dedicated attention to hidden institutions and informal structures is discussed as part of the underlying cause for ambivalent outcomes or failure in that there can be many determining drivers in this less observable domain. Here Hobley (1996) argues that concerning the covert (hidden) institution, “many of the efforts directed towards institutional development focus on training and internal management systems. Yet this is likely to be ineffective if rent-seeking drives incentives in detrimental directions.” (p. 23). Further, Hobley (1996) argues that the existence of hidden institutions can explain some of the causes of why implementing organizations of development projects keep producing status quo despite numerous training exercises officially supposed to facilitate institutional change.

The broad understanding of the power dynamics underpinning international development and participation discourse in this thesis draws on Giddens (1984), who understands power as the ability of actors to define and decide in line with their own interests relative to the interests of other actors. Power asymmetries among actors in social-ecological and telecoupled systems can thus be identified by

looking at how roles of autonomy and dependence are created and reproduced in the dialectic relationship between actors and between actors and embedded institutional structures (Giddens, 1979). However, rather than directly applying a theory of power and discourse analysis, notions of power and discursive aspects are addressed through the operationalization of flows in research article 2 and the institutional logic framework in research article 3.

This thesis applies the concept of discourse to describe information flows and dominant definitions of development success and failure (Persson & Mertz, 2019). The concept of power, in turn, is included to characterize asymmetries between actors' positions in ICDPs, tied to their official and unofficial roles in management and access to information and important meetings. While regulatory powers as part of the conceptualization of legislative flows in research article 2, this thesis focuses mainly on the definition- and decision-making powers (Arts, 2003) related to institutional telecouplings and expressed through financial, discursive, and informational flows. Strong official discourse and homogenization concerning a group of actors such as IPLCs or international development agencies can mask the individuality and dynamic of power relations and more hidden structures (Peck & Theodore, 2012).

3. International forest and environmental policies and projects

This chapter presents the empirical context of research articles 2 and 3 and elaborates on relevant discussions not captured in the correspondent publications. Firstly, this includes a presentation of milestones in international policy on forests and environmental protection and the major organizations influencing its development. Then, the chapter presents international organizations' role in the integrated project approach to conservation and development, and finally, the chapter zooms in on the political context in Argentina, where the data for research article 2 was collected.

3.1 Development of international forest and environment policy

Research article 2 analyzes how institutions and actors at different scales are included in managing a forest and community project that has the overarching goal of supporting local livelihoods while protecting forests. Today, deforestation and climate change are widely acknowledged global and local challenges, but the nature of the root problems and solutions are greatly disputed. Institutions dealing with forestry issues in a climate change context and at an international scale have been referred to in the literature as an International Forest Regime Complex (IFRC) (Giessen, 2013). The IFRC and associated international policy development is an essential context for the discussions in research article 2 and the motivation for developing research article 3 on institutional logic as it explains some of the power and information asymmetries of today's design and management of conservation and development initiatives, also beyond the forest sector.

Krasner (1982) defines an international regime as “sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations.” Giessen (2013), among others, points out that the IFR is not providing any single binding agreement but is instead highly fragmented and involves many different interests and objectives, which is why it is often described as a *complex* (see Rayner et al., 2010; Glück et al., 2010; Howlett and Rayner, 2010). The term *regime* is subject to debate due to this great fragmentation of the associated institutional networks (Giessen, 2013; Humphreys, 2006). Adding the term “complex” helps to bridge this disagreement by opening up a discussion of both formal and informal cooperation and fragmentation. Thus, a regime complex can, also in line with Rayner et al. (2010) and Glück et al. (2010), be understood as “a set of specialized regimes and other governance arrangements that are more or less loosely linked together, sometimes reinforcing each other but at other times overlapping and conflicting.” (Giessen, 2013, p. 62). Broadly speaking, the conflict arises mainly between utilitarian and conservation-oriented forest actors (Giessen et al., 2014). This thesis adheres to the idea of IFRC but addresses the associated challenges at a narrower institutional scale (cf. research articles 2 and 3).

As goes for international policy development, from the 1980s and onwards, different factors have contributed to putting deforestation on the agenda. The Brundtland report in 1987 officially linked deforestation to ethics by using the term *sustainable development* as the concept of evolving without compromising the living standards of future generations. This report coupled environmental, social, and economic objectives, a trinity reestablished during the United Nations Conference for Environment and Development (UNCED) in Rio 1992 (Castañeda, 2000). Grassroots groups advocating for customary rights also started to attract more international attention. The livelihoods of IPLCs have historically been suppressed by colonial powers claiming ownership of their land and its natural resources, resources they had managed sustainably for decades (Domínguez & Luoma, 2020).

A series of international processes followed the UNCED in 1992. After acknowledging the need to deal with various environmental and social issues to address climate change in a just and sustainable way, many private, governmental, and non-governmental actors started negotiating how (MacDicken et al., 2015). Among the key efforts to streamline a global approach to forest management was an expert meeting on the Harmonization of Criteria and Indicators for Sustainable Forest Management held by FAO/ International Tropical Timber Organization (ITTO) in Rome 1995 and an Intergovernmental Seminar on Criteria and Indicators in Helsinki 1996 held by the government of Finland and supported by FAO. In addition, FAO has been considered a primary “Task Manager” of the ad hoc programs following the UNCED in 1992, such as Forest Resource Assessments (FRAs) and for the operationalization of SFM criteria and indicators on a national level (Casteñeda, 2000).

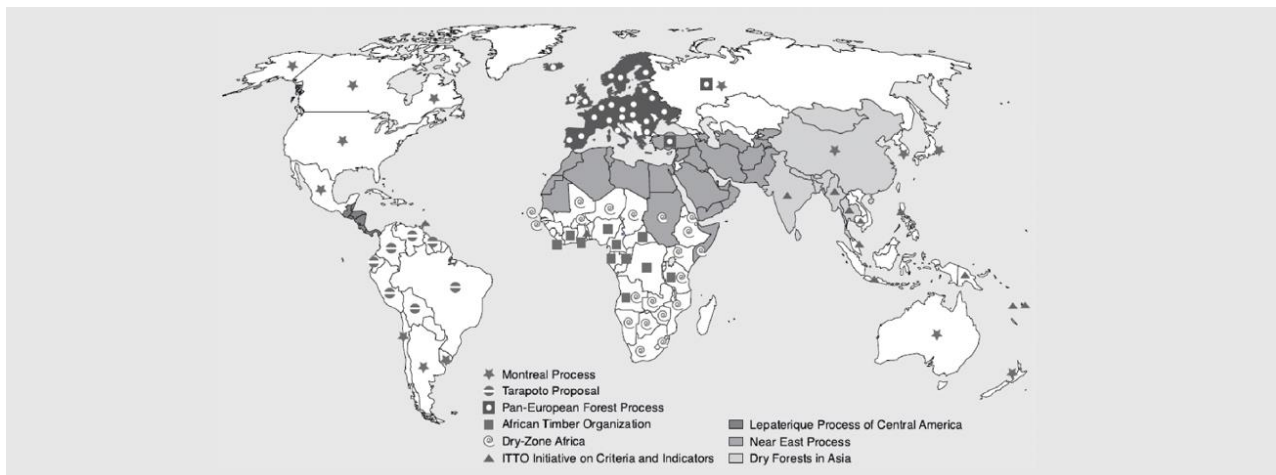
Through these processes, the participating parties were to agree upon a set of criteria and indicators for sustainability and sustainable development, as it was defined in the Brundtland report (1987). Concerning forests, Castañeda (2000) defines criteria as “the essential elements or principles against which sustainability of forest management is judged” and indicators as “quantitative or qualitative *indicators*, which are measured and monitored regularly to determine the effects of forest management interventions over time.” (p. 34). From the negotiations in Rome, Helsinki, and other following international events, the following thematic elements of SFM were recurred by UNFF and are now broadly understood as globally agreed criteria: the extent of forest resources; biological diversity; forest health and vitality; productive functions of forests; protective functions of forests; socio-economic functions; legal, policy and institutional framework (FAO.org).

Through such agreed-upon translation of the concept of SFM, and by guiding national regulations, legislations, and policies in official support of SFM, that international development agencies in the IFRC influence domestic policy and thus the circumstances under which IPLCs are included in natural

resource governance. There are no standard indicators for these criteria, as they are considered directly dependent on the specific conditions in each country which influence which SMF norms prevail in their implementation (Gale & Cadman, 2014). However, these negotiations are the foundation of, amongst others, the standards development and procedures in the World Bank, which are followed by a broad range of international development agencies, as discussed in article 3.

Castañeda (2000) highlights nine major processes to develop the standard criteria and indicators for SFM (figure 1). As visualized on the map, almost all countries have participated in one of these processes. However, despite participatory actions initiated by FAO, many developing countries were excluded from the negotiations initiated during UNCED, a rather severe exclusion as the criteria and indicators have affected most countries worldwide (Linser et al., 2018). Moreover, IPLCs in developing countries represent some actors living in the most direct relationship with nature and, thus, the most directly vulnerable to environmental change and political interventions (Montaña et al., 2016). Moreover, IPLCs hold essential knowledge about their ecosystems, and it is crucial to ground policies and projects in this knowledge to increase the likelihood of meeting biodiversity conservation targets (Reyes-García et al., 2022).

Figure 1. International negotiations on criteria and indicators for SFM



Source: Castañeda (2000). The nine processes include the Pan-European Forest Process on Criteria and Indicators for Sustainable Forest Management, Montreal Process on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, Tarapoto Proposal for Criteria and Indicators for Sustainability of the Amazon Forest, the Dry-Zone Africa Process, the Near East Process, the Lepaterique Process of Central America, the Dry Zone Asia Initiative, and the African Timber Organization (ATO).

In these international processes, different actors represent different interests and influence on domestic and international sustainability governance (Dingwerth & Pattberg, 2009). This influence can materialize through four pathways: international rules, international norms and discourse, creation of or interventions in markets, and direct access to domestic policy processes (Bernstein and Cashore, 2012).

While Burns et al. (2017) and Burns & Giessen (2014, 2016) focus on the way international organizations in the IFRC, such as the World Bank, can influence domestic policies in developing states, this thesis zooms in on how such influence is mirrored in the positioning of actors in ICDP management (research article 2) and informed by the institutional logics of individual development professionals (research article 3).

Concerning the key legislative elements in the IFRC, Giessen (2013) distinguishes between soft law (norms and statements leading to political commitments, e.g., UNCED), hard legal instruments (e.g., UNFCCC or the Convention on Biological Diversity), and private international law (e.g., FSC principles and the “legal chain of custody”) (p. 62). While research article 2 includes aspects of hard legal instruments in the form of the Argentine Forest Law and World Bank policies, research article 3 focuses on soft law as expressed by individual attitudes and institutional logics of development professionals.

The research presented in this thesis recognizes the multitude of influencing institutions but focuses primarily on stakeholders in conservation and forestry, aid agencies, and development banks, especially the World Bank. As the largest and most influential international development bank, the World Bank has a long history of developing forest policy guidelines and environmental and social standards. Their first forest policy was developed in 1978 but dated to the first forestry project loans in 1949. Updated strategies were launched in 1991 and 2002, respectively (Burns & Giessen, 2016; Humphreys, 2008). These strategies imply elements resembling a “one size fits all” or “blueprint” approach. In the forest and environment sector, the World Bank is known to promote deregulation and market-based mechanisms. Scoones (2015, 2019) argues that the blueprint approach to international development has a long history from the 18th and 19th-century notions of development to August Comte, Darwin, Rostow’s stages of economic growth, Truman in 1945, and the Washington consensus. He discusses how the result of this linear thinking of evolution, of modernization has (in practical terms) led to a result where we end up with development as blueprint plans, control, and modernization.

Despite the many official attempts to develop international policy and legislation to address the climate crisis and associated environmental and social injustices (Corbera et al., 2019), the prevailing conservation policies and NGO or donor-supported projects are often rooted in similar colonial and patronizing discourse that created the crises, to begin with (Domínguez & Luoma, 2020). As advocated in research article 3, organizations that fund development interventions but exclude IPLCs from direct decision-making must take responsibility for the consequence of their investment even if they do not officially claim project ownership.

In the Paris Declaration on Aid Effectiveness (2005), commitments by donors to provide relevant aid to developing countries were reiterated, and increased emphasis was put on the ideal to “(..) align aid with recipient country priorities, respecting recipient country leadership and strengthening their capacity to exercise it.” (Winters, 2010, p. 224). However, as described below, it is not yet clear how much of a difference these commitments have made in designing conservation and development programs and projects.

3.2 The project approach to international development

One way these official ambitions among international organizations and nation-states have materialized is through ICDPs. ICDPs are grounded in the belief that projects can achieve win-win situations between human welfare and natural resource protection if designed to integrate conservation and development objectives (Salafsky, 2011). This approach implies a movement away from, for example, fines and fences traditions in protected areas towards a greater interest in projects that focus on benefitting from the conservation of natural resources (Morgan-brown et al., 2010). In addition to the idea of a mutually beneficial relationship between conservation and development, which often shows ambivalent results (Bauch et al., 2014; Cagalanan, 2013), ICDPs often involve promises of participation of IPLC beneficiaries and community-based natural resource management (CBNRM).

The reason why it is paramount to collaborate directly with IPLC beneficiaries on ICDP design and management is that IPLCs living in or nearby biodiversity hotspots naturally hold invaluable knowledge about adjacent ecosystems and their biocultural characteristics, which is essential for sustainable governance and our understanding of human well-being (Tengö et al., 2014). Not surprisingly, IPLC participation in conservation and development projects (Dawson et al., 2021; Kim et al., 2020) with robust accountability institutions (Gulrajani, 2014; Massarella et al., 2018) throughout the development project system continues to be a well-documented prerequisite for effective and socially just development (Satyal et al., 2018).

As evident from the literature included in research articles 2 and 3, numerous empirical examples exist of the need to remain critical of participation claims in ICDPs and other development interventions. For example, participation can be compromised by local elites, or planning can be dominated by outside interests and interpretation of problems rather than built on local knowledge (Mosse, 2004). In such cases, concepts like distance and institutional decoupling introduced in this thesis are relevant. For example, what beneficiaries on the ground might observe as a stove, a seed bank, or a community meeting, can be communicated by project managers in a sending system using narratives like sustainable development and participatory forestry. However, while this is an example of institutional

distance, it is not straightforwardly an example of intended disregard of the reality on the ground as such service delivery is, by actors in higher management positions, understood as part of wider program objectives, objectives not necessarily known or defined by the actors on the receiving end.

Some development agencies tend to make use of a highly participatory discourse but, in practice, do not always take direct responsibility, and the approach to IPLCs' inclusion tends to be decided by a combination of minimum safeguards requirements and discretion (Cooke, 2004). In the World Bank, for example, part of their participatory effort is conceptualized through their requirement to borrower countries to develop Poverty Reduction Strategy Papers (PRSP). As pointed out by Winters (2010), the PRSP initiative has five underlying principles, including 1. broad participation and country-driven development, 2. recognition of multiple poverty dimensions, 3. focus on results and outcomes benefitting the poor, 4. focus on partnerships and participation of development partners, 5. and a long-term perspective. Like any policy or project design, such initiatives provide different opportunities for locally embedded and sustainable development. This thesis shows how institutional behavior and relationships are key to understanding cases when such opportunity ends up instead reproducing the status quo, only now covered in participatory rhetoric, making power and information asymmetries more challenging to detect.

This thesis supports the fundamental call that for ICDPs to realize their potential for socially and environmentally just projects through participation and CBNRM, they need to directly tackle and overcome the “debilitating forces of bureaucratic intervention, donor-driven ideologies, and economic logics” (Dressler et al., 2010, p. 21). Because there is no blueprint for such institutional change (Hobley, 1996), research must provide context-specific examples of ICDP management approaches to provide relevant and realistic recommendations for improvement. Natural resource policies and projects, such as ICDPs, should be grounded in the reality they intend to change. This reality is rarely limited to people and processes in a specific location but to a complex network of signals, drivers, and actors at multiple sites (Mosse, 2004). In turn, because international development agencies are typically involved in financing and designing ICDPs, they can influence approaches to conservation and development in the loan or aid-receiving countries. As such, the way project activities unfold is not only influenced by domestic political-economic circumstances but also by the political priorities of donors and their constituencies (Martens, 2000). Altogether, these dynamics emphasize the relevance of this thesis' objective to develop telecoupling-inspired approaches to navigate this complexity.

The question about which actors are invited to participate in decision-making on such projects is often decided from a mix of official and unofficial procedures and incentives (Mosse, 2004). It reconfirms the already noted importance of being attentive to hidden structures and underlying institutional mechanisms. Projects that are overly ambitious in theory and unimplementable in practice can facilitate hidden institutions because people find informal ways to keep receiving project funding when the formal way is too costly and the official objectives too challenging to meet without one compromising the other (Mosse, 2004).

This pressure has become a widely discussed issue related to what Scoones (2019) calls a mainstream and technocratic risk management approach. Some project actors can move from adhering to formal institutions to informal or hidden ones because they cannot live up to the official requirements. In turn, a technocratic management style might result in elite-driven governance of land use and natural resources, enabled by the project machinery's high level of administrative, technical, and theoretical complexity. Such complexity can work against political and economic transparency and local ownership, possibly leading to intentionally overlooked conservation areas and social issues. The insatiable hunger for technical knowledge and expertise to deal with risks may, according to Scoones (2019), have the opposite effect and increase ignorance as many risks should instead be accepted and more deeply understood rather than wasting time and resources on futile attempts to avoid the unknown. The key to this understanding is the direct collaboration with IPLCs, as these are the experts of their environments and their everyday uncertainties.

Still, as discussed in research articles 2 and 3, the tendency that ICDP involves great geographical and institutional distances between IPLC beneficiaries and the decision-making centers of those development agencies involved in the project design and financing is quite symptomatic. The question then remains: who has the opportunity and the responsibility to change this tendency and increase the inclusion of IPLC opinion and knowledge in ICDP design and management? The ability of development professionals to influence and facilitate direct collaboration with IPLCs through ICDPs cannot be generalized. However, research article 3 provides an approach likely to illuminate the question in a wide variety of cases. It shows that the institutional logic (Friedland & Alford, 1991) among development professionals is, on the one hand, bound by the organizational structure and, on the other, there is flexibility to let roles and responsibilities become influenced by individual orientation, motivation, and capacity. Recent research suggests that it is more pragmatic to make participatory improvements within the system (Harris, 2021). However, the premise behind this argument is that management culture can change without changing the structure of projects and the organizations that manage them. This issue

points once again to the structure-agency dynamic revisited in research article 3, which shows how, on the one hand, development professionals do their jobs and defend their practice through the official priorities of their respective agencies while, simultaneously, questioning the established structure and making discretionary decisions. This finding highlights the importance of not homogenizing development agencies but instead insist on a debate on development practice and the flexibility that departments, project teams, and individuals must try and experiment with to find alternative approaches to institutional change.

3.3 The political context of forest management in Argentina

A case in point for understanding the management of ICDPs is the political environment in loan or aid-receiving countries. An example included in this thesis is the case of the World Bank-financed Forest and Community project in Salta, Argentina, where data for research article 2 was collected. This section unfolds aspects of the political-economic context in Argentina not captured in the article.

In Argentina, environment and development policy is strongly determined by the relationships between government institutions and the private sector (Gabay & Alam, 2017). Gabay and Alam (2017) find a symbiotic relationship between large agribusinesses and the government reflected in the country's political priorities. In turn, in the early 1990s, pushed by the economic crisis, national bureaucracies in Argentina dissolved and started building political and financial coalitions with international and transnational organizations such as the World Bank and FAO. By financing market-oriented programs in Argentina, the World Bank has pushed for international trade and access to international markets, which, in theory, is expected to create social and environmental opportunities.

Overall, the World Bank has become highly influential in the forest- and environment policy frameworks promoted internationally and in Argentina specifically. McDonnell (2017) finds that the World Bank's attempts to push for reform in low-income countries are tied to an institutionalized desire to export Western ideals such as neoliberalism, which he sees as symptomatic for many international financial and development agencies. Many development programs in Argentina have generally favored neoliberal and market-oriented approaches to natural resource management that critical voices claim are falling into a paradigm trap because they limit political solutions to those that can be imagined from a neo-liberal standpoint (Burns & Giessen, 2016).

As goes for the government, there is ongoing competition, for example, between the Ministry of Environment, which administers the natural forests, and the Ministry of Agriculture, Livestock and Fisheries, which manages forest plantations (Burns and Giessen, 2014). This competition relates to an

apparent tension and contradiction between the country's stated objectives for forest protection (Law No. 26,331) and plans for increased crop production (Agri-food and Agro-industrial Strategic plan 2010-2020), released by the Ministry of Agriculture, Livestock and Fisheries. The latter includes targets of a 57 million tons increase in crop production, which already has had severe consequences for forest resources and livelihoods. Moreover, Argentina's federal republican form of government implies that forests are under the jurisdiction of provincial laws (Constitution of the Argentine Nation 1994, Article 124) apart from national parks, which the national government administers. Generally, the provinces, the sub-national bureaucracies, hold a relatively high level of sovereignty and discretionary authority.

The Gran Chaco, where the Salta-based Forest and Community project is located, is a socio-ecological region that spans Argentina, Bolivia, Paraguay, and Brazil. This lowland region is hot, semiarid, and home to unique cultural and biological diversity. Together with the Amazon and the Cerrado, the Gran Chaco is one of the largest forested areas in South America (Henderson et al., 2021; Cáceres et al., 2016). In turn, the region has one of the highest deforestation rates in the world. Conversion of natural habitats into agriculture, illegal logging, and use of pesticides and fertilizers have contributed to biodiversity loss and the degradation of many supporting and regulating ecosystem services throughout the region (Volante et al., 2012). Because the Gran Chaco crosses several national borders, cross-national collaboration is needed to manage its natural resources effectively and coherently, as these boundaries are political and not physical. The poverty level among local Campesinos (criollos) and indigenous peoples of the Gran Chaco is very high. These communities depend on the land for their livelihood, including fishing, hunting, subsistence forest use, and cattle ranching (Alcorn et al., 2011) why they have been significantly affected by the technological advancement of industrial agriculture that has intensified land conversion (le Polain de Waroux et al., 2018).

In Argentina, defining or establishing property rights over natural resources is as complex an issue as in many other countries in the global South and often a source of political and social dispute. It is not a matter of either or because the specific property right is often nuanced and depends on the social context, and this is why thinking of property rights as a continuum rather than as a dichotomy is in many contexts useful (Du Plessis et al., 2016). The Forest and Community project, analyzed in this thesis, is part of a larger program advocated for by the state to implement support for people in conflict with property rights institutions. However, this objective is operationalized in a way that does not build directly on feedback from the involved communities or an understanding of how local institutional arrangements work in practice (Hobley, 1996), as discussed in research article 2.

4. Methodology

4.1 Critical realism

Critical realism is the philosophy of science that underpins this thesis. As developed by (Bhaskar, 2013), critical realism sustains that ontology and epistemology are separated. There is a reality that exists independent of our knowledge about it. However, how reality appears depends on the tools, data, and processes we use to investigate and account for it and communicate about it (our epistemology). For critical realists, then, the reality is constructed and relational: the mere act of choosing a method, or of choosing the boundaries of a socio-ecological system, for example, are normative acts that influence how we observe and document ‘reality’. Critical realism supports analyses of intangible telecoupled phenomena, development discourse, and institutional complexities in that it acknowledges uncertainty and the conditional nature of reality while still aiming to use these insights to explain everyday social practice (Gerrits, 2021; Price, 2014). This perspective supports the normative move towards a land system science that digs deeper into questions of values and belief systems to provide concrete recommendations for sustainable transformation (Nielsen et al., 2019).

From this critical realist standpoint, this thesis is concerned with questions of *why* certain phenomena exist. For example, the research tailors conceptual frameworks to understand why the phenomenon that IPLCs are not perceived as equal project partners in ICDPs, persists. As such, theories and theoretical concepts are selected based on an assessment of their ability to explain and identify causes. In that regard, critical realism builds on the assumption that there is a deeper reality than the one that exists by virtue of peoples’ knowledge and experience (Buch-Hansen and Nielsen, 2012). Fundamentally, critical realism discerns between the *transitive* and *intransitive* dimensions (Bhaskar, 1975). The transitive dimension is associated with epistemology, the part of the world conceptualized by data, discourse, and theory. The intransitive dimension, which is the dimension of interest for critical realists, is associated with ontology. In this dimension, reality exists independent from posits in the transitive dimension.

Bhaskar (1975) discerns three ontological domains: the *empirical* domain, the *actual* domain, and the *deeper* domain. The empirical domain lies within the transitive dimension, defined by what can be observed and experienced. The actual domain consists of those phenomena and events that exist despite our experience. Finally, in the deeper domain, we find those unobservable mechanisms that result in events and phenomena in the actual domain from time to time. It has been a methodological ideal for this thesis to be attentive to these dimensions, especially in discussions of underlying mechanisms discourse and development paradigms, power structures, information flows, and institutional logics.

The concept of institutional logic acknowledges a reality beyond the system boundaries of our recognition as it involves an analysis that cuts across the three domains, i.e., fragments can be observed in the empirical domain (e.g., statements and attitudes) from concrete events in the actual domain (e.g., decisions and actions), driven by premises in the deeper domain (e.g., power structures and discourse). The emphasis on underlying mechanisms, also evident in research article 3, is not a simplification of institutional telecoupling as discursive practice. Social practice, individual attitudes, and practical circumstances are equally important, which is why the thesis emphasizes these aspects.

The potential of applying telecoupling to qualify causal understanding in LSS presented in article 1 is dependent on how telecoupling ontology is understood. From a critical realist view, telecoupling can be both a 'real-world' phenomenon and a heuristic. It is a 'real-world' phenomenon from the conviction that there are telecoupled mechanisms in the actual domain that exist despite experience, and which are related to different enabling factors in the deeper domain. Institutional telecoupling, for example, can be understood as a tendency in an open social system and an actual mechanism with premises in the deeper domain where it exists in complex interaction with other phenomena in other domains. Due to these interactions, premises in the deeper domain (e.g., capitalism and neoliberalism) do not always generate the same phenomena. Other influencing factors must be considered to understand the influence of drivers and impacts. This is why causality is so challenging to establish, as discussed in article 1, and the broader empirical context so important to be attentive to, as highlighted in chapter 3. In turn, telecoupling as a heuristic has the potential to support the analysis of these mechanisms in the deeper domain and their relation to phenomena and events in the actual domain. The telecoupling lens can take up the challenge of exploring and generating hypotheses around those causal links that are not easy to observe, experience or generate knowledge about.

The ontological distinction between the empirical, actual and deeper domain further guided this thesis' operationalization of flows as material, immaterial, direct, and indirect to facilitate an analysis of dynamics across observed events and more hidden structures. This three-dimensional understanding of reality contributes with essential mental tools to, on the one hand, acknowledge the potential consequences of a phenomenon and, on the other hand, the causality and premises for institutional change. The institutional and system change aspect is characteristic of critical realism prevalent in empirical and conceptual discussions across the results section in this thesis. From the critical realist standpoint, institutional and system change is possible because the relationship between the three domains is dynamic. Moreover, the notion of a three-dimensional reality has pushed the research to discern between *de jure* and *de facto* patterns. This thesis's primary data collection and qualitative

analyses clearly show how systematic empirical observations can deviate from reality's deeper connections and structures.

As critical realists understand events in the world as symptoms of different relations and mechanisms in the actual and deeper domain, these relations and mechanisms must be acknowledged as more extensive than the output they generate from time to time. For telecoupling research and the search for causal links and examination of impacts, this is crucial since it emphasizes the necessity of approaching telecoupling research with qualitative and mixed methods that support analysis of the underlying and more intangible layers to identify the strongest mechanisms contributing to producing environmental and social impacts, as discussed in research article 1.

4.2 Abstraction and retroduction

To generate knowledge and from an understanding of the connection between surface elements and the deeper domain, which is what critical realism encourages, the methodological approaches of abstraction and retroduction are fundamental. Abstraction is the necessary exercise of theorizing and looking beyond the observable at the underlying premises for events in the actual domain. The method requires a pendular movement between examining surface elements, such as written and oral statements or events, and underlying structures, such as incentives and discourse. Through abstraction, the ideal is to isolate the strongest causal mechanisms for a given phenomenon and examine how they work in an empirical context.

Complementing the exercise of abstraction in this thesis' methodology is the logic of retroduction. Retroduction departs from observing a phenomenon (i.e., a conclusion) and then explores the enabling particularities explaining the phenomenon (i.e., the premises for the conclusion). Epistemologically it implies a movement toward recognizing underlying mechanisms. For example, a conclusion that serves as a starting point for research articles 2 and 3 is that IPLCs are rarely included in decision-making across the project cycle of ICDPs. From the methodological approach of retroduction, the analytical objective is to explore *why*, from a qualitative inquiry with different actors involved in ICDPs. Not to provide a complete picture but to discuss hypotheses for a preliminary conclusion. Hypotheses act as premises by making assumptions about circumstances for the conclusion. An example from this thesis is the operationalization of direct and indirect flows as premises for the distance between institutions in a project management situation (section 5.2.3). The premises never have a monopoly over the explanation of the phenomenon. They are conceptualized and discussed for the sake of navigating the complexity of causality and system boundaries, well-knowing that reality is always more complex and multi-sited than the analyses generated from studying it.

4.3 Multi-sited research

In this thesis, multi-sited ethnography has been an inspirational approach to investigating telecoupled institutions. Ideas about multi-sited ethnography (Marcus, 1995) support the need for a telecoupling perspective and vice versa. The increase in holistic perspectives and interdisciplinary research has challenged dichotomies of conventional ethnography, such as the distinction between the local and the global and between lifeworlds and world systems. The “global” and the “world system” become “in a piecemeal way, integral to and embedded in discontinuous, multi-sited objects of study.” (Marcus, 1995, p. 97). Therefore, as with telecoupling research, multi-sited research implies the challenge of blurry system boundaries, ad-hoc research design, overlapping disciplines, and unfamiliar methodological terrain.

Telecoupling is a helpful heuristic for multi-sited research as it supports an analysis of agents and flows between multiple sites in multiple systems, as exemplified by the diagnostic tool presented in research article 2. Multi-sited telecoupling research pushes for consideration of the bigger picture, not just as a context but as nested in the analytical lens. For example, past and current discourses of international development agencies can unfold and materialize at different times and locations of ICDP actors. Therefore, the multi-sited perspective is essential both temporally and spatially, as further discussed in research article 1. As such, multi-sited research is about “expanding what is ethnographically “in the picture” of research” (Marcus, 1995, p. 102). The approach mirrors the one presented in Friis and Nielsen (2017), whose construction of the field is dynamic and dependent on the empirical findings emerging from following specific commodity flows to multiple sites.

Multi-sited research can appear abstract as methodological demands are somewhat unclear. However, by explicitly operationalizing the acknowledgment of the world’s interconnectedness into a methodology, it becomes pragmatic to telecoupling analysis and other holistic and integrated research avenues. The methodology further acknowledges that the most relevant object of study is rarely the simplest but can be, for example, a connection or disconnection between objects. The question remains, how to construct multi-sited spaces of investigation. One option posed by Marcus (1995), and mirrored in this thesis, is to do a “(.) more open-ended and speculative course of constructing subjects by simultaneously constructing the discontinuous contexts in which they act and are acted upon.” (p. 107).

Following these connections can reveal the different elements of systems that constitute the study object. In that regard, Marcus (1995) discerns between the following techniques for data collection: “Follow the people” (Classic: Malinowski), “follow the thing” (Classic: Wallerstein. Others: Appadurai, Mintz, Latour, Haraway), “follow the metaphor” (Haraway, Martin’s flexible bodies), “follow the plot, story, or allegory” (Classic: Levi-Strauss), “follow the life or biography” (Fischer, Abedi), “follow the conflict” (“the extended case method”), and finally the “strategically situated” (single-site) ethnography.

Adding to this, Peck and Theodore (2012) present a “follow the policy” approach that resembles the “follow the project” approach applied in this thesis, albeit with some challenges. The positioning of the researcher and the reciprocity involved in the commitment to participating actors is a challenge in multi-sited research due to the embedded mobility demand. As noted by Peck and Theodore (2012), it is essential not to become fetishized on the mobility of the study object (e.g., the policy or project) and always focus on how it is “put to work by local actors, and how they are translated, contextualized and embedded” (p. 25). Lessons learned from research article 2 show that a practical first step is to set the scene by mapping actors and their relationships in relation to the analytical object. In addition, the mapping of direct and indirect flows can help identify important disconnections.

A challenge that remained, however, was that the daily lives of development actors were, naturally, greatly influenced by the pandemic and the threats and restrictions it caused. These circumstances complicated the final stages of data collection and implied a need to reconstruct the “field” under investigation. Tools and literature on multi-sited research guided this process and motivated a virtual data collection, zooming in on development professionals working with ICDPs in Latin America (section 5.2.3). Some of the implications of virtual data collection for researcher positionality are elaborated in section 4.5.

The selection of each data collection site in the thesis, physically and virtually, has been based on continuous iteration between research objectives and observations of practice. The ideal has not simply been to go broad rather than going into detail. Each site (location, group of actors, systems, other objects) demands a specific understanding of language, culture, and institutional logic. As such, interviews need to be tailored to each group of actors. In turn, it is time-consuming and complicated to compare across data sets. Acquiring this needed knowledge and expertise in multi-sited research is a demanding task, balancing holistic perspectives and in-depth dedication to a field. The access to actors typically varies across sites, and during the empirical data collection for this thesis, it was challenging and demanded a prioritization of whom to reach out to and where. The priority of trying to reach both local IPLCs, provincial and national government officials, and international development agencies

implied some tradeoffs, including limited time in the communities of local beneficiaries. Still, because the data collection process has been dedicated to exploring the same phenomenon from multiple perspectives and actor perceptions, the results have showcased central aspects of the complexity, interconnectedness, and distance, characterizing causal and institutional dynamics of ICDP management. As Marcus (1995) argues, multi-sited ethnography represents a move towards a more diverse sense of the field that development studies must continue to evolve.

While there is little explicit empirical operationalization of multi-sited ethnography, much learning on the opportunities and challenges of studying multi-sited phenomena can be derived from telecoupling research. Andriamihaja et al. (2019) provide an example of an analytical distinction between the analysis of local and distant systems and investigate how decision-making procedures in institutional networks influence local land use change. The authors explain that approaching local system actors as the analytical entry point for a snowball sampling led to a deeper analysis of the local context and a limitation in their study in terms of understanding international processes.

This example reflects an interesting concern and emphasizes the level of insight expected in telecoupling research about other sites and scales than the studied object. Moreover, it illustrates the continuous scientific pitfall of reproducing local-global dichotomies, as also evident in the research presented in this thesis. Developing a multi-sited research methodology can help telecoupling research avoid the risk of biased data-collection associated with this dichotomy, i.e., collecting more detailed and primary data at the “local” scale while relying more on secondary data and existing literature for the “international” scale. This thesis argues that research should aim at investigating relevant institutions equally at different sites rather than treating so-called distant systems as raised above the need for local-level investigation. One problematic implication of the latter is the conclusion that a system is distant prior to the investigation of system interactions.

Local-level investigation of a “distant” sending system can provide information on, for example, the origin of a flow which is an essential part of establishing causality and understanding how flows behave in telecoupled systems. As but by Baird & Fox (2015), “(..) just as understanding the impacts of globalization requires a multi-sited ethnography; a solid understanding of the socioeconomic drivers of land-use change requires an approach that looks at biophysical and socioeconomic impacts of change at multiple sites.” (p. 448). The ideal should be to obtain the same level of insight across the studied actors, processes, and systems under investigation, which points back to the importance of setting the research boundary. Research article 2 strived to draw this boundary by limiting the data collection to a specific case study. Data collection sites were identified from a “follow the project” approach. The ideal was to

access as many individual actors and organizations as possible involved with the project rather than predefining a local or global scale of investigation.

The research confirmed how crucial it is to consider organizational structure alongside the individuality of actors within the same organization. Structures such as issues of ownership, social ties, cultural values, political history, and economic circumstances are likely to determine who benefits from an ‘‘action situation’’ (Eakin et al., 2017), that being a project, political agreement, or something third. Together with the institutional logic of individual actors, such structures make the institutional environment. While the institutional environment and those structures, individuals, and organizations characterizing it, is vital to consider in most telecoupling research, the examples above show that approaching this with multi-sited research is easier said than done. Still, the effort is needed to move towards a more nuanced understanding of land use changes and needed interventions, as elaborated in research article 1.

4.4 Methods

The following subsections provide an overview of the methods applied in this thesis and a reflection on the development of conceptual frameworks, presenting methodological considerations not captured in the research articles. Further details on applying the listed methods are available in the methods sections of research articles 1, 2, and 3 and respective appendices.

4.4.1 Literature reviews

Literature reviews have been conducted as part of the research design for each result chapter, including all collective writings, and applied explicitly as a research method in research article 1. It has been an essential aspect of these reviews to be transparent and document the history of findings and analytical categorization by following reporting guidelines (Moher et al., 2010) and keep all data available and organized in Nvivo software. The literature review has proved useful for identifying knowledge gaps and understanding theory development (Snyder, 2019). The review of existing research has identified significant knowledge gaps, avenues for telecoupling theory development, and new approaches to identify drivers of decoupling between theory and practice in international development.

4.4.2 Coding and qualitative content analysis

Coding and qualitative content analysis have been applied in all three research articles as the approach is suitable for organizing and identifying meaning across data sources (Williams & Moser, 2019). In research article 1, the data subject to coding is the literature sample of telecoupling research, while in

research articles 2 and 3, the data is a collection of transcriptions from qualitative interviews and discussions. In both cases, the coding has been conducted in Nvivo in an exploratory and iterative process, building codebooks based on initial open coding guided by specific research questions. Qualitative coding of both interview data and literature has enabled a process of immersing in the data and becoming familiarized with the data in a way that allows identifying also latent content in a systematic manner.

4.4.3 Qualitative interviews

Qualitative, semi-structured interviews are the primary data collection method for research articles 2 and 3. Being semi-structured implied that interviews were guided by a list of questions, prepared a priori, and based on the operationalization of the research objective, field observations, and literature review. The questions were mainly open-ended and guiding rather than prescribing a specific chronology. This exploratory approach allowed more informal conversations to facilitate the sharing of more sensitive information and opinion (Maxwell, 2004). For research article 2, data were collected in person during fieldwork, while all interviews for research article 3 were conducted virtually.

The qualitative data collection was generally challenged by the research's critical lens on the management of programs and projects in the global South. Consequently, a considerable amount of time was devoted to reaching out to various actors, many of whom were in uncertain career positions and, maybe as a consequence, were reluctant to share information beyond official documents. Interviewees of research article 3 were keener on talking about the organizational structure than expressing personal perceptions, as the topic of local participation was a sensitive aspect of the reputation of their respective agencies. Therefore, informal online calls and emails frequently preceded the interviews to build trust.

4.4.4 Developing conceptual frameworks

This thesis' methodological approach and methods selection has been driven in part by the empirical field and in part by the objective of developing new framework approaches to identify underlying causalities and institutional relationships in international development programs and projects. There is no mainstream approach to developing conceptual frameworks (Jabareen, 2009) and the steps are not always a stringent movement from the research question to the definition of variables. In turn, some fuzziness exists in the distinction between theoretical, conceptual, and analytical frameworks. As is also the case with the telecoupling framework, as discussed in research article 1, it can be unclear in scientific research whether the frameworks presented are meant to be applied to conduct analysis or as a heuristic through which findings are interpreted. Maybe because of this fuzziness and lack of protocol,

scientific articles rarely elaborate on the concrete steps behind the development of frameworks. When they are, it might only be those steps that fit a methodological reference or draw on existing theory and not the more informal sources of inspiration, aspects of randomness or intuition, experimentation, and individual motivations. The latter are aspects that can be challenging to recapture in scientific rhetoric. Notwithstanding, this section makes an attempt.

The informal steps of knowledge production are associated with reflexivity and positionality, as further elaborated in section 4.5, and influence how frameworks are built and applied. As put by Simandan (2019), “Any theory is a constellation of epistemic strengths and weaknesses, in that it enables new ways of seeing things, while at the same time obscuring or downplaying other potential elements.” (p. 141). The diagnostic tool presented in research article 2 was partly inspired by a telecoupling heuristic and partly by group discussions with local communities and NGOs in Salta, Argentina. The rhetoric among these actors when discussing international development projects was to describe such projects as something made by people, governments, and organizations “far away” or “up there”. They described their experience with project activities from a rhetorical distinction between those doing design far away and those implementing or receiving services at the project sites. The dichotomy inspired the operationalization of telecoupling sending and receiving systems as design- and implementation systems and the positioning of actors within them.

The three flows operationalized in research article 2 (assets, project information, rules, and regulations) were selected because these were the ones emphasized by interviewees. Meanwhile, it was clear from the literature reviews that the tool needed to be flexible to fit cases with different types and numbers of flows. The diagnostic aspect was born from discussions with researchers and NGO staff in Salta on how to make it easier to identify to what extent projects live up to their participatory and collaborative claims. The first idea was to make a digitalized tool where project information on, for example, meeting frequency and participants and the direction and directness of various flows could be entered throughout the project cycle to monitor the level of collaborative management. The imagined outcome of the exercise was a visualization of the distance between actors in design and implementation systems. Altogether, the diagnostic tool was developed, in a piecemeal way, from existing literature, informal discussions, and individual interviews with representatives from the various project stakeholder groups. While not (yet) digitalized, it can serve as a way to provide policy information and as a helpful tool for practitioners representing local interests to hold financial and government actors accountable.

As goes for operationalizing the institutional logic framework, this was inspired by informal conversations with government and development professionals in Buenos Aires and Washington, DC. It

was evident that the same epistemological barriers coming from homogenizing local communities surface when homogenizing international development agencies. The informal discussions revealed that in parallel to the official procedures of the agencies, discretion, individual motivation, and belief systems greatly influence attitudes toward IPLCs' participation and the role of development professionals in that regard. This finding mirrored the dialectic of the relationship between individual mentality and organizational structure captured in the concept of institutional logic (Reay & Jones, 2016). The initial idea was to capture individual mentalities through q-methodology and participant observation in the most prominent international development agencies in Washington, DC. However, the pandemic made further traveling impossible with the consequence that the idea for an analytical framework ended up tapping into the fuzziness of framework definitions. While analysis of organizational structure was made possible by review of official documents and online sources, the data collection barriers meant that not all individual mentality components were illuminated. For example, mental models and knowledge structures were not fully captured and would require further knowledge elicitation and categorization techniques (Brennan & Rondón-Sulbarán, 2019; D'armengol et al., 2021) to be more comprehensively analyzed. That said, the virtual approach had its benefits for the discussion on individual motivation and orientation, as further reflected upon in the following section 4.5, and even with the opportunity of long-term observation of social practice, data collection on institutional logic is inevitably challenging as it requires insight into both formal and informal, conscious and less conscious, thoughts and structures. Altogether, the resulting framework reflects a mix of concrete analytical steps and the conceptual relationships through which the studied phenomenon is understood.

This thesis does not claim to provide an exhaustive list of relevant indicators of institutional telecouplings and dominant institutional logics. Rather, it shows how flows can be operationalized as specific indicators to indicate the distance between institutions and how other indicators of institutional logic shape the perception of accountability towards IPLCs and the responsibility of including them in decision-making. Accountability and inclusion in decision-making are concepts representing core values in this thesis and thus underpin the entirety of its analytical approaches and selection of conceptual frameworks.

4.5 Positionality, personality, and other ethical reflections

Conducting research in the name of socially and environmentally just development raises essential questions about researcher positionality and ethics. A first and important example is my outsider position concerning the fieldwork in Argentina, an outsider position related to my role as a middle-class, educated Scandinavian who does not speak the local languages and mainly knows of the cultures

and ecologies from literature. There is an inherent ambiguity in being part of a privileged Ph.D. program and traveling the world in the name of sustainability science. In academia, the inconvenient truths of poverty and climate change tend to become built into theoretical frameworks and scientific debates, while the everyday practice focuses on career development, networking with other scientists, and publishing. Fieldwork sites and activities risk being decided based on the latter and not from a thorough discussion on ethics or the identification of an appropriate match between the researcher and the field site.

Keeping a research diary during data collection and analysis helped me channel such moral struggles into continuous reflexivity on researcher positionality and bias. I tried to move beyond the institutional frameworks on ethics from my university, which are limited to concerns about consent, and towards a practice of active reflexivity that acknowledges the dynamism of positionality in time and space (Soedirgo & Glas, 2020). This reflexivity implies considering both the researcher's and the participant's positionality (Sultana, 2007). I talked with research assistants and selected local interviewees about bias and privilege, and we interrogated our assumptions in both bilateral and collective conversations that were simultaneously rewarding, difficult, and thought-provoking. On the one hand, these moral struggles and my positionality complicated the data collection process because of the inherent social distance to both impoverished rural communities and development professionals or government employees in powerful positions. On the other hand, confronting the challenges with selected participants opened insights to a deeper level than otherwise possible. Inviting interviewees to share their views on the broader research agenda was also prioritized from the acknowledgment that I was studying a world already interpreted by those who live in it (England, 1994). I encountered community members who noted that they could almost now recite standard socio-economic questionnaires after more than twenty years of research- and project activities in their area. Meanwhile, they were facing the same water scarcity issues that attracted much of this scientific and political attention. This experience motivated me to change my research design from focusing on forest-adjacent livelihoods to focusing on understanding the dynamics behind such project failure.

My experience of a strong disconnection between project procedures and local needs made me reflect on the critical realist distinction between the observable and underlying realities (Bhaskar, 2013) and the epistemic gap between attention towards the realized world vs. the still-possible world (Simandan, 2019). Simandan (2019) points to a typical bias among laypeople and researchers alike to focus only on those circumstances that are realized and now make up a (perceived) inevitable world rather than try and understand the multitude of alternatives that have not been but are still possible to realize. One of many

consequences in the context of ICDP management is failing to understand how marginalized actors can have limited assets to show in the realized world, but important and great possibilities in the unrealized world that are important to be attentive to. I have strived to keep my attention sensitive to this complexity. The reflection also helped me understand and navigate the epistemological risk of analyzing that part of reality that satisfies the human and scientific desire to build narratives. As put by Simandan (2019), “(..) people tend to make sense of reality by focusing on what has actually transpired and by building subjectively satisfying stories that make outcomes seem inevitable, necessary, or ‘bound to have happened’ ” (p. 133).

While I did not manage to operationalize my active reflexivity fully into data collection methods, it helped me disentangle less constructive preconceptions from essential values. For example, I tried to avoid preconceptions and homogenization of development professionals while also being careful not to compromise my critical perspective on the top-down implementation of development norms. Naturally, this influence of not just positionality but also personality (Moser, 2008) implies a risk of bias that I was confronted with on several occasions. Unsurprisingly, my development-critical research interest was received with great interest and enthusiasm by political and project “underdogs” such as smaller NGOs and community members. In turn, it was met with great skepticism and sometimes indignation by actors in more powerful positions, such as the development professionals of international development agencies. Longer-term fieldwork within these agencies could have reduced the skepticism. For example, the research stay at the World Bank provided me with knowledge of the culture and rhetoric that made it easier to recruit interviewees than what was the case with the other three agencies included in research article 3. However, there were also cases where the interviewees came to expect a level of knowledge about banking and financial instruments that I did not possess, which instantly positioned me as an outsider not capable of comprehending their life worlds.

Following my field trips to Argentina and the World Bank, two significant events pushed me to rethink my research strategy: the COVID-19 pandemic and becoming a mother. The pandemic had the natural consequence that I needed to conduct virtual data collection. Online fieldwork through mediated data collection, such as videoconferencing, has been an increasingly popular scientific activity since the pandemic (Howlett, 2022). My plans to return to the Creole and Wichí communities in Salta did not lend themselves to online activities, but for the objective of research article 3, it turned out to be a particularly useful approach. Online-qualitative interviews can be considered fieldwork in my case to the extent that the zoom-based data collection enabled me to zoom out and consider multiple “field” sites (cf. section 4.3) and institutions that might not have been possible to reach physically.

On the other hand, the traditional understanding of fieldwork implies interaction with interviewees in their own settings. Still, this is challenging in any case when dealing with international development agencies and professionals as they are usually too busy to have you following them around, and they are often required to only meet under very formal circumstances. Meanwhile, international development professionals are very accustomed to working online. Therefore, I was, in many cases, able to position myself in a more casual approach to the interview as a conversation than what was possible during physical meetings with similar actors during my early fieldwork. While there are specific guiding principles to consider for interpersonal online research (Marlowe & Allen, 2022), mediated methods for qualitative data collection are well suited to meet calls for more ethical research in developing countries by focusing on low-carbon activities, the collaboration with local experts for physical data collection, and the coordination of such efforts with scholars more widely (Howlett, 2022).

On a more personal note, the pandemic reconfirmed poor organizational conditions for child care at my university and many others around the world (Burk et al., 2021). Until my son was 14 months and started daycare, I was balancing multiple full-time activities of mothering and conducting research. To my knowledge and experience, becoming a mother in academia tends to be viewed as an implicit testimony of lowered ambitions. This is unless you make the priority of quickly returning to work instead of indulging in an early bonding symbiosis. While some debates focus on the need to reduce the impact of childbirth on female publications (Lutter & Schröder, 2020), I believe it to be far more sensible to focus on increasing the capacity and flexibility of universities to welcome dedicated parents, regardless of gender. To me, the current trend is more than a reflection of gender inequality, it reflects an unsustainable approach to caring responsibilities. There is a unique sensitivity, empathy, and empowerment associated with fully engaging yourself in early parenting years that I am afraid becomes excluded from scientific knowledge production if the neoliberal approach to parenthood at academic institutions (Huopainen & Satama, 2019) is not challenged and changed.

In addition to being influenced by these practical and personal circumstances, this thesis is inevitably a product of its time. Therefore, the results presented in the following chapter, specifically the statements conveyed by research participants, must be understood in light of the political and socio-economic conjuncture within which they were produced.

5. Research results

5.1 Preparational research and collective writing

The development of the three research articles presented in section 5.2 is partly grounded in prior preparational research and collective writing with colleagues in the COUPLED project. For example, the book chapter (Appendix A) motivated the agenda of research article 1 by proposing telecoupling operationalization through existing theory, and it inspired research articles 2 and 3 to consider the (in)justices of telecoupled environmental governance.

The book chapter shows how the land-use processes underpinning telecoupled systems can imply issues of distribution, participation, and recognition of certain actor groups. Literature review through an environmental justice lens revealed that telecoupling research, to date, has primarily dealt with distribution issues. This finding inspired the discussion in research article 2 on how telecoupling can address issues of participation and the variety of power and information positions various actors hold in telecoupled and international environment and development interventions. A key message in the book chapter is that while integrating environmental justice in telecoupling research is essential, this does not automatically lead to understanding the causality of injustices. Causal analysis of injustices in land-use processes requires a careful reflection on the approach to telecoupling, the empirical subjects, and the selection of methods appropriate to identify telecoupling causalities, as discussed in research article 1. While research articles 2 and 3 do not directly apply an environmental justice framework, they explicitly focus on identifying issues of participation, decision-making power, and information asymmetries and their causalities. As such, the research articles support the concluding message in the book chapter that an environmental justice lens “can move telecoupling research beyond a broad description of a complex world towards an in-depth normative approach that reflects upon the injustices that result from these complexities.” (Corbera et al., 2019, p. 228).

Collective reports 1 (Appendix B) and 2 (Appendix C) discuss unclear aspects of telecoupling, including actor characterization, impact assessment, and causality. Collective report 1 on causality and impacts is the departure point for the review of telecoupling research included in research article 1. The report documents the challenge of identifying causes in a telecoupled world by showing examples from the literature on how impacts and drivers are frequently separated in time and space. The report concludes that, on the one hand, telecoupling research calls for more rigorous accounts of the evidence behind statements on impacts and causality. On the other hand, the complexity of such evidence in telecoupled systems calls for further review of the literature from a perspective that goes beyond the identification of gaps concerning mainstream methodology and towards a more exploratory assessment

of the contribution of telecoupling to the discussion of causality in LSS, i.e., the research agenda taken up in research article 1.

Collective report 2 on actor characterization inspired the integration of telecoupling and institutional analysis, particularly the mapping of project actors in research article 2. The report is grounded in a discussion of four cases of telecoupling research and examines approaches to actor identification and analysis. One concluding point is that a pertinent challenge surfaces in the relationship between actors and immaterial flows related to the challenge of capturing informal institutions and analyzing actor behaviors. A central recommendation in the report is thus to move beyond the sector and scale-based identification of actors, associated homogenization of “typical” actor groups, towards analyzing informal institutions and actor behaviors in all their transboundary complexity. These challenges are further addressed and discussed in research articles 2 and 3.

5.2 Research articles

The research presented in the collective writings above makes up part of the theoretical foundation of the three articles presented below that directly answer the research questions raised in section 1.1. Research article 1 addresses ways to operationalize telecoupling to contribute with more nuanced causality perspectives in LSS. It presents how telecoupling literature shows the most obvious potential to improve causal attribution when applied directly as a framework on an empirical case or combined with existing tools and concepts rather than applied more exclusively as a narrative. This finding can guide further research to be attentive to the ontological and epistemological understandings of telecoupling because this influences how telecoupling is applied and, thus, the potentials that are triggered. Acknowledging this can focus telecoupling to develop in a direction sensible for research in the science-policy interface.

Research article 2 operationalizes telecoupling to analyze the management of conservation and development projects. It does so by integrating aspects of institutional analysis and comparing a case study of an ICDP to existing empirical evidence on the inherent geographical and social separation of actors in the management schemes of such projects. In addition, the article develops and tests a telecoupling-inspired diagnostic tool that visualizes the project-related flows between actors as a function of the institutional distance between design and implementation systems. The tool contributes to further theory development within the topic of international development and stakeholder participation.

Research article 3 zooms in on development professionals' role and institutional logic concerning IPLC participation and decision-making on ICDPs. Institutional logic has shown a relevant theoretical concept within various topics and disciplines but is still novel in terms of defining which components that make up institutional logic. In addition to demonstrating valuable empirical evince on the complexity of the relationship between individual mentalities and organizational structure, the article presents an analytical framework that complements existing efforts to operationalize the concept of institutional logic. It does so by integrating theoretical perspectives from mental model research and participation and accountability theory.

Telecoupling as a framework to support a more nuanced understanding of causality in Land System Science

Louise Marie Busck-Lumholt^a, Johanna Coenen^b, Joel Persson^c, Ole Mertz^d, Anna Frohn Pedersen^e and Esteve Corbera^f

^a*Institut de Ciència i Tecnologia Ambientals (ICTA), Universitat Autònoma de Barcelona, Barcelona, Spain;* ^b*Institute of Sustainability Governance (INSUGO), Leuphana University, Lüneburg, Germany;* ^c*Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark;* ^d*Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark;* ^e*IRI THESys and The Department of Geography, Humboldt-Universität zu Berlin, Berlin, Germany;* ^f*Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain*

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1. Introduction

Understanding how relationships between people and their environment make up land systems is key to supporting more sustainable land use and reducing the negative environmental impacts of land-use change (Rounsevell et al., 2013). Today, there is broad scientific awareness about the interconnectedness of these relationships, and this is reflected in the land system science (LSS) literature, which seeks to understand and model land-use change through analytical approaches that emphasize relativeness, complexity, and context-dependency of causes and effects. This includes frameworks such as coupled human-environment (Turner et al., 2003) and social-ecological systems (Schlüter et al., 2012) human-natural systems (Liu et al., 2007), and most recently, the telecoupling framework (Liu et al., 2013).

Systems and actors influencing and/or being influenced by land-use change are increasingly both linked and globalized. This implies that processes influencing land-use change outcomes, including the actions by individual actors, can be physically distant while at the same time being causally connected. For example, deforestation can be caused by consumption in a distant country (Torres et al., 2017), and modifications in ecosystems in one place can be fuelled by trade relationships and multinational corporations in another place (Pace & Gephart, 2017). In LSS, it is key to disentangle this causal interconnectedness to understand the social-ecological drivers of land-use change and better target interventions for more sustainable land systems (Meyfroidt, 2016).

In this article, we undertake a literature review to understand how the telecoupling framework can address this challenge of causal attribution in LSS. Specifically, we ask: 1) Which analytical approaches

characterize telecoupling research? 2) How can the different approaches to telecoupling contribute to LSS with new insights? and 3) Can these insights help clarify the influence of the telecoupling framework for causal attribution in LSS?

Telecoupling emerged as an analytical tool to help account for socio-economic and environmental interactions across large distances by examining the systems of interest, the flows that connect them, the causes and effects of those flows, and the actor-networks that mediate them (Eakin et al., 2014; Liu et al., 2013; Friis & Nielsen, 2017a). Thus, telecoupling recognizes the complexity and interconnectedness of causes and effects in land-use systems. In this regard, existing research and reviews of the telecoupling literature have provided insights into how telecoupling can improve our understanding of human-environment interactions and contribute with applicable terminology and techniques for analyzing such interactions in a globalizing world (Corbera et al., 2019; Friis et al., 2016; Kapsar et al., 2019; Sonderegger et al., 2020). There have been a few flagship contributions highlighting techniques for explaining cause-effect relationships through a telecoupling lens (Meyfroidt, 2019; Carlson et al., 2018). However, we still know little about how existing research has benefitted from applying the telecoupling framework to understand causal relationships within LSS and how telecoupling is influencing research designs and the interpretation of research findings. This is critical to avoid the risk of pursuing a conceptual idea that is not any different from what is already available in the LSS literature on causality (Lambin et al., 2001; Meyfroidt et al., 2018; Meyfroidt, 2016).

While telecoupling research has gained momentum since 2013 (Friis, Cecilie., Nielsen, 2019; Eakin et al., 2017; Liu et al., 2013), the interdisciplinary and empirical application of the framework is still novel. The attention to proximate and underlying causes is not new to the LSS community (Scheidel & Gingrich, 2020), but the telecoupling conceptualization introduced a terminology and framing for disentangling the complexity that arises when both proximate and underlying causes are coupled over social, institutional, and geographical distances.

These conceptual debates on the utility of telecoupling for establishing causal relationships are presented in the following chapter. Then, we present our approach to data collection, data processing, and our literature review. We elaborate on the review findings in three separate but interlinked sections corresponding to the three research questions. We then discuss the findings through a critical lens and recommend future pathways for telecoupling application.

2. Telecoupling and the challenge of attributing causality

Telecoupling is the process that connects social-ecological systems across time and space. In its original framing, telecoupling is understood through the analysis of five major components: systems, agents, flows, causes, and effects (Liu et al., 2013). *Systems* are categorized as either sending-, receiving-, or spillover systems, meaning that they either ‘send’, ‘receive’, or are indirectly impacted by material and immaterial flows (of money, commodities, information, etc.) from other systems (Hull & Liu, 2018). *Agents* can be humans, organizations, animal species, or any actor at any scale whose actions are consequential to the studied phenomenon (Liu et al., 2014). Examining the *flows* between agents helps trace distal drivers of land-use change and the connections between causes and effects at different scales, between distant locations, and beyond the regulatory context of the studied phenomenon. By analytically following material and immaterial flows, causes can be discovered that are not immediate, obvious, or place-bound (Friis & Nielsen, 2017b). In this article, we define material flows as physical measurable units such as commodities, people, or biophysical elements, and immaterial flows as more intangible flows such as information, discourse, and social interactions (Friis & Nielsen, 2017b). We understand information flows as including knowledge and money, but other literature such as Eakin et al. (2014) defines money as part of the physical material flows. Both material and immaterial flows are important for the identification of causes behind telecoupled land-use change processes. For example, soybean expansion is connected to the increase of a material flow (i.e., international trade of soybeans) and is driven by proximate causes such as agricultural technology. In turn, the adoption of new technologies is strongly linked to immaterial flows like information about technologies and production schemes, disseminated through personal experiences, social networks, workshops, meetings, and social media (Henderson et al., 2021). Thus, the flow-based analysis draws attention to the spatial and temporal complexity of causes and effects which characterize telecoupled systems (Eakin et al., 2014). We understand *causes* in relation to telecoupling as the factors that determine the emergence and strength of telecoupled relationships, and the *effects* as the environmental and socioeconomic consequences of such relationships (Liu et al., 2014). Furthermore, we refer to the analysis of causal mechanisms, which is what distinguishes causation from correlation (Meyfroidt, 2016).

To our knowledge, the initial conceptualization of the telecoupling framework did not claim an ability to identify causal mechanisms. Still, research grounded in the idea of telecoupling often assumes or analyzes a (telecoupled) relationship between a given land-use phenomenon occurring in a specific location and its distal drivers and feedback mechanisms. In so doing, telecoupling researchers apply a variety of approaches to establish causality between phenomena, by, for example, qualitatively exploring information and discursive flows across distance (Eakin et al., 2014) or quantitatively tracking

and measuring the flows of commodities between regions (Yao et al., 2018). Liu et al. (2013) highlight how land-use telecouplings can have various economic, technological, political, environmental, or cultural causes, and how these causal mechanisms influence the emergence, dynamic, and strength of the relationship. Eakin et al. (2014) exemplify this process by showing how telecoupling entails effects on livelihoods or land systems that are caused (indirectly) by spatially distant (but connected) actors.

While telecoupling can provide new perspectives on the interconnectedness of the global economy and its social-ecological consequences, this interconnectedness implies some fundamental challenges for causal attribution. For example, a given specific land use, or land-use change process, cannot be explained by a single phenomenon (e.g., increased international demand for a certain crop) but by a combination of drivers (e.g., increased international demand, coupled with local economic incentives), which in turn may be products of different political, social and/or cultural forces. It becomes increasingly difficult to disentangle the causal relationships driving land-use change processes since causal factors can rarely be understood in isolation from each other, and they often transcend institutional, spatial, and temporal scales (Norder & Seijmonsbergen, 2017).

Causal effects in telecoupled systems will often be created by multiple and overlapping causal variables. Some causal processes work more gradually, and some work more rapidly, often depending on a number of factors connecting sending and receiving systems (Friis et al., 2016). For example, Nepstad et al. (2014) argue that several mutually reinforcing factors, including temporally and spatially overlapping policy and supply chain interventions, decreased demand for new deforestation in the Amazon. Leisz et al. (2016) analyze a case of telecoupled land use and land cover change in Vietnam and show how this is linked to a multitude of both distal causes in the form of historical political decisions, immediate causes, and causes at both higher and more local scales.

Even though the debate between quantitative and qualitative causal analysis has become more integrative in acknowledging that causes can be validated both quantitatively and qualitatively (Beach & Pedersen, 2016; Carlson et al., 2018), researchers still tend to avoid making direct causal claims unless quantitative analyses are included (Efroymson et al., 2016; Rounsevell et al., 2013). Altogether, the literature highlights that attributing causality to telecoupled land-use systems is a complex endeavor. Such complexity stems from the fact that causes and effects in land-use systems can be approached from different scalar, temporal, and spatial perspectives, which involve specific conceptual and methodological challenges. We highlight examples from the literature on terms related to this challenge in Table 1.

Table 1. Terms related to the complexity of attributing causality in telecoupled land-use systems

Term	Definition	Source
Causes		
Multi-causality	Any given pattern may be caused by several different processes, and the action of each is dependent on context.	Chapman et al., 2017; Lambin et al., 2001
Confounders	A variable that influences explanatory (independent) and response (dependent) variables. Confounding variables can be both observable and unobservable.	Carlson et al (2018)
Proximate (or direct) causes	Human activities or immediate actions at the local level that originate from the observed change and directly impact the observed change.	Geist & Lambin, 2002; Meyfroidt, 2016
Underlying (or indirect) causes	Fundamental forces that underpin the more proximate causes.	Geist & Lambin, 2002; Meyfroidt, 2016
Effects		
Cascading effect	The process by which a system affects other multiple systems in sequence as a result of telecoupling dynamics; occurs when a change of one element of a system drives a chain of events leading to many other changes in the system.	Baird & Fox, 2015; Paitan & Verburg, 2019
Cumulative effect	Impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency [...] or person undertakes such other actions.	Clark, 1994
Legacy effect	Effects that do not disappear until many years to decades after the emergence of a telecoupling.	Liu, 2014; Norder & Seijmonsbergen, 2017; Paitan & Verburg, 2019
Non-linearity	Social and ecological patterns do not gradually change as a linear function of relevant processes but rather display thresholds, time lags, and generally complex behavior (including regime shifts).	Chapman et al., 2017; Paitan & Verburg, 2019
Threshold effects	Seemingly stable systems can suddenly undergo comprehensive transformations into something entirely new, with internal controls and characteristics that are profoundly different from those of the original.	Duit & Galaz, 2008

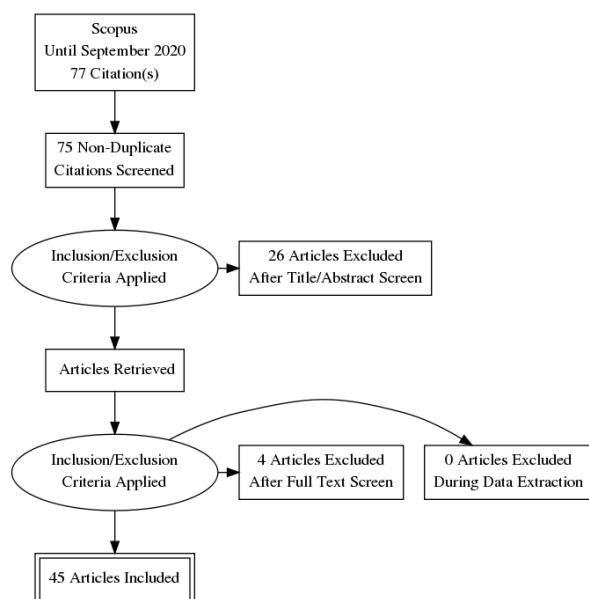
	Small events might trigger changes that are difficult or even impossible to reverse.	
Time lags (or inertia)	Effects that do not emerge until years or even decades after the initiation of a telecoupling.	Liu, 2014; Norder & Seijmonsbergen, 2017; Paitan & Verburg, 2019
Multifinality	Similar combinations of causal factors result in substantially different outcomes, for example due to small variations in contextual factors or contingent events.	George & Bennett, 2007; Meyfroidt, 2016
Equifinality	Different combinations of causes that end up in similar outcome.	George & Bennett, 2007; Meyfroidt, 2016
Temporal spillover	Conducting behavior A in time 1 affects the probability of conducting behavior A in time 2.	Nilsson et al., 2017
Cause and effect		
Feedback	Feedbacks occur between systems when effects of the first system on a second system feed back to affect the first system. Feedbacks can be negative (damping) or positive (amplifying).	Liu et al., 2013; Rotmans & Loorbach, 2009
Feedback loop	Feedback loops, or reverse causality, can be related to bidirectional causation and implies that events in a nonlinear causal chain can be both causes and effects,	Carlson et al., 2018; Meyfroidt, 2016; Sugihara et al., 2012
Multi-scalarity	Relevant processes are simultaneously operating at a diversity of scales, manifesting in patterns at multiple scales (both temporal and spatial).	Chapman et al., 2017
Path dependence	Positive feedback loops or self-reinforcing sequences i.e. chains of chronologically ordered and causally connected events which are more tightly connected and less contingent than in typical causal chains.	Mahoney, 2000; Pierson, 2000
Unobserved heterogeneity	The unmeasured third factors that may affect the relation between the causal factor and the outcome.	Meyfroidt, 2016
Spatial decoupling	The decoupling of drivers and outcomes which gives rise to telecouplings.	Friis et al., 2016

3. Methods

3.1 Data collection

This paper builds on data from a review of 45 articles that draw on telecoupling to empirically study land systems. Conceptual and literature-based articles were thus excluded from the review. The sample articles were collected through Scopus, using the search string: telecoupl* OR tele-coupl* AND "land use" OR "land-use" OR "deforestat*" OR "land system" OR "land-system" in the title, abstract or keywords. The search yielded 77 results, containing articles published up until September 2020. Subsequently, we made sure that each article in the sample had a) been peer-reviewed; b) written in English; c) analysed an empirical case; d) mentioned telecoupling at least once, and e) made explicit reference to land use or land cover change in the title or abstract. This resulted in a sample of 45 articles which we acknowledge is substantially smaller than, for example, the sample in Sonderegger et al. (2020) who, due to a broader screening, identified 137 articles roughly within the same search period. It is beyond the scope of our review to address the entirety of research topics engaging with telecoupling, and our search string and inclusion criteria have left out some flagship contributions as a consequence (e.g. Boillat et al., 2018; Eakin et al., 2017; Ringel, 2018). The aim of our review is not to exhaustively document the breadth of the research field, but rather to pinpoint the variety of opportunities that the telecoupling framework offers for causal attribution in relation to different research agendas within LSS. The sampling process is visualized through the PRISMA flow chart below (Figure 1), which is an acknowledged method for reporting sampling strategies in systematic reviews (Moher et al., 2010).

Figure 1. PRISMA of literature included for review.



Source: Figure generated from own data in <http://prisma.thetacollaborative.ca/>

When the final sample of the 45 articles was identified, we conducted a content analysis to analyze how the relationships between telecoupling approach, research design, data collection, and methods for data analysis are investigated. We employed a mixed approach, using elements from both the systematic review tradition (Moher et al., 2010) and qualitative content analysis (Mayring 2014). We used a systematized coding scheme to review and critically appraise the selected research (Moher et al., 2010). We analyzed the articles by looking at relationships in coded content in Nvivo rather than applying statistical methods (meta-analysis), inspired by a qualitative content analysis tradition and guided by the following review steps (cf. Mayring, 2014).

- 1) Identification of knowledge gaps in existing telecoupling reviews (exploring review strategies and supplementary materials) and LSS literature on causality.
- 2) Formulation of the research question to inform identified knowledge gap;
- 3) Linking research question to theory (state of the art, theoretical approach, preconceptions for interpretations);
- 4) Definition of the exploratory research design and development of the codebook;
- 5) Defining the literature sample supported by the PRISMA approach;
- 6) Codebook and methods of data collection pilot-tested and revised;
- 7) Inter-coder reliability established, processing of the study in Nvivo and organization of node hierarchies;
- 8) Presentation of results in response to the research question; and
- 9) Discussion concerning quality criteria.

The coding protocol combines deductive and more open-ended inductive categories, each assigned a code in the review (supplementary material_1). Inductive category development consists of formulating broad categories such as ‘causal relations’ and working through the text line by line, formulating code categories directly from the text at the decided level of abstraction (i.e., how detailed or general categories are formulated). In the deductively formulated category system, categories are predefined (such as ‘material’ or ‘immaterial’ analytical focus), and text segments are coded to illustrate examples of the character of the category.

The predefined codes were developed based on first readings of the review sample, theoretical insights from the telecoupling literature, and existing reviews (Kapsar et al., 2019; Eakin et al., 2014a; Friis et al., 2016; Meyfroidt, 2016; Liu et al., 2013; Liu et al., 2014). The inductive codes facilitated an exploratory inquiry of how telecoupling provides both opportunities and pitfalls in causal attribution. These codes refer primarily to the identification of authors’ statements on their application of

telecoupling. The deductive codes contributed with information on research characteristics such as data collection and processing approaches and to what extent these strengthen causal statements. An example is our distinction between ‘material’ and ‘immaterial’ analytical focus, through which we try to identify which aspects of the study object are in primary focus. This is different from the distinction between material and immaterial flows. A study might analyze a material flow (such as commodities) but focus on the immaterial aspects of this commodity flow (such as local attitudes in the receiving system or political incentive structures in the sending system) (supplementary material_1).

3.2 Data coding and analysis

The articles were not examined in terms of how well they attribute causality since causal analysis is not an explicit objective of all reviewed articles. Rather, we analyzed if and how telecoupling influences the way causal relationships are identified and we reviewed the methods and methodological approaches used to make causal attributions. The different research designs are discussed in their relation to one another and with regards to the causal statements made in the article and the telecoupling approach applied (i.e., discerning between heuristic and structured approaches and the application of telecoupling as either a narrative, empirical application, or operationalization through existing concepts and tools see also supplementary material_1).

Since the analysis included some elements of latent content (the underlying meaning of the text), coding reliability became particularly important. . Intercoder reliability was enhanced by conducting a series of pilot tests during the development of the codebook and conducting continuous and collective meetings to evaluate results. Moreover, each article was reviewed by a minimum of two authors with the use of the same coding scheme, and the first author was in charge of merging reviews, aggregating and analyzing the coded text segments.

With regards to causality, the coders were asked to code all statements made that captured cause-effect relationships were coded, including statements that were not explicitly claiming to attribute causality. Codes were then labeled with direct reference to authors’ terminology to avoid unstructured and layered interpretation by individual coders. The analysis was conducted in Nvivo, relying on the codebook to investigate the articles’ causal statements, analyzing their relationship to other codes, and organizing node hierarchies.

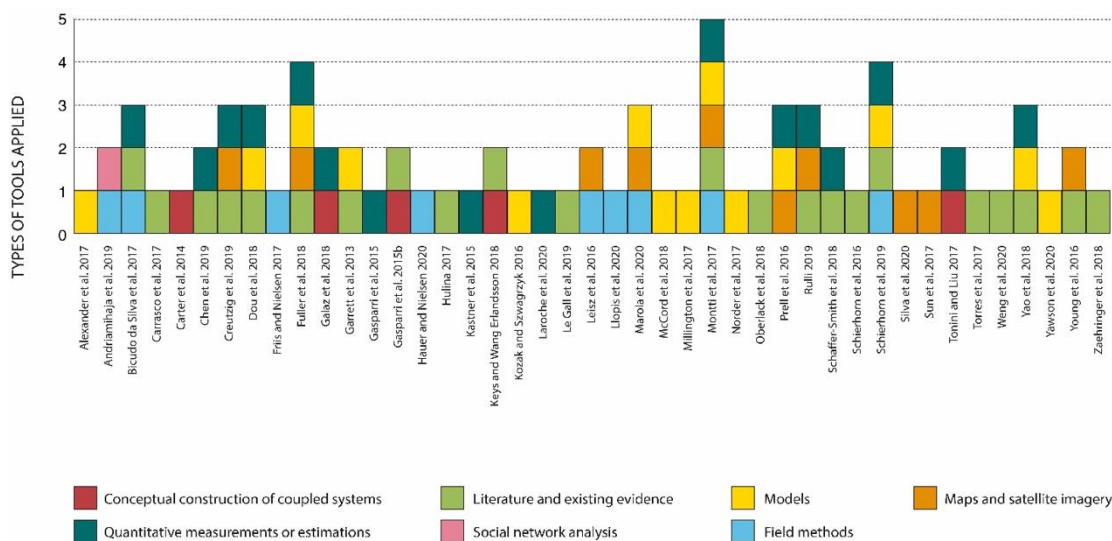
4. Results and discussion

4.1 Analytical approaches in telecoupling research

The reviewed articles represent a broad variety of research topics and types of flows, albeit a majority focus on land use, land-use change, or international trade since we limit the sample to studies within LSS. In turn, the flows mostly analyzed are financial flows, commodities, and trade flows, but there are also several examples of more immaterial flows such as information, knowledge, and policy (supplementary material_1). Generally, the contributions reviewed in this paper shows how a relatively simple idea like telecoupling can support a broad variety of research inquiries addressing a high level of complexity.

An overview of the causal statements and key research attributes is presented in the supplementary material. These statements vary in scale from specific country-level inquiries such as how Chinese imports from the Congo basin are driven by the US demand for Chinese furniture (Fuller et al., 2018), to broader discussions of the multiple drivers of global and regional land-use change (Creutzig et al., 2019). Nine articles justify causal statements by referring to findings from field observations, whereas the majority of the causal statements are justified by using evidence from existing literature, models, and quantitative measurements or estimations (Figure 2). The figure presents broader categories while a breakdown of specific tools applied is available in supplementary materials. Two articles are excluded from the figure as we did not identify any specific causal claims (Seaquist et al., 2014; Zimmerer et al., 2018).

Figure 2. Type of tools applied to justify causal statements.



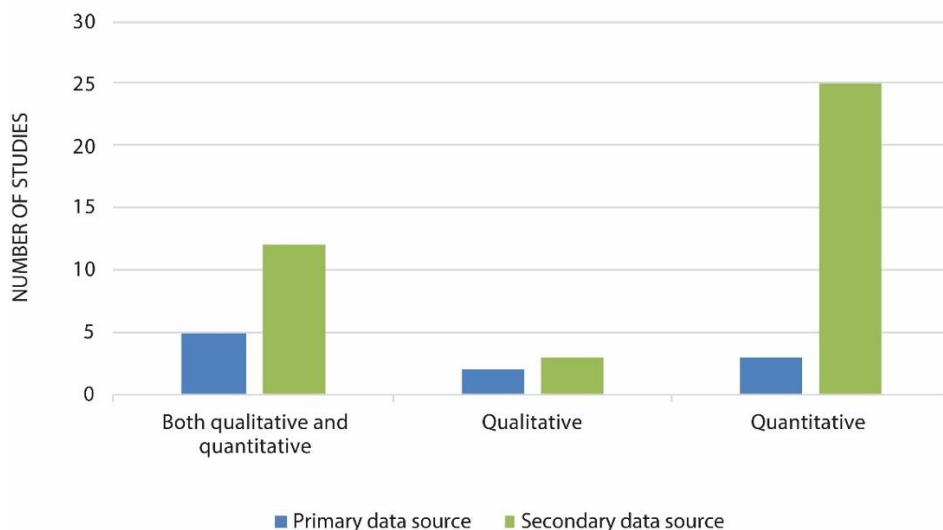
Source: Figure generated from own data

In 30 of the 45 articles, data is included on the same topic over a given time period (years or decades, past or future) (supplementary material_1,4). Twenty-three of these deal with spatial data (including forest cover data), while the others are spread across biophysical, economic, and trade data, among others. The use of longitudinal data is not equivalent to an explicit focus on causal temporal couplings (e.g., legacy effects and time lags), such as the historical interactions between deforestation and soil loss (Norder & Seijmonsbergen, 2017), as there is a much stronger focus on the spatial connections (supplementary material_1).

The articles that primarily use quantitative assessments tend to frequently approach their research from a deductive approach, testing a predefined explanatory theory or exploring the effects of a top-down rule or policy, whereas the mixed methods and qualitative approaches are more exploratory (see supplementary material_1). Generally, qualitative and mixed methods approaches together with temporal perspectives seem to be an underrepresented combination in the sample. Qualitative approaches are important to pursue since some flows in telecoupled systems are difficult, if not impossible, to quantify. Discursive or knowledge flows cannot easily be measured in quantitative terms. Generally, due to the context-dependent, complex, and dynamic nature of land systems, and the (partial) lack of relevant knowledge and data (Newig et al., 2020), it is challenging to isolate causal factors and measure and quantify them. More interpretative analyses are required to explain the less tangible dimensions of causal relationships.

For example, REDD+ is an official framework for reducing emissions from deforestation and forest degradation, but in terms of understanding the drivers and effects of related interventions, it is important to examine the various incentives and values of the governing actors (Eakin et al., 2014), as they pursue different aims and strategies for implementation, which will affect the outcome of the interventions (Andriamihaja et al., 2019). Thus, in a REDD+ case, it is relevant to map and quantify the direction of material and financial flows. However, to understand the full nature of causal mechanisms, it is essential to investigate, through more qualitative inquiry, the more immaterial flows of ideas and values, and the actions and behaviors of actor-networks mediating these. A relevant and frequently referenced but rarely applied approach in telecoupling research is process-tracing. The process-tracing method breaks down flows and causal chains observed in case studies into analyzable units and validates each link in causal graphs as well as invalidates counter-hypotheses (Beach & Pedersen, 2016; Bennett & George, 2005).

Figure 3. Data source within qualitative and quantitative studies.



Source: Figure generated from own data

In the review sample, the use of secondary data is more common in studies with primarily quantitative interpretation rather than qualitative interpretation (Figure 3). In two studies, qualitative secondary social data is used (Carter et al., 2014; Keys & Wang-Erlandsson, 2018). This finding is related to the tendency that most of the examples of temporal perspectives are conducted with quantitative (22 articles) rather than qualitative (two articles) assessment. The two examples that combine a qualitative assessment with some degree of quantitative and longitudinal analysis include Oberlack et al., (2018) who provide a stylized timeline from 2007 to 2016 of a bioenergy project case in Sierra Leone that led to significant land-use changes. The timeline provides an overview of major activities and events associated with the project in the set-up phase, the operational phase, and the scaling down and termination phase. While the authors do not claim to present more than a process overview, we argue it is a useful tool for a telecoupling analysis as it provides a context for knowledge and value generation and allows for the consideration of links between concrete events in time (temporal couplings) that might be decisive for the outcome of the intervention. Another example is Hauer and Nielsen (2020) who do not explicitly adopt a longitudinal design, but they provide an example of how questions in qualitative interviews can be tailored to focus on organizational evolution and changes over time.

There appears to be a reluctance to engage more explicitly with the implied temporal dimension of the telecoupling framework and to move beyond quantitative approaches more familiar in traditional LSS. Due to the few examples in our review that combine qualitative and mixed methods approaches with a temporal perspective, we present a few cases beyond our sample to illustrate the value of conducting comparative longitudinal studies on topics that are often subject to telecoupling research. Vicol et al.

(2018), for example, apply a temporal perspective on the implications of global value chain upgrading for coffee producers in Indonesia. They select secondary qualitative-quantitative survey data from case studies at three different geographical sites where village-level field visits and household surveys had been carried out at least annually between 2008 and 2016. This allows them to make a longitudinal assessment of local attitudes and analyze how coffee value chain relationships emerge, evolve, and break down. These are dynamics that would be difficult to capture using a single-sited snapshot of an isolated case. Petursson & Vedeld (2017) present an approach to analyzing the development and manifestation of conservation policy discourse over time by analyzing qualitative data from interviews in the same case-study region in Uganda for a period of eight years from 2003 to 2011. This enables them to generate new insight into how changing actor interests and power relations can contribute to explaining the gap between rhetoric and reality in protected area governance. Another approach is presented by Liu et al. (2014), who suggest that information about transnational land deals could be documented in a relational database and categorized according to sending, receiving, and spillover systems, with each system including a list of agents, flows, causes, effects, and their linkages to other telecouplings such as species invasion. This would provide future telecoupling analyses with information on how land deals evolve and are connected in time. As pointed out by the authors, a promising database to enable such research inquiries is the LandMatrix, an independent land monitoring initiative to improve transparency in decisions over large-scale land acquisitions (landmatrix, n.d.).

We do not find any evidence that the interaction with telecoupling prescribes a specific type of analysis. Still, we do find that the application of the telecoupling influences the analytical perspective and contributes to generating new insights by specifying distal system dynamics, as we elaborate on in the following sections.

4.2 Different approaches to telecoupling

In the literature, the word ‘telecoupling’ is on the one hand used to describe the phenomena of globalization, and on the other hand, used as a conceptual framework to study these phenomena. We echo the argument that telecoupling research needs more consistent language, as proposed in (Meyfroidt, 2016) and, equally important, to be clear about how telecoupling is understood. We find that the potential of telecoupling to directly support more nuanced causal attribution in LSS depends on this variety in telecoupling application and operationalization.

A distinction between telecoupling as a phenomenon, a concept, and a framework has been identified in previous reviews (Kapsar et al., 2019). However, our review reveals examples where all three types are

applied simultaneously, which makes it difficult to clarify the difference it makes for causal attribution to adopt a telecoupling lens in the analysis. For the sake of consistent wording, from here onwards we refer to telecoupling as a framework in our conceptual discussions and recommendations for future research. To categorize and discuss the variety of approaches to telecoupling across the articles in our review sample, we offer a modification of the typology proposed in Kapsar et al. (2019) by discerning between 1) research that applies telecoupling implicitly as a phenomenon or research context (telecoupling as a narrative), and 2) research that directly applies the telecoupling framework on an empirical case in combination with another framework (telecoupling operationalized through existing concepts and tools), and 3) research that directly applies the telecoupling framework to an empirical case (empirical application of telecoupling). These three archetypes are not mutually exclusive but provide a constructive categorization for the discussion of the value added by the telecoupling framework.

Telecoupling as a *narrative* constitutes much of what we already know from research on multifaceted sustainability challenges about system interconnectedness but makes the interconnectedness more explicit by zooming in on the linkages involved in global processes. We identified 24 articles applying telecoupling as a narrative for research context rather than operationalized through existing concepts and tools or empirical application, and 16 of those articles focus primarily on material aspects (Figure 4). For instance, Rulli et al. (2019) apply telecoupling as a narrative in their analysis of potential environmental impacts of the expansion of oil palm production in Indonesia, where they focus primarily on observable, measurable, and material aspects such as quantifying forest loss, fragmentation, CO₂ emissions, and freshwater pollution. They refer to the interconnectedness of drivers (bioenergy and palm oil consumption) and the multitude of environmental impacts, as an argument that policymakers should develop strategies that consider the complexity of telecoupled systems and spillovers.

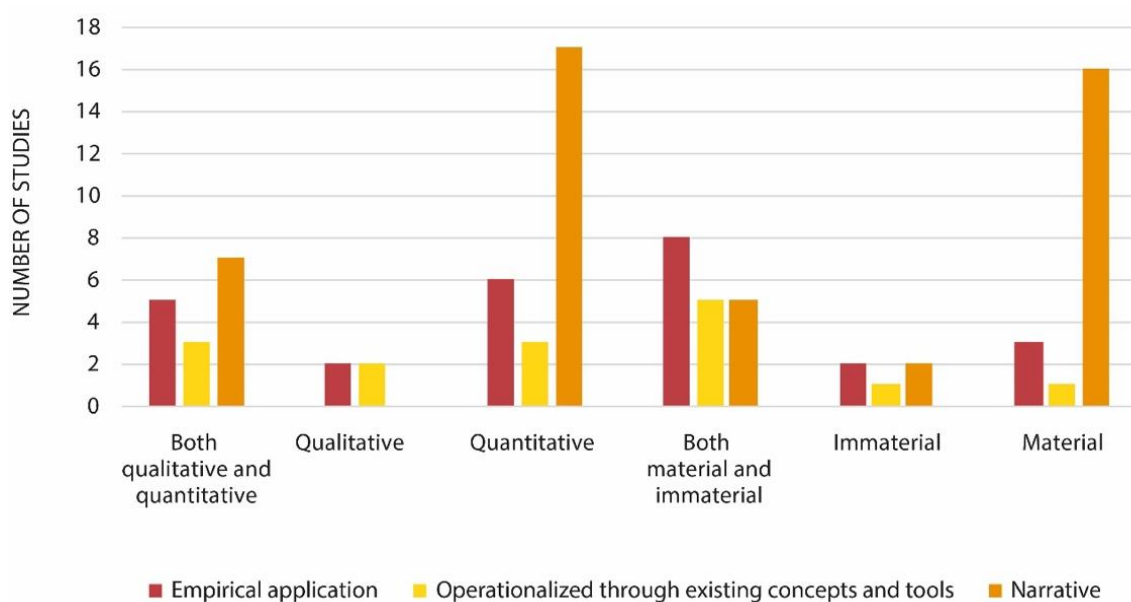
Applying telecoupling as a narrative can help move beyond seeing globalization as a diffuse process and towards attending to specific global linkages and identifying the underlying distal drivers of environmental and social problems that manifest in a particular place. However, the analytical influence of telecoupling in studies that do not refer to any of the framework components, but only briefly mentions the term as an empirical phenomenon, is unclear (see for example Creutzig et al., 2019; Galaz et al., 2018; Schierhorn et al., 2019; Fuller et al., 2018; Kozak & Szwagrzyk, 2016; Kastner et al., 2015).

In several research articles applying telecoupling as a narrative, telecoupling is understood broadly as a globalization process that has various impacts on land use and land cover, rather than operationalized as

a tool to identify causal relationships. For example, Llopis et al. (2020) explore two telecoupling dynamics (protected areas and cash crop price boom) as drivers of the state of local well-being in a context of agricultural intensification in a biodiversity hotspot in Madagascar, or Bicudo da Silva et al. (2020) who consider telecoupling processes such as ecological tourism connecting urban and distant populations as the driver of direct and indirect land changes in Brazil. As such, telecoupling as a narrative can work as a way to describe the phenomenon of multiplex and intertwined causes rather than disentangling the complexity through the operationalization of the telecoupling framework components.

In contrast, the remaining 21 articles apply telecoupling more explicitly in either operationalization through existing concepts and tools or direct empirical application with reference to some or all of the telecoupling elements of the original framework: systems, causes, effects, actors, and flows (Liu et al. 2013). These more explicit telecoupling applications are frequently carried out with a combined material and immaterial analytical focus (13 articles out of 21). Telecoupling as operationalized through existing concepts and tools and empirical application is also associated with more examples of qualitative interpretation (four articles) and integrated qualitative/quantitative interpretation (eight articles) than the ‘telecoupling as a narrative’ application where 17 articles apply quantitative interpretation, 7 articles engage with both quantitative and qualitative interpretation, and zero articles appear purely qualitative (Figure 4). In turn, analyses of information-based flows such as discourse, knowledge, policy, and social dynamics are found primarily within empirical application or operationalization through existing concepts and tools (supplementary material_1).

Figure 4. Telecoupling application and analytical focus.



Source: Figure generated from own data

Telecoupling as *operationalized through existing concepts and tools* shows how telecoupling can support an extension or modification of existing conceptual frameworks from various disciplines to better capture the interlinkages and interdependencies in a globalizing world. Hauer & Nielsen (2020) combine telecoupling with geographies of marketization. The marketization perspective supports attention towards everyday practices and actor behavior in the study site while telecoupling provides a structured way of accounting for the systemic position of the studied phenomenon. Using this approach, they show how rice markets, rice cultivation and landscapes are intertwined and co-evolving in Burkina Faso rather than one causing the other. The iteration between a systemic and practice-oriented analysis enables a move beyond isolated descriptions of causes and effects and towards an understanding of the causal mechanism and broader causal relationships influencing the rice sector.

Another example is Andriamihaja et al. (2019) who combine the telecoupling framework with a social network analysis (SNA) approach to capture the drivers of more immaterial flows by showing how the interests of distant actors influence and accelerate local land competition in Madagascar. They inform this theoretical approach by qualitative field observations at a regional and national level and qualitative-quantitative survey information on, amongst other things, product prices, and less tangible and informal information flow. They visualize this variety of data in a network graph showing the intensity, scale, frequency, and complexity of flows and interactions that comprise the evidence for the variety of land-use change drivers. They note how the application of telecoupling enabled them to better understand the links between distant drivers and local effects. In this example, telecoupling provides a framework for the application of SNA by prescribing the domains for analytical inquiry (systems, actors, causes, effects, flows), and SNA offers a way of carrying out this inquiry in a structured and quantifiable way. The articles within this category engage directly with telecoupling and deal with an empirical case but the focus is on how empirical application is operationalized through either integration or combination with existing theory (Hauer & Nielsen, 2020), conceptual integration (Zimmerer et al., 2018; Oberlack et al., 2018), the extension of existing frameworks (Keys & Wang-Erlandsson, 2018), or models (Yao et al., 2018), or through specific methodological tools (Andriamihaja et al., 2019; McCord et al., 2018; Millington et al., 2017). We cluster these together in one archetype because they all primarily focus on developing the idea of telecoupling through explicit interaction with existing concepts and methods.

Finally, the application of telecoupling for direct *empirical application* reveals how the telecoupling framework can be used as an analytical tool to disentangle actors, systems, flows, causes, and effects in situations where the analytical boundaries are inherently challenging to draw due to the transcending

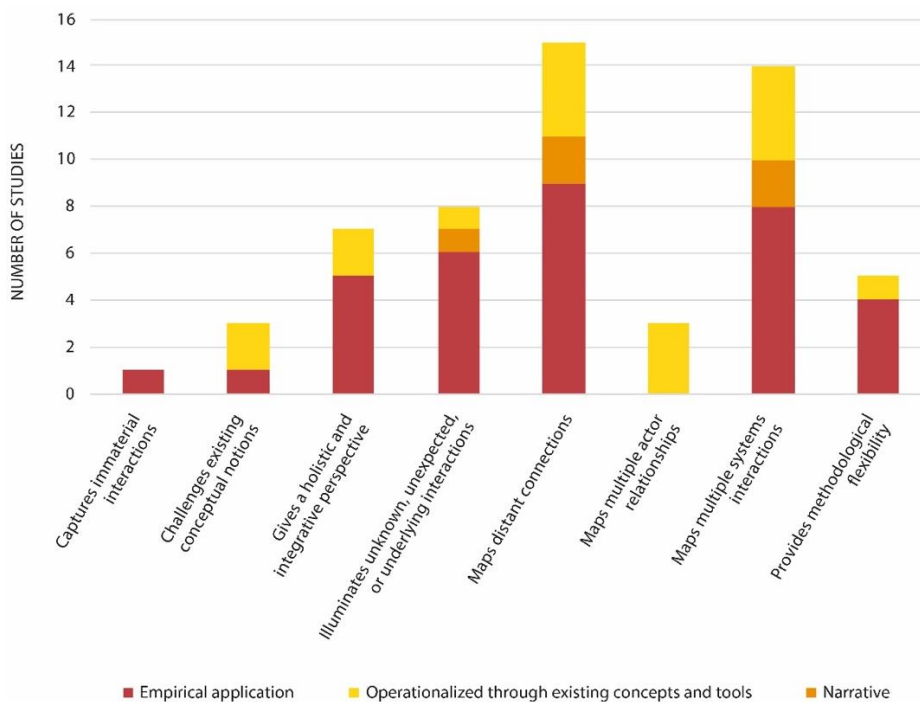
nature of the research problems studied. Friis and Nielsen (2017), for example, break up the banana production network into separate units of analysis (sending and receiving systems, actors, feedback, flows, etc.) and show how qualitative data and an empirical application of telecoupling can help expand the understanding of agency and power between distant actors. They show how this analytical approach better captures the complexity of causal relations behind the banana boom rather than limiting the analytical focus to a particular production system or place. Hulina et al. (2017) also show how telecoupling supports their analysis of migratory species by accounting holistically and systematically for the multitude of interrelated components (systems, flows, agents, causes, effects), in a way that provides a full picture of issues related to species migration and conservation, without losing sight of important but more underlying factors such as public perceptions of land use and cultural acceptance of the need for species conservation. Gasparri et al. (2015) combine a focus on both material and immaterial aspects in their empirical application of telecoupling to show how knowledge transfer, direct investment, and cooperation with South America are crucial elements of the soybean expansion in Southern Africa, which can result in similar deforestation and biodiversity loss as in South America

We propose these three distinct ways of understanding and applying the telecoupling framework as a way to structure the discussion that follows, even if aware that there are examples of more ambiguous applications. For example, Marola et al. (2020) refer to telecoupling as a phenomenon and emphasize that their objective is ‘not so much to see what telecoupling can tell us about environmental certification as what we can learn from environmental certification about crafting information flows to govern telecoupled systems.’ (p. 2). Still, they apply the idea directly to an empirical case. As they refer to telecoupling as a phenomenon and a globalization effect rather than an analytical framework, we have categorized their application as a narrative. The article is atypical for the sample in that it shows that telecoupling as a narrative can also be applied more directly to explore an empirical case, and thus contribute to the theory development of the framework components even if they are not explicitly included in the analysis. They do so by providing a structured way to analyze and distinguish between information flows between distant places in terms of bandwidth, which can support empirical theorizing on telecoupling governance (Marola et al., 2020).

4.3 The analytical influence of telecoupling for causal attribution

Nineteen of the 45 articles in the reviewed sample report in different ways how the telecoupling framework contributes to their analysis. Articles belonging to the empirical application of the telecoupling framework more often report on such contributions, followed by studies that combine telecoupling with other theoretical frameworks. Studies that employ telecoupling as a narrative rarely do so (Figure 5).

Figure 5. Reported contributions of the telecoupling framework.



Source: Figure generated from own data

The statements in Figure 5 suggest that the umbrella conceptual framing of telecoupling (*mapping distant connections* and *multiple systems interactions*) is the most broadly reported contribution of the framework across all three types of application. In a globalized and interconnected world, it can be difficult to determine which variables should be accounted for as a cause, and which should be accounted for as the effect (cf. the challenge positive feedback loops presented in Table 1). By mapping distant connections between multiple system components, the telecoupling framework disentangles this multitude of possible cause-effect relationships. It does so in a structured manner that makes it possible to focus on investigating specific linkages, causes, and effects, while acknowledging the wider system and other potential explanations. Thus, telecoupling does not ask what can be seen as a cause for the object of study, but what might have an interaction with the object of study. Hauer & Nielsen (2020)

argue that the emphasis on systems connections through the analysis of flows results in less attention towards the question of how systems emerge, and how causal mechanisms play out. From another perspective, it could be argued that the telecoupling framework supports exactly such inquiry by showing *how* systems are created, maintained, or dissolved, by the direction and strength of flows between actors. In that sense, telecoupling maps the challenge of inferring causality, while at the same time providing a way to meet this challenge.

Mapping multiple actor relationships is also key in the original framing of telecoupling, but a less frequently reported contribution in the reviewed sample (3 articles) (Figure 5). This speaks to the argument by Sonderegger et al. (2020), that the embedded network aspect of telecoupling deserves further testing and operationalization. Telecoupling research can contribute to shedding light on the interconnectedness between systems, actors, processes, and flows, but inevitably falls short in depicting all the dimensions of such complexity at once. Acknowledging the telecoupling framework as a type of network approach would also imply acknowledging this premise, and that the framework can map multiplex causal relationships that can then be subject to narrower inquiries in integration with other theoretical frameworks and/or by tapping into the telecoupling toolbox. This growing toolbox contains script tools for the assessment of potential causes and effects between social-ecological telecoupled systems through both statistical assessment and qualitative description (Tonini & Liu, 2017; Nielsen et al., 2019).

The objective of telecoupling research does not need to be to identify *all* causes and effects related to a given empirical case of land-use change but to identify which telecoupled relationships generate the largest socio-economic and environmental impacts (Liu et al. 2014) and to discover more unanticipated, intangible or underlying driving forces (Geist & Lambin, 2002). This is related to the reported strength that telecoupling contributes to *illuminating unknown, unexpected, or underlying interactions* (Figure 5). Telecoupling can help identify otherwise overlooked drivers by following flows between agents across systems with complex and fuzzy institutional boundaries. The inherent uncertainty related to causal attribution in LSS should be acknowledged as part of telecoupled systems rather than as a barrier to causal analysis. Uncertainty is not necessarily an analytical shortcoming but can be a valuable finding if it is explicitly discussed and integrated with the analysis. Some land-use changes require an acceptance that there will always be uncertainty because of the difficulty of attributing one factor as a cause and another one as an outcome (Rauschmayer et al., 2009).

In principle, causality can never be fully proven, only inferred. It has been a long while since science started to attribute causality beyond what can be directly observed, but there are not many holistic

analytical frameworks within LSS that manage this accepted uncertainty about causal mechanisms. Whether applied directly and empirically, through existing concepts and tools, or as a narrative, the telecoupling framework does not prescribe any theory or methods to analyze causal mechanisms. Still, the framework's approach to relationships between causes and effects as complex linkages and pathways (cf. Eakin et al., 2017), provides a heuristic framing for the data collection on processes, actors and flows that can contribute to a more nuanced understanding of causality and causal mechanisms. As put by Eakin et al. (2017), the phenomenon of unexpected outcomes can in part be explained by the intangible nature of linkages such as values, political dynamics and information flows in telecoupled systems. For example, in the classic case of the causal relationship between increased meat demand in China (cause) and deforestation in Brazil (effect), analysis of the direction and strength of trade flows provides information on the interdependency of distant actors and land use processes which contributes to revealing the mechanisms through which the cause produces the effect (Torres et al., 2017). As such, and especially when approached through integrated toolboxes, telecoupling facilitates consideration of the agency of causal linkages which is essential to guide the different types of land use policy interventions that different causal mechanisms call for (Meyfroidt, 2016).

Integrated approaches to telecoupling causality are enabled through the framework because it provides *methodological flexibility* (Figure 5). The telecoupling framework gives analytical direction for the identification of specific causal relationships between systems and actors through material and immaterial flows, while at the same time providing flexibility to discover alternative patterns (Figure 5). As noted in Friis and Nielsen (2017b), it allows to flexibly set the institutional and analytical boundaries of the study, while always keeping a focus on the local issue at hand. For example, Eakin et al. (2017) use telecoupling as a heuristic and draw system boundaries based on the different values and interests of actors associated with a telecoupled food production system. Moreover, the telecoupling framework provides flexibility in the sense that what makes a cause and what makes an effect will change depending on the analytical entry point i.e. which flows and actors that are in focus and what is interpreted as sending, receiving, and spillover systems.

Telecoupling does not prescribe *where* to look for specific drivers and effects, but it provides a framework for *how* to look, and from where a decision on an analytical entry point can be made without losing sight of the bigger picture. This is associated with the reported strength that overall, telecoupling *supports a holistic and integrative perspective*. As put by Lambin et al. (2001), what drives land-use change are 'peoples' responses to economic opportunities, as mediated by institutional factors' (p. 261), opportunities that are created by local, national, and international markets. This underscores well why an

integrative holistic perspective on concrete interactions across scales and geographic distance is paramount. Moreover, the argument supports the need to further tap into the reported contribution regarding *demonstrating immaterial flows and interactions* to illuminate the beforementioned more intangible factors (e.g. incentive structures and institutional logics), which is key to fully understanding the complexity of causes behind land-use change.

For example, underlying economic incentive structures among government actors or discursive flows between institutions in a given land-use setting can over time contribute to environmental degradation if local and positive attitudes towards conservation progressively weaken (Geist & Lambin, 2002). While challenging to go beyond the acknowledgement of their presence and towards structured causal analysis, these underlying and discursive structures make up enabling causal factors for the phenomenon in focus (e.g. environmental degradation) and should be explored in both their quantitative (e.g. volume or frequency) and qualitative (e.g. motivation or subjectivity) characteristics and the context of the telecoupled systems. Boillat et al. (2018) present a good example of telecoupling operationalization through existing concepts and tools in combination with more qualitative inquiries, in this case, a telecoupling analysis in an environmental justice framing to map power asymmetries in four different cases of protected area governance. Underlying causal mechanisms are also more far-reaching than the effects they from time to time generate. An example from the review is the observable trade of commodities (material flows), which can be linked to more underlying reciprocal flows, policy, and discourses (immaterial flows) (Gasparri et al., 2015; Leisz et al., 2016). In addition, the biological state of a forest can be influenced by cultural values, institutions, and social capital even though a direct causal link to physical traits such as resource extraction cannot be easily attributed with concrete measures and numbers (see Gibson et al., 1999 or Geist & Lambin, 2002).

We did not identify any direct reports on the potential and strength of the telecoupling framework in terms of supporting analysis of complexities related to the temporal dimension such as facilitating the identification of non-linearity, time-lags, or inertia (Table 1). As noted earlier, 30 of the 45 reviewed articles include some level of temporal perspective. However, the ability of the telecoupling framework to identify temporal couplings is not reported in the articles applying the framework more explicitly (Figure 5). The temporal dimension is addressed in the original conceptualization of the telecoupling framework (Liu et al., 2015). However, as our review indicates, not much telecoupling research aims at moving beyond the presentation of system interactions as temporal snapshots and towards addressing both temporal and underlying flows behind multiple interacting causal mechanisms. Such information is relevant for policy intervention as it informs about the permanency and institutionalization of the

telecoupled system. Relevant tools for more integrated inquiries have already been discussed in relation to telecoupling research including socioeconomic metabolism (Friis et al., 2016), process-tracing (Carlson et al., 2018; Meyfroidt, 2016), hybrid telecoupling models (Millington et al., 2017), agent-based modeling (Dou et al., 2019) or system dynamics models (Paitan & Verburg, 2019), and networks of action situations (NAS) approach (Oberlack et al., 2018), amongst others. Moreover, there are visualization techniques to show temporal order and development within social-ecological systems (Banitz et al., 2022; Sonderegger et al., 2020). However, accounting for temporal dynamics such as latency effects or slow-moving variables remains a challenge.

A telecoupling framework that supports longitudinal and mixed methods assessments would strengthen its contribution to causal analysis, not least because underlying drivers that require qualitative inquiry tend to reveal themselves over time. For example, increased timber logging is a proximate cause of the decline in biodiversity. The direct effect of timber logging in terms of habitat destruction can be measured and mapped quantitatively. However, looking at the cause of increased timber logging in more detail would require attention to the underlying driving forces (Geist & Lambin, 2002) at broader governance scales, and a consideration of the cumulative causes and more slow-moving variables (Pierson, 2003). Moreover, underlying driving forces such as individual incentives related to increasing incomes from logging, and slow-moving variables such as attitude change require more qualitative inquiries.

Addressing causal mechanisms in an exploratory and hypothetical manner does not necessarily mirror a lack of structural approach to causality (cf. Carlson et al., 2018). Rather, it can be seen as an acknowledgement of the challenges associated with causal attribution (Table 1). Tapping into the strengths reported in Figure 5, the telecoupling framework becomes particularly suited to meet some of these challenges as it disentangles the interconnectedness associated with environmental and social problems involving multiple actors, scales, and locations (multi-causality), the immaterial and indirect flows between actors (potential underlying causes or confounding variables), and the spillover systems of such problems (cumulative and cascading effects).

5. Conclusion

Attributing causality in LSS is a challenging endeavor in today's interconnected world. In this article, we have demonstrated how the empirical telecoupling literature has taken up the challenge. First, we have shown that such literature is characterized by a broad variety of disciplines and analytical approaches. While most studies applying telecoupling do so with the use of quantitative methods, as

identified in earlier reviews, qualitative and mixed methods studies and perspectives on temporal couplings are underrepresented. Consequently, we have suggested that qualitative and mixed-method longitudinal approaches to telecoupling research can complement quantitative analyses and provide a promising pathway for strengthening causal assessments in complex system interactions.

Second, based on the review, we have argued that telecoupling applications are most explicit in their contribution to providing a more nuanced understanding of causality in LSS when approached through either empirical application or operationalization through existing concepts and tools, rather than as a narrative. The empirical application of telecoupling shows that using telecoupling directly as an analytical tool to map and visualize actors and flows between distant systems can reveal unexpected impacts, spillovers, and significant causal relationships that are surrounded by complexity and uncertainty. Telecoupling operationalized through existing concepts and tools, in turn, demonstrates that conceptual frameworks from other disciplines can be enriched with a telecoupling lens and subsequently contribute to better capturing interconnectedness across distance. Altogether, the explicit interaction with the telecoupling framework seems to facilitate a more holistic focus on both material and immaterial aspects of causal relationships.

Third, the analysis of the review findings and the authors' reports on the benefits of engaging with the telecoupling framework, reveal that the analytical contribution of applying the framework is broad and ranges from its methodological flexibility to the holistic mapping of multiple systems and distant interactions. While it is rarely elaborated in detail how telecoupling contributes to causal attribution, there is evidence that telecoupling supports the identification of causal relationships that explicitly address, and thereby overcome, the analytical challenge related to the inherent complexity, unpredictability, and uncertainty of causes and effects which can complement existing LSS theory. Providing a flow-based and agency-focused perspective on causality can if operationalized through relevant qualitative and quantitative methods, guide the direction of interventions to target the processes and actors responsible for the most decisive causal mechanisms.

Overall, this article has demonstrated that telecoupling can push otherwise unobservable driving forces to the empirical domain through the conceptualization of multiple system components. In research advocating for better causal attribution in LSS, however, there is often a focus on the need to have causality proven with solid evidence from rigorous and triangulated methodological approaches. In this regard, we conclude that a telecoupling perspective does not necessarily make research better at proving causality, but it provides a structured framework for better understanding the complexity in the variety of ways causes and effects can be linked and unfold in a hyperconnected world. Finally, the telecoupling

framework offers terminology and a toolbox for structuring and communicating such complexity in a way that shows applicable in various disciplines and methodological approaches, which makes it suitable for trans- and interdisciplinary research and collaboration. It is the analytical process that the telecoupling framework supports, which we argue can ensure a more nuanced understanding of causal attribution within LSS and beyond.

How are institutions included in integrated development and conservation projects? Developing and testing a diagnostic approach on the World Bank's Forest and Community project in Salta, Argentina

Louise Marie Busck-Lumholtz^a, Esteve Corbera^{a,b,c}, Ole Mertz^d

^a*Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain;*

^b*Department of Geography, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain;* ^c*Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain;* ^d*Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark*

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1. Introduction

Development projects today are to a large extent operating within the discourse of participation and integrated project designs as rarely questioned premises for success. Centralist top-down approaches have been increasingly replaced by ideas about more grounded, people-friendly, and inclusive interventions (Li, 2007). In the forest sector, so-called Integrated Conservation and Development Projects (ICDPs) have become a popular approach that, in theory, is grounded in a participatory take on development (Bank and Sills, 2014). However, reports on the level of participation and the environmental and social effects of ICDPs are often ambivalent (Wainwright and Wehrmeyer, 1998; Mutune and Lund, 2016; Bank and Sills 2014; Saguin, 2018) and many ICDPs rarely or only indirectly mirror the objectives they were intended to meet (Mosse, 2004; Jeanrenaud, 2002). This trend has also been observed in cases of participatory forest management, rural development projects, decentralization of forest management, and interventions with market-based solutions to deforestation (see Oberlack et al., 2018; Pfliegner, 2014; Pouliot and Treue, 2013; Ribot, 2004; Mosse, 2004).

Some find that participation in ICDPs facilitates more positive conservation attitudes (Morgan-brown et al., 2010), while others find no effect on conservation (Linkie et al., 2008). Several case studies highlight the inevitable trade-offs and potentially conflicting goals of development and conservation (Cagalanan, 2013; Sayer et al., 2009; Barrett and Arcese, 1995) and report failure or reproduction of the status quo (Alcorn et al., 2011; Oberlack et al., 2018; Arjunan et al., 2006; Bank & Sills, 2014).

Generally, participation surfaces as the most crucial but also the most difficult element to realize in such

integrated projects (Brown, 2002; Cagalan, 2013; Gockel and Gray, 2015; Sanjayan et al., 1997; Tafon and Saunders, 2015).

Despite this growing evidence of the success and failure of ICDPs, and the availability of detailed project cycle frameworks for practitioners (e.g. Ba and Kyne, 2008), the misalignment of project design and practice and the wider management issues (Aldashev & Vallino, 2019) should be investigated and monitored to better understand the reasons behind participation challenges. This calls for an analysis that considers not just the informational and institutional flows in project actor networks but also the lack of flows and fragmentation of such networks (Rudnick et al., 2019) and the difference between theoretical and tangible participation and collaboration (Fox, 2020; Eriksen et al., 2021).

We address these research gaps by presenting and testing a novel diagnostic archetype approach to project management assessment that visualizes issues of institutional distance and opportunities for collective decision-making arenas in ICDPs. The approach is theoretically grounded in the concept of telecoupling and developed through an iterative process of literature review and fieldwork conducted in a participatory ICDP at the various sites where project actors were located. Telecoupling has been considered a useful heuristic device to analyze and better comprehend sustainability challenges. Still, to our knowledge, there are no studies to date which have operationalized telecoupling to analyze the management and implementation challenges of development projects. We do this through our diagnostic approach and introduce new ways by which academics and practitioners can address some of the structural problems with participation and collaboration that often characterize international development projects. Finally, we argue that such information contributes to better explaining the misalignment between a project's design and its implementation.

2. Telecoupling as a lens to study the management of ICDPs: a diagnostic approach

In our globalized world, we have developed an interdependent institutional infrastructure where distant actors, processes, and places are connected by material (e.g. goods or people) and immaterial (e.g. information or discourse) flows. The concept of telecoupling has been proposed as a heuristic device (Friis and Nielsen, 2017) to illuminate this interconnectivity across institutional and geographical distances, and as a framework (Liu et al., 2013) operating with five interrelated telecoupling components: systems, agents, flows, causes, and effects. We apply telecoupling more broadly as an analytical lens in our approach to project management diagnosis, where the framework components of systems, agents, and flows are integrated alongside elements of institutional analysis. The sending system is considered the origin of the interaction or flow, and the receiving system as the recipient.

Their boundary is a dynamic delineation and a result of the literature review and empirical case study analysis rather than an a priori definition (Friis and Nielsen, 2017).

Research adopting a telecoupling lens has often applied the concept to study global connections driving land-use change (Kapsar et al., 2019) but there are calls for more integration of institutions in the analysis of these connections (e.g. Eakin et al., 2014; Oberlack et al., 2018). In this paper, we respond to such calls by demonstrating that the adoption of a telecoupling perspective in the study of ICDPs can shed new light on how they work and why they might fail as conservation and development institutions. Institutions are understood as both regulatory and organizational arrangements (Hobley, 1996) with a focus on both formal and informal practices that structure institutional behavior (Ostrom, 2005). Our take on telecoupling is inspired by the telecoupling network integration approach proposed by Seaquist and Johansson (2019) and the schematic representation of telecoupling as a way to analyze governance presented in Eakin et al. (2014). Our approach is actor network-based in the sense that we understand the sending system as made up of processes and actors involved in project design rather than a self-standing social-ecological system, while the receiving system involves the project actors dealing with direct implementation and the beneficiaries of project activities.

Through a telecoupling lens, it becomes possible to study not only connections across distance but also how weak or missing flows between project system actors cause disconnections between sending and receiving systems (Hull and Liu, 2018) which in turn result in a decoupling of project idea and reality, and unfeasible or irrelevant objectives and outcomes (Fox, 2020). This notion concurs with those who have advocated for participatory planning tools as a means to get the local understandings of problems and solutions ‘right’ (Agrawal, 2008; Li, 2007; Ribot, 2004) and those who believe that addressing local environmental and social needs requires collaborative management, including strong and bidirectional flows among project actors regarding project information, project assets, rules and regulations (Fox, 2020; Grillos, 2017; Aldashev and Vallino, 2019; Larsen, 2008; Fernández Milmanda and Garay, 2019). In the following, we first elaborate on these flows, secondly, we describe the project actors and issues of institutional distance, and finally, we present our diagnostic approach through three management archetypes that reflect different opportunities for collective decision-making as a result of the degree of institutional distance between project actors.

2.1 Flows determining management situations

The project management domain which we analyze, can be looked at as a network of actors and flows, where the type of flows are decisive for institutional distance and thus the ability of collective decision-

making. Munroe et al. (2019) consider all decision-making in telecoupled land systems to take place within a collective decision-making arena due to the interdependency between actors in sending and receiving systems. We argue that a prerequisite for a collective decision-making arena to exist is at least some bidirectional flows between the institutions participating in the governance situation. The ability to define development is most likely to be possessed by actors with financial resources and political positions to control the flows of project information, project assets, and rules and regulations, which can be unidirectional from ‘sending’ to ‘receiving’ project actors. As such, we argue that de facto collaboration in project management situations cannot be understood without attention to flows as this approach provides more insight into what makes up institutional distance and collective decision-making, rather than looking at ‘actors’ and ‘links’ alone (Munroe et al., 2019; Rudnick et al., 2019).

We understand flows broadly as the “movements of material, energy, or information between the systems that are transferred as a result of actions taken by agents.” (Liu et al., 2013:5). Telecoupling literature has shown the importance of studying flows over large distances, also with regards to local responses as they might get lost on their way before they can influence distant policy decisions, causing disconnections between signals and drivers (Hull and Liu, 2018; Friis and Nielsen, 2017a; Liu, 2017; Oberlack et al., 2018). In an ICDP, this is especially problematic when the project claims to have a design based on local needs. In a situation where local opinion and knowledge are not directly part of the design phase, the design may rely on existing research or project actors’ experience and imagination regarding local development needs (Aldashev and Vallino, 2019; Eriksen et al., 2021).

In our analysis, we focus on 1) information and planning of project objectives, activities, scheduling, and budgeting (project information flows), 2) the formulation and imposition of rules and regulations on natural resource use, restrictions on land use in general, zoning practices, etc. (rules and regulation flows), and 3) project funds, goods, and services such as technical expertise (project asset flows). Bidirectional flows of project information (dialogue) and transparency regarding rules and regulations are crucial for relevant funds, goods, and service delivery. Local beneficiaries need to be able to know what to ask for, and whom to hold accountable, to participate in decision-making and thereby help project managers with a more efficient and effective way to bring relevant project results (Kosec and Wantchekon, 2020).

It is necessary to be critical of the relevance of project information flows, especially in cases where the content has been decided far away from the intended beneficiaries. Local community members, as well as other project actors, will never just be passive recipients of flows. Therefore, it is optimal to complement a diagnosis of a project’s management situation with an analysis that considers the demand

side, rather than only being attentive to whether or not the information is there (Berliner et al., 2018; Ojha et al., 2016).

Project asset flows and rules and regulation flows are important, particularly when considering rural community actors who might be unlikely to be able to act on information flows without the corresponding financial resources and decision-making authority. Assets can also flow the other way, from local beneficiaries and outwards, by hiring local consultants or in the form of the sharing of benefits generated by a project activity such as tourism revenue (Larsen, 2008). Rules and regulations are decisive for the distance between project actors and thus for the opportunity of a collective decision-making arena because ICDPs will never be implemented in a vacuum. They are bound to specific international and domestic rules and regulations, directly and indirectly, affiliated with the project. Regardless of strong dialogue and collaboration through project information flows and project asset flows, top-down rules and regulations would likely limit the collective decision-making arena and sustainability of collaboration (Fox, 2020; Hasan et al., 2020).

We discern between unidirectional, bidirectional, direct, and indirect flows to enable a more nuanced understanding of network ties and the complexity in networks that are not explicit, formally intended, or structured. We understand bidirectional flows as dialogue and unidirectional flows as situations where dialogue is not required or specifically sought. This could be, for example, when project managers conduct consultations and present a priori defined activities to a local beneficiary (unidirectional flow from project manager towards the local beneficiary) and the local beneficiary express opinions which are then extracted as raw data by the project manager (unidirectional flow from the local beneficiary towards the project manager) (Rowe and Frewer, 2005). Many unidirectional flows can be indicative of information asymmetry causing distance between the sending and receiving system.

With direct flow, we mean a transfer or interaction (depending on whether it is unidirectional or bidirectional) between actors in a situation where there is clarity about the process of the flow, the type of flow, and the actors involved. With indirect flow, in turn, we refer to cases where such transfer or interaction is less clear in either process, type, or the number of actors involved. The flow's directness can indicate where it might be necessary to be attentive to more informal institutional behavior. For example, an indirect flow of project information may reflect an underlying incentive to withhold information. An indirect project asset flow can indicate an unclear or unofficial distribution of funds, goods, and services, and indirect rules and regulation flows could indicate discretionary rather than rule-based decision-making

2.2 Project actors and institutional distance

The term telecoupling can be translated to ‘coupled over distance’ where distance is relative, relational, and not limited to geographical distance, but also reflects institutional or social distances (Eakin et al., 2017). The way flows are mediated between project actors in the sending and receiving system can maintain, increase, or reduce institutional distance because it influences the level of collective decision-making between project actors in the design and implementation system.

Drawing on Eakin et al.’s (2017) telecoupling typology, we understand institutional distance as something that arises when project actors or systems share few formal, social, or institutional relations. For example, there can be a strong relationship between two project actors if they are financially interdependent. Simultaneously, it can be a relationship characterized by distance if there are indirect or missing project information flows. As such, a project design system and implementation system can be linked through formal ties while being inherently disconnected in practice.

Increasing institutional distance also increases the risk of homogenization of project actors and organizations, and vice versa. While it may be conceptually helpful to construct institutional boundaries around “the donor”, “the local community”, “the NGO”, and “the governmental agency”, it is problematic in practice. If these constructs are distributed through flows of project information and there is little or no direct dialogue, it can undermine an understanding of individual realities which may reinforce the institutional distance between project actors (Lewis et al., 2003). Thus, as well as being a consequence of missing flows, institutional distance can be produced by unidirectional flows.

The concept of institutional distance speaks to the organization design theory by Galbraith (1974) and the challenge he identifies in relation to large organizations with interdependent sub-units: “the design problem is to create mechanisms that permit coordinated action across large numbers of interdependent roles.” (Galbraith, 1974, p. 28). The higher the number of project actors, the more complex the interdependencies, and the more information must be processed to ensure coordination. If we imagine ICDPs as large organizations and project actors as interdependent sub-units, it becomes clear that strong bidirectional flows between them are crucial to reduce the distance and ensure a space for coordinated action i.e., what we refer to as the collective decision-making arena.

Our understanding of collective decision-making in a project management domain is related to Rudnick et al.’s (2019) description of a ‘*shared governance network*’, where project coordination is shared among many actors through bidirectional flows; more organizations with greater tie density (stronger flows) are less likely to break into fragmented subgroups. In management systems where there are direct

interactions between project actors, trust-based, reciprocal relationships are more prevalent and there can be a stronger emphasis on the importance of local knowledge (Ostrom, 2005) and NGO experience (Eriksen et al., 2021).

As Munroe et al. (2019), we understand decision-making by actors through a telecoupling lens and thereby as interdependent in the sense that the choices and abilities of one actor depend on the relation to other actors and systems. For example, implementing agencies such as NGOs can be caught in a difficult position between flows in two directions: towards the local community in the form of project information and service delivery, and towards the government and the financing agency in the form of incoming flows of rules and regulations and project information (Aldashev and Vallino, 2019; Cook et al., 2017). Even though NGOs are typically considered of paramount importance for the participatory effect of ICDPs and other projects (Shin et al., 2017), their behavior may not be predictable in mediating these flows. Local and international NGOs, as well as government agencies and donors, are never homogenous entities and they may display contrasting behaviors and distinct rule-making structures (Ostrom, 2005).

2.4 Project management archetypes

The direction and directness of different flows between actors in the design and implementation systems can indicate project actor relationships, institutional distance, and thus which type of management situation is dominant. We present below a diagnostic approach that can support both practitioners and academics alike in their efforts to understand the causal mechanisms that may lie behind an ICDP's ability to be managed collaboratively. Drawing on the archetype analysis tradition (Eisenack et al., 2021) and inspired by the concept of telecoupling (Friis & Nielsen, 2017b), we construct three archetype management situations that can help diagnose ICDPs claiming to be participatory or community-driven (Figure 1). We consider issues of institutional distance and thus the opportunity for collective decision-making as dependent on 1) project asset flows, 2) project information flows, and 3) rules and regulation flows. Project information flows are of primary concern in this paper, but the other two types of flows included in Figure 1 are considered relevant to contextualize the direction and strength of project information. Figure 1 shows examples of three archetypes but the specific actors, direction, and directness of flows will vary, also within archetypes, across cases. We exemplify this in section 4.3.

The tables that accompany the figure contain further information for its interpretation: Table 1 provides a list of abbreviations used in Figure 1 and the typical roles of project actors relevant to include in the

analysis of ICDPs. Table 2 sums up section 2.1 with an overview of the types of flows included in Figure 1, together with a description of the ‘direction’ and ‘directness’ variables.

Figure 1: Project management in a telecoupling perspective

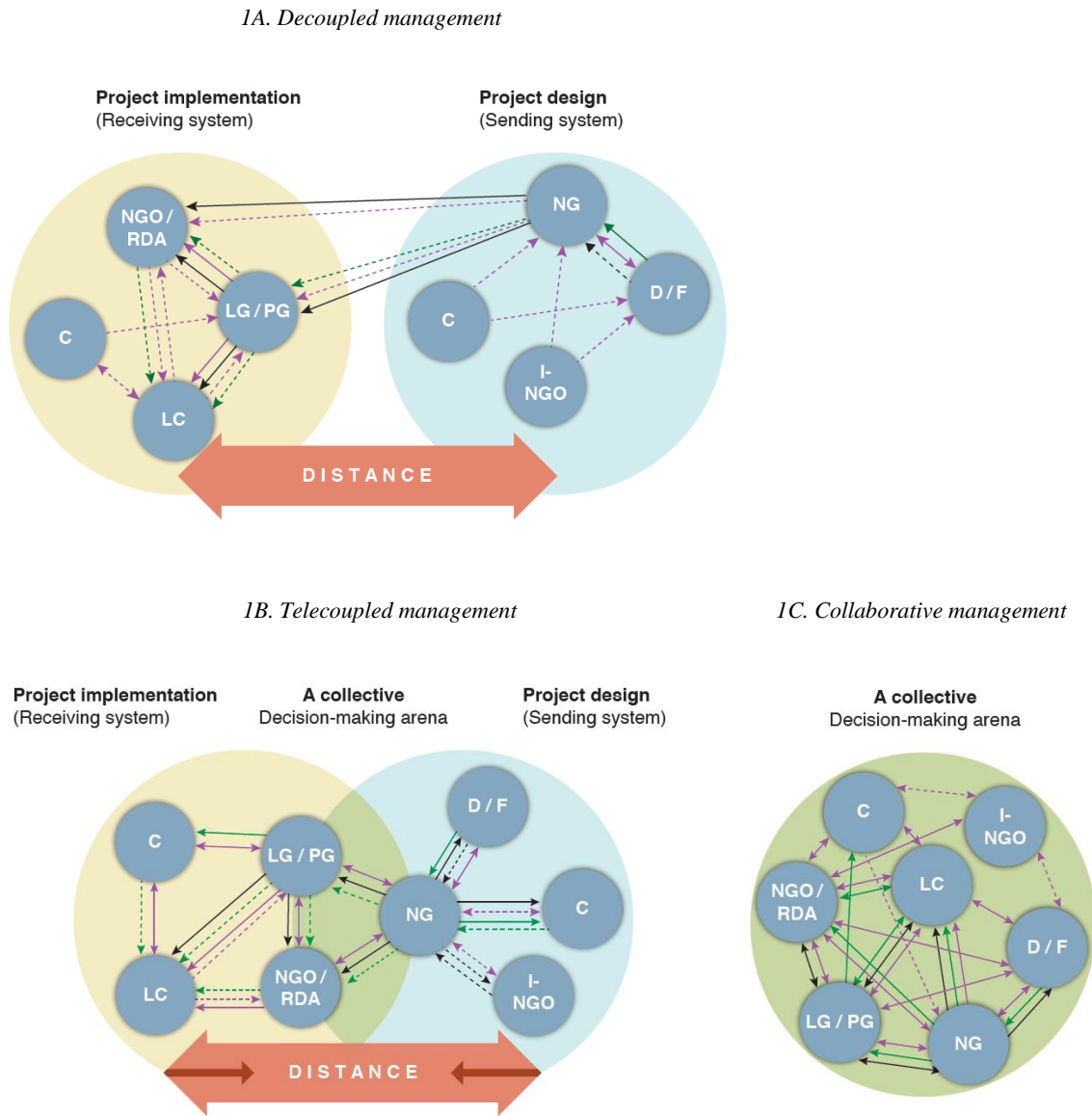














Table 1. List of key project actors

Actors	Typical roles and responsibilities
Donors (D) or international financial actors (F)	Support for projects through the provision of loans or grants; Negotiating project activities and distribution of project funds; Risk assessment and analysis of the client's country system and procurement capacity; Assist client with procurement planning; Provide training, technical assistance, and awareness-raising; Monitor compliance with a loan or grant agreement (Aldashev and Vallino, 2019; Rahman et al., 2016)
Consultants (C)	Study, design, or supervision of the project; Technical assistance; Institutional strengthening and capacity building
National Government (NG)	Borrower; Identification of project need, strategy, planning, and design; Carrying out procurement activities following the loan or grant agreement (Rahman et al., 2016)
Provincial (PG) or Local Government (LG)	Brokers and accountable representatives for the target population; Responsibility and decision-making power allocated to the local level government depends directly on the borrower (Rahman et al., 2016). In the F&C project, they are not involved with implementation arrangements.
International NGO (I-NGO)	Outside pressure or consultant depending on the project (Aldashev and Vallino, 2019)
Local Implementing Unit (LIU)	Teams of specialists and technicians that are hired by the borrower to implement project activities. These units are ideally located in or very near the site(s) where activities are to be realized.
Local NGO (L-NGO) or Rural Development Agency (RDA)	Bottom-up pressure or implementation responsibilities depending on the project; Broker and representative of the target population; Service providers to assist with project implementation; Consultancy (Aldashev and Vallino, 2019; Maya Pasgaard, 2015)
Local Communities (LC)	Official project beneficiary; Subject to participatory activities (Maya Pasgaard, 2015; Ravina et al., 2018)

Table 2. Description of flow categories

Flow categories	Description	Direct and unidirectional	Symbol	Indirect and unidirectional	Symbol	Direct and bidirectional	Symbol	Indirect and bidirectional	Symbol
Project asset flows	Project funds, goods and services such as technical expertise, know-how, and awareness raising.	Direct transfer of funds, goods and services from one project actor to another.		Indirect transfer of funds, goods and services from one project actor to another. The symbol can be used to indicate that there is one or more intermediary actors between the sending and receiving project actor, or		Direct interaction regarding distribution of funds, goods and services between project actors. The symbol can be used to indicate shared responsibility, negotiation or		Indirect interaction regarding distribution of funds, goods and services between project actors. The symbol can be used to indicate that the interaction is unofficial, unclear,	
		Direct transfer of information about project objectives, activities, and scheduling from one project actor to another.		Indirect transfer of information about project objectives, activities, and scheduling from one project actor to another. The symbol can be used to indicate that there is one or more intermediary actors between the sending and receiving project actor, or that the transfer is		Direct interaction regarding project information such as setting of objectives, planning activities and scheduling between project actors. The symbol can be used to indicate shared responsibility, negotiation or		Indirect interaction regarding project information such as setting of objectives, planning activities and scheduling between project actors. The symbol can be used to indicate that the interaction is	
Rules and regulation flows	The formulation and imposition of rules and regulations on natural resource use, restrictions on land use in general, zoning practices, etc.	Direct imposition of rules and regulations from one project actor to another.		The indirect influence of rules and regulations from one project actor to another. The symbol can be used to indicate that there is one or more intermediary actors between the sending and receiving project actor, or		Direct interaction regarding the formulation of rules and regulations between project actors. The symbol can be used to indicate shared responsibility, negotiation or		Indirect interaction regarding the formulation of rules and regulations between project actors. The symbol can be used to indicate that the interaction is	

The three archetypes are *decoupled management*, *telecoupled management*, and *collaborative management*. Additional distinctions within the receiving system could be made between project implementing agencies and beneficiary communities. In the sending system, we include those actors that are involved in the negotiations on the project budget and objectives while we include those in charge of implementing project activities in the receiving system. The archetype is then determined by the direction and directness of flows between these project actors.

Decoupled management (Figure 1A) is characterized by a lack of a collective decision-making arena, illustrated by the great distance between the sending and receiving system. In this archetype, implementing agencies and local communities are not part of the design phase of the project. Those activities are reserved for the national government, and the financing agency, and are potentially influenced by recommendations from an international NGO (I-NGO) or other consultants. Project definition- and decision-making is likely to lie with those in the most powerful financial and political positions, such as central government institutions and financing agencies. Although a financing agency like the World Bank would emphasize that the formal responsibility of planning and implementation lies with the borrower, in practice their project supervisors often play a critical role in project design and conceptualization (Burns et al., 2016a; Ika, 2015). Between project actors in the sending and receiving system, flows are either unidirectional or indirect, coordination between actors is poor, and there is no mechanism for bottom-up feedback or dialogue. There are no or only a few bidirectional flows, and these would be between the national government and the financing agency. Such a management situation can be indicative of a failed program or project (Rudnick et al., 2019)

Telecoupled management (Figure 1B) is characterized by a greater number and density of flows between project actors. The distance arrow is illustrated as being able to both increase and decrease to indicate that the larger the overlap, the larger the collective decision arena, and the smaller the institutional distance between the two systems and vice versa. The design and implementation system has an area of overlap to indicate some level of collective planning and decision-making. The premise for this management situation is that two or more actors are involved in both design and implementation activities and that there are direct and bidirectional flows between two or more of these actors. It is not possible to provide one single case that fully exemplifies telecoupled management, as it represents a situation where some but not all actors are coupled over distance, and there is some but not full overlap between actors involved with design and implementation. For example, it can be cases where NGOs or RDAs participate in both design and implementation and have strong bidirectional flows with the local

communities, but the local communities, in turn, are still detached from the other actors in the design system.

In collaborative management (Figure 1C), decision-making is more evenly shared by project actors, which is reflected in the high number of strong and bidirectional project information flows, project asset flows, and rules and regulation flows between project actors. All project actors thereby become involved in both design and implementation which allows for collective definition- and decision-making. Design and implementation become an integrated system of feedback and interactions in the collective decision-making arena, which constitutes an opportunity and should not be considered a democratic output in itself. As pointed out by Grillos (2017), some participatory institutions are representative and succeed in collective decision-making, while others can be prone to elite capture.

We see collaborative management as the ideal for projects to be democratic, implementable, socially just, and locally relevant, thus supporting arguments related to co-management frameworks for natural resource governance (Armitage et al., 2007; Ribot, 2003; Ostrom, 2005; Addison et al., 2019).

Collaborative management is about designing *with* the local community beneficiary instead of *for* the local community beneficiary, by placing them at the center of the arena where decisions on project objectives are made (Eriksen et al., 2021) throughout the project cycle. We acknowledge that the collaborative management archetype draws significantly on Ostrom's school of institutional analysis which has extensively shown that sustainable governance requires multitiered management systems that build on rich local knowledge and institutions that match the complexity of the ecosystems we ought to manage sustainably. While the Ostrom school is mostly concerned with the challenges and complexities involved in *common pool resource* management, we focus specifically on *project* management, which in turn can hinder or enable collective decision-making on the management of common pool resources.

3. The Forest and Community project, Argentina

3.1 Case description

The project chosen to test our diagnostic approach to project management is the Forest and Community (F&C) project, implemented by Argentina's government in three northern provinces of which our focus is on the province of Salta¹. The project is financed by a World Bank loan to the Government of Argentina, represented by the Ministry of Economy (MEC) as the borrower, and the Ministry of

¹ The project is as well designed to be implemented in the provinces of Chaco and Santiago del Estero, but the data collection for this paper has focused on the province of Salta.

Environment and Sustainable development (MAyDS) as the implementing agency. The ministries do not carry out project implementation on the ground but oversee the procurement processes, the financial management, the decision-making on project activities, and are responsible to comply with the World Bank loan agreement. At the time of fieldwork (2019), the provincial government had not been part of the implementation arrangements. MAyDS established a Buenos Aires-based National Executing Unit (NEU) integrated into the ministry's line functions and set up Local Implementation Units (LIU) in each of the three provinces where the project is being implemented. The NEU oversees project management at the national level, including inter-institutional coordination, supervision and monitoring, cumulative procurement processes, liaising and reporting to the World Bank. To make use of existing networks and because there is only a limited allocation of resources to provide salaries for LIU staff, local NGOs and Rural Development Agencies (RDAs) are hired as so-called service providers to provide technical assistance and support communities in project implementation.

The World Bank's 58.76 million USD loan for the project has Sustainable Livelihoods as the largest component with 41.69 million USD in the original project documents (World Bank, 2015). This involves helping selected indigenous and Creole communities with the preparation and implementation of Integrated Community Plans (PICs). The PIC enables access to funding for different land-use activities like silviculture and timber logging, but also includes non-extractive opportunities such as eco-tourism. The project is closely tied to the passing of the 2007 Forest Law in Argentina which included provisions for provincial governments to implement Land Use Planning Processes (LUPPs) as a prerequisite for provinces to receive funds attached to the law. In turn, LUPPs implied a Land Use Zonation (LUZ), where land was to be divided into three zones: a red zone for areas of high conservation value, a yellow zone for medium conservation value, and a green zone for low conservation value. The Forest Law has been criticized for its top-down implementation (Volante and Seghezzeo, 2018). The F&C project officially strives to meet this criticism by assisting with the development of PICs for the yellow zones in the Northern provinces. Formally, the F&C project's design is described as participatory, community-driven, demand-driven, and with strong collaboration between project actors, especially local NGOs and community organizations (World Bank, 2015).

The project was still active by the time of fieldwork, why it was premature to identify its impact and evaluate the results. However, it is a large-scale project involving a multitude of stakeholders at different scales and thus represents many of the typical management and coordination challenges of ICDPs. It is also a very complex, ambitious, and contentious project, why we argue that if our

diagnostic approach can yield constructive insights in this context, it will be applicable in less complicated cases as well.

3.2 Data collection

Data collection was conducted during two field trips to Buenos Aires and Salta in February and July-August 2019. Relevant actors at the national and provincial levels were identified and most were available for interviews, whereas project actors at the local level were more difficult to access. At the time of fieldwork, nine PICs were being implemented in Salta. Since project staff in several of the PICs were not responsive, the sampling strategy became largely based on recommendations from central management on where to find an area where project activities had been approved and initiated (SSI15)². When contact was reached with two PICs located in the same region and representing both Creole and indigenous Wichí participants, these were selected for further data collection.

A total of 44 interviews were conducted. This includes eight interviews with staff from the MAYS at the national level, seven interviews with staff from the LIU in Salta, three with World Bank employees, 12 with representatives from NGOs and RDAs, and 14 household level interviews in local communities. Two project sites were visited: 1) a community of Creole “Campesinos” with 116 registered project participants (some from the same household), where 12 interviews were carried out at the household level; and 2) a registered community of approximately 53 Wichí families where one group interview was carried out and followed up by one separate household-level interview. The schedule for data collection in the Wichí community involved several modifications due to local frustration with the repeated project and research related surveys carried out in their community. Therefore, the original plan to do structured interviews with a representative number of project participants did not work well, and a group discussion was carried out instead. The local NGO representative, who also participated in the group discussion, had contacted the Wichí community leader, who then invited project participants to join the meeting in the village center. The residents in the community were known to be very angry with interventions like the F&C project that, according to them, never materialized on the ground. Consequently, the Wichí community leader was unsure if anyone would show up and therefore invited all the male household heads in the village, out of which thirteen joined the discussion. Some left during the meeting, others came, and ultimately seven participated actively in the discussions.

² The paper will use following interview code style: SSI=semi-structured interview, CSSI=community semi-structured interview; #-interview number organized in chronological order.

Following the group discussion, conversations during a walk in the village provided information on expected service delivery and showcased examples of initiated work that had never been finished, such as the digging of a water well. Since there were no women present at the group discussion (the majority of registered project participants in the Wichí communities are men), a separate household interview was carried out with two female community members. All interviews explored issues related to communication, awareness of project activities, involvement in decision-making across the project cycle, roles and responsibilities, and information-sharing mechanisms (the list of questions is available in the supplementary materials).

Project documents such as the World Bank project appraisal report, implementation manuals, and public information flyers obtained from project staff were reviewed to explore the design of the project and contrast official objectives and management procedures with observed practices. The F&C project officially builds on a series of preparational activities and studies³, why it has been described in great technical detail. The purpose of this case study is to share a snapshot of management practice for the sake of showing the usefulness of our diagnostic approach. Therefore, the analysis addresses a sample of project documents rather than an exhaustive list.

A longer-term stay in the field may have resulted in more local voices being heard. However, we assess that it would be unlikely that perceptions about the project would have been different than those gathered since the project had not yet resulted in any tangible benefits that other local beneficiaries could value differently. We consider that the interviews conducted are enough to suggest a management archetype, which is what we seek to demonstrate through our diagnostic approach. Transcriptions of the interviews, written notes from community visits, and project documents were analyzed in Nvivo and QCAmap (see supplementary materials for further details on the qualitative coding). The direct quotations presented in this paper have been corrected grammatically for readability.

³ These include the Forestry Development Project (P006040) (approved 1995), the Native Forests and Protected Areas Project (P040808) (approved 1996), and the Sustainable Natural Resources Management Project (P100806) (approved 2008)

4. Applying the diagnostic approach to the F&C project

4.1 Flows between actors in the F&C project

4.1.1 Rules and regulation flows

We consider rules and regulation flows from the national government and in the context of the World Bank loan requirements and policies since the qualitative interviews revealed these flows to be decisive for project collaboration. The World Bank sends direct flows of rules and regulations to the national ministries through their loan criteria, safeguard policies, and various protocols for procurement, monitoring, evaluation, etc. (World Bank, 2015). According to the NEU project director, this meant that the Bank was very involved with project design, as they generally want to oversee the management of contracts and budget spending to make sure that no project activities go against Bank policies (SSI15). As the Provincial Government also demanded, another Bank requirement was the certification of ‘peaceful occupation’ for the project area (SSI15). The NEU imposed the Bank-affiliated rules and regulations indirectly when they set project requirements for LIUs and service providers (NGOs and RDAs). Since the LIU worked under the direct guidance of the NEU, who dictated their operations, we consider the rules and regulation flows from the NEU towards the LIU to be direct and unidirectional. The LIU and NGOs/RDAs communicated some of these rules and regulations in meetings and workshops at the local community level. However, we assess this to be a more indirect flow because it was unclear from the interview and document analysis how and to what extent this was done.

The Provincial Government was not officially included as part of the F&C project management but they played an important role regarding rules and regulation flows. The approval of PICs needed to go through the Provincial Government, which has the main jurisdiction to directly impose rules and regulations on land use interventions for both local communities, NGOs, RDAs, and the LIU. NGO and RDA staff pointed to this jurisdiction as being very bureaucratic, limiting participation and slowing down project implementation substantially. For example, they require that project participants in the F&C project can show land titles, and they will not approve projects that do not have proper mechanisms installed for conflict resolution (SSI16).

There was no evidence of formal institutions, such as local forest guards or on-site forest departments, in place to control forest use (CSSI1; CSSI3) nor any protocol for monitoring (SSI16), and from interviews, it was unclear whether the local community members were supposed to be part of the monitoring of LUZ and associated project activities (SSI3). Moreover, the interviewed community members did not seem to have been informed about the relation between the project and the Forest Law,

and there were no reports on participation in the LUZ, the formulation of the law, or the setting of F&C project objectives and protocols (8 CSSIs; SSI16).

The apparent top-down flows of national rules and regulations resonate with evidence from the same Argentine northern provinces presented in Volante and Seghezze (2018). It is noteworthy since the F&C project was closely tied to the Forest Law by arguing to help to communicate the LUZ locally and enable a participatory implementation (SSI14). The project information flows are thus closely linked to the rules and regulation flows, which seem to behave in the same unidirectional and indirect way between actors in the design and implementation system.

4.1.2 Project asset flows

Project funds were transferred directly from the World Bank towards the MEC as the official borrower, and from there to the NEU. Towards the LIU and implementing agencies, the flow of project assets was more indirect and interrupted. This was evident partly by the fact that the project, during a mid-term review, was rated as unsatisfactory, resulting in a change of project schedules and budget cuts which led to a temporary halt of project funds disbursement (SSI5). Moreover, according to a previous project director, the project represented a change in the approach to the management of project funds in the sense that besides small amounts for office supplies, money was only transferred to the LIU, NGOs, and RDAs on-demand after activities had been realized (SSI9).

The management of funds and procurement processes required to implement PICs was centralized, while flows of goods and services required for the operationalization of project objectives were supposed to be delivered by the implementing agencies (SSI9; SSI3; SSI14). An emphasis on heavy bureaucracy and irregular disbursement of project funds seemed to be echoed across implementing project actors (SSI19; SSI14; SSI16), and an RDA employee underscored that there was no participatory approach to the management and decision-making on project funds (SSI19). The LIU project coordinator emphasized that this created great difficulties for local interaction with communities, “delays generate mistrust (..) they (the local communities) are afraid. And for me, it is very reasonable because they are living in areas with many needs (..) If the project does not arrive in a reasonable time, they will say that it is just more of the same.” (SSI14). From these findings, we consider project asset flows from the NEU towards implementing project actors, and from the LIU toward the NGOs and RDAs, to be unidirectional and indirect.

From the implementing project actors towards the communities, the distribution of project funds, goods, and services appeared very problematic, fragmented, and in some cases withheld (SSI16; SSI17; SSI20).

From field observations and unofficial sources, it was reported that minor goods were distributed by the LIU, such as kitchen equipment and solar cells, without coordination with local NGOs or RDAs and, it seemed, without coordination with the local communities (CSSI2-12). According to local NGO staff, this distribution was “alien to what was formulated in the PIC” and thus not mirroring requests from the communities (SSI20). The implementing agencies questioned the amount of time allocated for participatory exercises to know community needs when the only project activities realized did not reflect their most urgent needs, such as access to clean water (SSI19).

Aside from the local Creole leader who unofficially seemed to assist with project coordination, there was no sign of bidirectional flows with local beneficiaries such as co-management arrangements regarding decision-making and distribution of funds, goods, and services. On the contrary, interview data and project reports conceptualize project activities as ‘offers’, provided by the implementing agencies, which can be aligned with community ‘demands’ (World Bank, 2015), and describe how these offers can be either accepted or rejected by the local beneficiaries (SSI15).

4.1.3 Project information flows

Between the World Bank, the MEC, and the NEU, we find direct bidirectional flows since there was dialogue and negotiations on project activities, reporting, monitoring, and evaluation (SSI8; SSI21; SSI15). From the NEU towards the LIU, the flow is unidirectional and direct, as they guided and dictated implementation (SSI9; SSI15; SSI14). This was also the case from the LIU towards the NGOs and RDAs, because they were told which activities to carry out without any structured dialogue or collaboration. According to on-site NGOs and RDAs, their inclusion in the design of the F&C project was limited to a consultation email with an invitation to read and revise project documents (SSI17). An employee from one of the RDAs noted that “there was practically no participation in the formulation process of the F&C project. On the other hand, in this project, the only thing there is so far, is formulation.” (SSI19).

At the community level, none of the interviewees could mention any project-related activity aside from a project meeting in 2018 (CSSI1-12; CSSI13). Such meetings were aimed at mapping local land use and community needs to inform the formulation of PICs (SSI19; SSI14). Some of the interviewed community members described it as events where different agencies presented ideas and strategies for how to improve the export of forest products (CSSI3). None of them seemed fully aware of the project’s purpose or expressed any role in defining this purpose (CSSI1-12; CSSI13). As put by one of the project participants, “What did they do in these meetings? They present each topic, tell us what is going to happen, inform us about things, present some idea to carry out, have some requests... those things.”

(CSSI6). The local Creole leader described the workshops similarly, “In the workshop they tell you what is good and what is bad, they tell you what to do and what not to do” (CSSI1). This type of communication we interpret as an indirect and unidirectional flow of project information from the LIU to the local community as well as from the local community towards the implementing project actors since the participation is characterized more by information extraction than direct dialogue.

The local project meetings allegedly followed the World Bank’s consultation procedure (World Bank, 2013) to mitigate negative social and cultural impacts. However, this did not appear to have translated into collaboration on early project design. There were arguments from RDA staff that the meetings were held after overarching project objectives were already decided (SSI19). This was supported by statements from the NEU director who noted that there were three predefined lines of investment, namely forest management, agriculture, and ranching, within which they invited local communities to propose activities (SSI15). In addition, a subcomponent was included in the F&C project design to give room for participants to propose their own projects, but we did not identify any evidence of its operationalization. The implementing agencies seemed to agree that there was an insufficient dialogue with the community to ensure participation in decision-making and to guarantee that project activities were based on local priorities (SSI19; SSI20; SSI16; SSI18; SSI17). The local Creole leader had a more positive perspective on the opportunity for project collaboration and argued that both Creole and Wichí communities were represented at an intercommunity and local stakeholder management roundtable⁴ that was overseeing all incoming investments (CSSI1)⁵. Thus, the lack of bidirectional flows between project actors and local communities that we encountered does not mean that local communities are passive recipients of flows⁶. Further data collection at later project stages might reveal more local dialogue or multi-stakeholder communication channels.

Generally, we did not identify any project information flows between the actors designing the project (World Bank, MAyDS, MEC) and the local communities. This might contribute to explaining why the communities’ urgent need for water (CSSI13; SSI22; CSSI1-12) was still in the process of being assessed rather than directly addressed. The PICs were supposed to bridge this gap and make sure that

⁴ We did not find any evidence in any of the remaining interviews that this roundtable was an institution directly included in the design and implementation of the F&C project. Further analysis could explore this issue more in-depth.

⁵ Creole and Wichí attitudes were very different, but it is beyond the scope of this paper to explore this difference in detail. See for example Gabay and Alam (2017) for more insights to the Wichí communities and Seghezzo et al. (2011) for discussions of different stakeholders’ visions of development, in the context of the Salta province.

⁶ Rural communities have been active in advocacy and lobbying in relation to LUZ, see for example Volante and Seghezzo (2018)

activities mirrored local priorities, but at the time of fieldwork, they were not yet implemented. Based on these findings, we assess the project information flows from the LIU and the NGO/RDA toward the local communities as unidirectional and indirect because of the low local awareness about project development and the very fragmented execution of project activities.

4.2 Project actors and institutional distance

There seemed to be a mismatch between implementation responsibilities, political authority, and project decision-making power. The provincial jurisdiction (elaborated in section 4.1.1) was argued as a big challenge for project operations (SSI15; SSI16). It is the provincial government that takes over the responsibility of PICs when the F&C project has been implemented (SSI14). Still, they were not officially included in the project. As goes for the LIU, NGOs, and RDAs, they held implementation responsibilities but were not trusted with the administration of project funds (SSI9; SSI15). The LIU was expected to be in ongoing dialogue with local communities, but they found that their lack of control over funds and restricted project staff (only a handful to implement the 31 PICs that were planned in the province at the time of fieldwork) limited their ability to both coordinate project implementation and be locally present (SSI14). Decision-making and information about the allocation of funds for future project activities were kept at higher management levels so when the financing stopped and the implementation paused, the local project actors, primarily NGOs and RDAs, became the face of the project that had disappointed, even though they were service providers without decision-making authority on project activities (SSI20).

There were different views, presented by project actors, on the gap between project design and project practice. Project staff at both LIU and NEU criticized the management framework as being too complicated, and argued that “Someone designed an idea, but it is not realistic.” (SSI1). Attempting to design a large-scale forest and community project as participatory was a first in Argentina, and the technical complexity of the design made it difficult for many project actors to imagine and operationalize a realistic implementation (SSI14; SSI19; SSI20). The previous NEU project director admitted that “There is a long way from the idea to the actual project.” (SSI7).

Project actors in the implementation system further argued that implementation had not taken off because of the bureaucracy and top-down project design (SSI14; SSI20; SSI9; SSI16) whereas the central management explained the lack of implementation by the financial restructuring and budgetary cuts (SSI5; SSI9; SSI15). None of the interviewed community members or local NGOs were aware that the project was rated as unsatisfactory by the World Bank or what they should have done to avoid the

budget cuts (SSI5; SSI3). The lack of bidirectional flows between central management and on-site project actors created an institutional distance to the communities and the implementing project actors (SSI3).

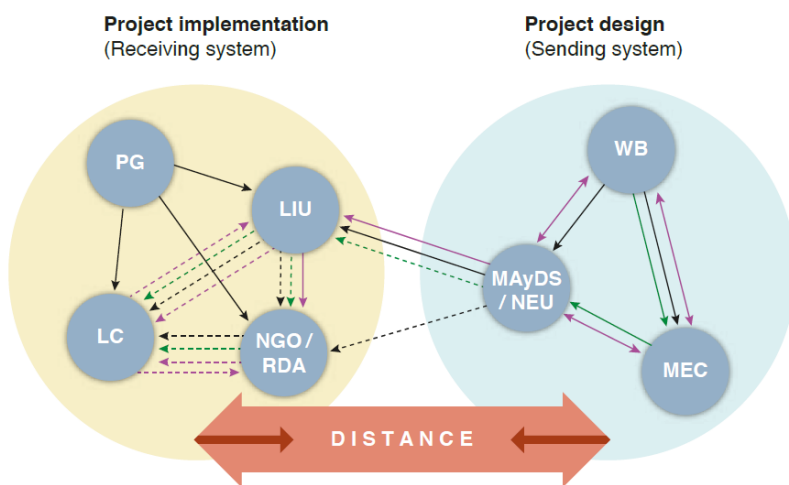
Both NGOs and RDAs believed in the good intentions of the NEU and the LIU as goes for community interaction and political will to move forward with project activities, but they emphasized that the realization of these intentions struggled due to a poor management structure and coordination of project teams (SSI18; SSI19; SSI20). As noted, the irregularity of the project had caused the participating communities to lose confidence (SSI14). They were frustrated that the project activities in which they had expressed interest, particularly the installation of water networks, had not resulted in anything concrete. As a Wichí cacique (local leader) noted, “Without water how do you expect us to participate in anything?” (CSSI13). One of the RDAs got a similar response in an early consultation where Creole communities were informed about the opportunity to develop PICs, to which they answered “We don’t want that. We want water.” (SSI19). The Wichí community members described the project presence as a disturbing element because they had to manage continuing visits and provide the same answers to the same questions from different researchers and project actors (CSSI13). Implementing NGOs and RDAs often pointed to this as a distance between project objectives and community needs, and between project development definitions and local values (SSI19; SSI16). Explained by a variety of structural barriers, project demands, and management responsibilities, the central project administration focused more on meeting process criteria of technical input and capacity building, than the urgency of realizing certain project activities.

4.3 Decoupled management

It was clear during fieldwork, that many actors envisioned the F&C project to be based on local community demands. However, from assessing the flows between project actors, we identified a management situation where information on local community needs was extracted in uncoordinated timing by the LIU and NGOs/RDAs and then brought into a bureaucratic machinery of provincial jurisdiction, World Bank protocols, and national policy. What comes out of this is uncertain as the project is still active at the time of writing, but we did not encounter convincing evidence of a collaborative or telecoupled management situation. Based on our findings, the management of the F&C project in Salta mirrors the decoupled management archetype (Figure 2). The way actors are situated, the nature of flows, and the resulting distance created between the sending and receiving system, provides no arena for collective decision-making or collaboration on project design and implementation.

The World Bank and the administrating government institutions in Buenos Aires surfaced as the key actors in the design system with the primary control of the direction and directness of flows. The LIU, the NGOs, and RDAs seemed to be part of the same implementation system as the local beneficiary communities since they worked directly with implementation but were not included in the design of project activities. We have placed the provincial government in the implementation system even though they are not official project actors; this is because they play an important role in project implementation, as previously noted (SSI15).

Figure 2. Decoupled management in Argentina's F&C project⁷



Our study indicates that these institutional drivers can be both formal and informal, although a full analysis of all the institutional drivers determining the direction and strength of flows was not possible. The gap between the formal institutional commitment to collaboration and the reality on the ground, which we found to be more fragmented and decoupled than collaborative, can be indicative that there are informal institutional arrangements at play alongside the more generic coordination issues and structural challenges. For example, the design actors in the F&C project were criticized by the NGOs, RDAs, and community members for not sharing data on project budgets, schedules, and general planning (SSI17; SSI20; CSSI13; CSSI1). If there is an agreement between actors to not share data with others throughout a project history, it could be an important informal but institutionalized relationship that shapes where information flows to. We detected this trend of missing information flows, but further analysis could explore the incentives of project managers withholding project information, or other

⁷ Abbreviations: Local NGO=L-NGO, Local Communities=LC, Local Implementation Unit = LIU, Ministry of Environment and Sustainable Development; National Executing Unit =NEU, The World Bank=WB, The Ministry of Economy (MEC).

types of flows, to understand the challenges and opportunities of their management positions in more detail.

While we did not identify any direct bidirectional flows (which is what characterizes our decoupled management archetype) we cannot rule out that they exist in some corner of the current management structure. We faced data collection difficulties and a large-scale comprehensive project in ‘crisis’ where different project actors had different views on the flows between them, why we did not get a complete picture. However, we believe that the qualitative insights we obtained are convincing enough to argue for a decoupled management situation during the time of data collection. As it is a project that has been under preparation, pilot-testing, formulation, and implementation, back and forth since 2015, the situation might have looked differently during another phase in the project. Therefore, we argue for the importance of applying this diagnostic approach throughout the project cycle.

5. Discussion

We have tested the applicability of a telecoupling-inspired diagnostic approach for the study of ICDP management, specifically looking at the case of the F&C project in Salta, Argentina. As a result, we have advanced ongoing debates on telecoupled land-use systems and the effectiveness of conservation and development projects in several ways. Grounded in our empirical findings, and through the lens of institutional telecoupling, we have developed a diagnostic approach that enables us to relate the flows characterizing project design and implementation to everyday (project) practice, which is an analytical approach that has only been hypothesized in earlier studies on telecoupling (Eakin et al., 2014; Oberlack et al., 2018; Newig et al., 2019; Lenschow et al., 2015).

This approach provides a new causal perspective on the well-documented tendency that participation on paper rarely mirrors participation in practice, and that community-driven approaches seldom build directly on community priorities (Mutune and Lund, 2016) but are rather set externally (Fama, 2020). We consider the diagnosis important to increase management transparency and to avoid that the institutional needs of a project (e.g. shown in blueprints and safeguards from the borrower and financing agency) become built into community perspectives from a better-than-nothing rationale. Such tendency can make project decisions appear perfectly participatory and the distance between theory and practice small (Mosse, 2004) even when the reality is that governmental project actors, or even financing agencies, have the primary power to define project objectives (Burns et al., 2017).

By following the analytical steps in our diagnostic approach, we have shown that the F&C project represents a decoupled management situation where the project is being coordinated in a fragmented

and bureaucratic project actor-network with structural challenges and unimplementable activity schedules resulting in more information-extracting than collaborative community engagement, local mistrust, and feeling of time and resource investments without tangible results. This supports existing evidence that participation, as defined and operationalized by project actors in a design system, does not necessarily materialize on the ground. In the decoupled management situation, local institutions and communities are at the receiving end of an already defined project design, which aside from creating local disappointment can lead to an increasing distance between project actors' perspectives on successful development (Addison et al., 2019) and maybe reproduce or intensify conflicts of interest between international stakeholders and local users of natural resources (Aldashev & Vallino, 2019).

Our diagnosis shows that the so-called participatory design of the F&C project has facilitated institutional distance rather than collaborative management; a somewhat embedded contradiction that appears symptomatic in other ICDPs (Mutune and Lund, 2016; Bank and Sills, 2014). Such institutional distance between project actors can be explained further by the fact that financing agencies and central government actors remain detached from the local communities because they seldom receive and process the knowledge and information emanating from the local level i.e. showing a lack of feedback mechanisms. This is of course not new since other development projects have used participation as a legitimizing rhetoric tool rather than as an operationalized management standard (Eriksen et al., 2021), or in some cases even copy-pasted stakeholder comments from other project consultations (Benites-Lazaro and Mello-Théry, 2019). There has long been an acknowledgment that globalization and the associated telecouplings (trade, discourse, technology, etc.) has led to an increasing homogenization of values and preferences often involving a loss and disregard of local knowledge (Young et al., 2006; Jeanrenaud, 2002). In some cases, the disregard for local realities become so internalized, and as a consequence somewhat hidden, that projects can be considered collaborative because there are mechanisms for stakeholder dialogue, even if practice shows that local beneficiaries are left out of the decision-making arena (Ayana et al., 2018) (cf. telecoupled management Figure 1B).

Our findings emphasize the lack of *practical* precision in enabling participation and collaboration at the project level, which complements Mosse's (2004) focus on the *conceptual* precision of participation. The F&C project in Argentina is an example of how the notion of a participatory process has become embodied as an expected and formal institutional behavior among project actors: legitimized more by the process and participatory activities than from direct collaboration with intended beneficiaries. This evidence also reflects the importance of further analyzing not only whether projects are manipulative, consultative, or participatory (Arnstein, 1969; Jones et al., 2014), but also why and by whom a given

project may be perceived in such terms. Future research could build on the diagnostic approach to better learn from cases like the F&C project where participation is operationalized as a management tool without translating the resulting community demands into action beyond project-related participatory channels (Merino, 2018), or where project concepts and ideas are shared with local beneficiaries but decided beforehand by actors in the design system rather than being developed and defined collectively (Burns et al., 2017).

Finally, we have argued that, in theory, collaborative management situations where all actor groups in the receiving system also participate in the early design phase can reduce the distance between project theory and practice. Each project case needs to develop site-specific approaches to operationalize collaboration through existing local institutions with assistance from local NGOs and RDAs that know the local communities. These actors, however, should not be engaged merely as service providers without ownership of the project, but be part of the early negotiations and formulation of project activities. Both local agencies and communities could be part of a more direct collaboration on project design and implementation by installing mechanisms for participatory budgeting (Grillos, 2017). It is a matter of institutionalized decentralization of project authority to ensure that objectives are relevant and implementable – resembling Ribot's (2003) recommendations for decentralized natural resource management. This, in turn, emphasizes the importance that impact evaluations assess not just project outcomes but the project system itself (Mutune and Lund, 2016). Collaborating with local actors from the beginning of project development, rather than spending time on building a holistic design model, can increase local engagement and the realization and sustainability of project results (Ravina et al., 2018).

Overall, we believe that the diagnostic approach can support the analysis of which project actors, flows, and institutional mechanisms contribute to explaining the current challenges of ICDPs (and development projects in general) in meeting their participatory aspirations and implementation goals. It can also serve as a monitoring instrument throughout a project cycle to avoid design and implementation becoming separate sending and receiving systems. Future operationalization of the diagnostic approach could benefit from including a temporal dimension to, for example, visualize if and to what extent project management draws on information flows from past project experience. Strengthening such flows could transform management practices in ways that result in more implementable and relevant procedures and outcomes.

6. Conclusion

This research has presented a novel diagnostic approach developed through the lens of institutional telecoupling and to be employed in the study of ICDPs. By looking at the World Bank-funded F&C project in Argentina as a case of ‘decoupled management’, we have uncovered the persistence of a blueprint development approach where project objectives are designed in negotiations between national and international project actors before any interaction with local project actors and beneficiaries.

We have only illuminated some aspects but not all, of why large-scale ICDPs like the F&C project tend to frequently face challenges with participation and implementation. In contrast to better-than-nothing rationales, our case study suggests that decoupled management and project presence without timely and satisfactory results can end up worsening local realities and opportunities for improvement because they create systematic disappointment and mistrust. More drivers and explanations could be identified from a more in-depth investigation of flows and the role that broader land governance processes play in the prioritization and implementation of project activities on the ground.

The decoupled management situation we identify is not a new phenomenon as it mirrors very symptomatic challenges already described and analyzed in the existing literature. However, the diagnostic approach we have developed to shed light on such challenges in a structured way allows for comparison across projects and project phases. The approach makes it simple and clear where crucial flows are broken or vague. Thus, the motivation for developing this diagnostic approach was the lack of surprise regarding the gap between theory and practice we encountered in the field, and our argument that there is a need to make such shortcomings more transparent and traceable in future ICDPs. Not by burying urgent local needs in complex theoretical frameworks but by implementing diagnostic approaches that can be applied across sectors by the multitude of actors typically supposed to work together on so-called participatory ICDPs.

Overall, we believe this work informs project practitioners about the benefits of creating more direct connectivity between project actors in the sending and receiving systems and of conceptually merging the two systems in both project design and implementation phases. The ability of ICDPs and other conservation and development projects to improve the well-being of rural communities and the state of their environments is what is at stake, and the challenge of enabling such connectivity is one that we must urgently overcome.

Engrained institutional logics jeopardize direct collaboration with local beneficiaries in integrated conservation and development projects

Louise Marie Busck-Lumholt^a, Esteve Corbera^{a,b,c}, Ole Mertz^d

^a*Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain;*

^b*Department of Geography, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain;* ^c*Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain;* ^d*Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark*

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1. Introduction

Since the 1980s, funding for biodiversity conservation and combined environment and development initiatives has increased markedly. Among these, Integrated Conservation and Development programs and projects (ICDPs), understood here as any program or project that involves a combination of environmental and development objectives and activities, make up more than two-thirds of biodiversity-related donor aid between 1980 and 2008 (Miller 2014). Meanwhile, recent evidence shows that when funds are channeled through multilateral institutions and part of large programs managed by international NGOs, or bilateral and multilateral organizations, only a very small fraction of biodiversity conservation funding usually goes to Indigenous Peoples and Local Communities (IPLCs) (Rainforest Foundation Norway, 2021). Additionally, research in Community-Driven Development (CDD) continues to find evidence that the inclusion of IPLCs in international development projects is often limited to “participation invitations” in the implementation phase, with their role typically being either absent or marginal in the design and evaluation phase (Aguilar-Støen & Hirsch, 2017; Pham, 2018; Gugerty et al., 2021; Busck-Lumholt et al., 2022b; Saguin, 2018).

External decision-making on ICDPs reduces the likelihood of local beneficiaries’ commitment which is often decisive for project sustainability and success (Dyer et al., 2014; Evely et al., 2011). Generally, there is convincing evidence of the success of local and indigenous people-led conservation (Dawson et al., 2021; Mansuri & Rao, 2013), yet critics of ICDPs have frequently pointed to conflicting objectives, institutional misfits, and inevitable tradeoffs between conservation and development (Sayer et al., 2009; Salafsky, 2011).

This paper departs from these findings and asks what role can be expected from development agencies in the move towards more accountable and collaborative ICDPs. Through conservation and development assistance, NGOs, bilateral institutions, and multilateral agencies have acquired defining roles in operationalizing ideas about participatory sustainable development through management frameworks, standards, and operational guidelines (Martens, 2002). In turn, their accountability toward local beneficiaries is essential for the effectiveness and perceived fairness of such development (Winters, 2010). Their importance is further emphasized by recent evidence on funding of ICDPs, which indicates that allocation of funds is not decided by development and conservation needs but rather by the governance and political-economic factors shaping the relationship between development agencies and aid or loan receiving counterparts (Reed et al., 2020b).

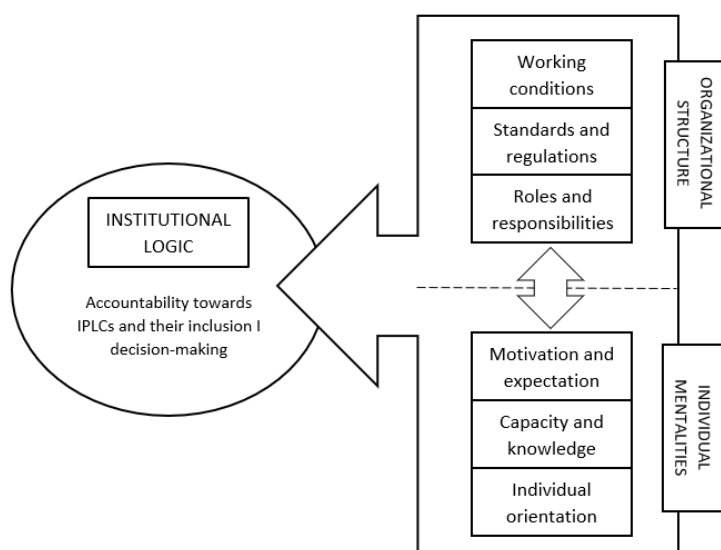
Existing literature offers great insight into development agencies' various pathways of influence on domestic policy and conservation strategies (Bernstein & Cashore, 2012; Burns & Giessen, 2016; Cashore and Stone, 2012; Wibowo and Giessen, 2015; Gale and Cadman, 2014) as well as on concerns about accountability in international development and public administration (Martens, 2002; Kim et al., 2020; Mcgee, 2013). However, development agencies are as diverse as IPLCs, and little is still known about their individualities and commonalities concerning their approach to collaboration with IPLCs.

By investigating individual development professionals' institutional logic (Friedland & Alford, 1991), this article provides information on the structural and underlying causes behind limited and unclear downward accountability and collaboration with IPLCs. Specifically, the analysis sheds light on the extent to which the institutional logic of development professionals supports the mainstreaming of IPLCs' values, knowledge, needs, and accountability in ICDPs. The analysis is based on qualitative interviews with project- and portfolio managers from the Inter-American Development Bank (IDB), the German development bank (KfW), the World Bank (WB), and the United States Agency for International Development (USAID) working with ICDPs in Latin America. These agencies were selected because they are the region's top sources of aid and loans related to general environmental protection (d-portal 2021). The concern drives the article that unless radical changes are made in the management culture of the development machinery, participatory procedures continue to render limited outcomes (Corbera et al., 2020; Saguin, 2018) as long as the important communication and decision-making is structurally kept at higher management levels (Aguilar-Støen, 2015; Busck-Lumholt et al., 2022b; Hughes et al., 2009).

2. The institutional logic of IPLCs' participation in ICDPs

Institutional logic is a meta-theory rooted in work by Friedland and Robert (1991) and since then applied in various disciplines, including environment and development studies, to build a typology of logics among public accountability organizations (Hathaway & Askvik, 2021). Inspired by mental model research (Lynam et al., 2012) and building on the structuration theory of Giddens (1983) that acknowledges the dialectic between organizations and actors, we focus on how institutional logic is expressed through organizational structure and individual mentalities. As presented in the conceptual framework (figure 1), we understand the organizational structure as working conditions, standards and regulations, and roles and responsibilities. Individual mentalities, in turn, we understand through motivation and expectations, capacity and knowledge, and individual orientation.

Figure 1. Analytical framework



The organizational structure can either facilitate or constrain collaborative management with IPLCs. Regarding *working conditions*, this article focuses on the time and resources allocated to meet project deadlines, the flexibility granted to project managers, and workplace characteristics. The analysis of *standards and regulations guidelines* includes various project guidelines and policy frameworks of development agencies, which by expressing certain norms, can represent institutional logic (Gugerty et al., 2021). *Roles and responsibilities* of development professionals are relevant to inform the institutional logic regarding IPLCs as it informs about who are considered project beneficiaries, how this collaboration is perceived, the difference in interaction with IPLCs vs. other project actors, and the accountability structure.

Individual mentalities, in turn, are essential because ‘incentives and constraints for individual agents can diverge significantly from those of the organization that they work for’ (Martens, 2002). *Capacity and knowledge* inform about individual starting points for working with ICDPs and the relationship between the task of including IPLCs in decision-making and development professionals' capacities and knowledge structures. The capacity of the agent influences how one thinks and acts on project tasks. For example, cognitive capacity constraints (Lynam et al., 2012) can become important when a project manager with environmental economics background is pushed to think about social and psychological aspects of rural development. Knowledge can be expressed by the way statements are presented. For example, when people care strongly about a subject, they are motivated toward accuracy in their understanding of the subject; the desire for accuracy is often associated with rule-based knowledge structures and processing (Lynam et al., 2012; Chaiken et al., 1996). Furthermore, the capacity and knowledge characterizing development professionals, and the often one-way transfer of such knowledge to the local beneficiaries, is indicative of power positions in the project system (Ramalingam, 2005).

Motivation, expectations, and individual orientation produce information on attitudes and more unconscious levels of reasoning. These components of individual mentalities have been central in mental model research (Craik, 1943; Norman, 1983), including research on institutional change and natural resource management (Lynam et al., 2012; Scholz et al., 2014; D’armengol et al., 2021), and have been proposed to support the analysis of institutional logic (Reay & Jones, 2016). Expectations can influence how a project actor enters and navigates a management situation. The motivation of development professionals can be political, economic, social, or career-oriented, depending which aspect of their work they consider. The motivation is part of the institutional logic that influences how collaboration with IPLCs is perceived and operationalized.

These organizational structures and individual mentality components are shaped by and shape the institutional logic, which emphasizes the agency of individual actors (Thornton et al., 2013). As visualized in figure 1, the components influence each other, and the connections between them are not straightforward as there are overlapping and interdependent themes, for example, working conditions and capacity. Moreover, expectations are related to the actor’s relational model, of which the focus in this article is on roles and responsibilities that make up part of the organizational structure. Perceived or expected roles and responsibilities can be specific about a project partner's characteristics or general or stereotypical based on individual orientation and broader discourses (Scholz et al., 2014).

3. Methods

3.1 Case study: four development agencies

While the WB, KfW, USAID, and IDB are structurally different, they are all international development agencies and are defined and organized by their purpose, membership, and national governments. There are many positions within the agencies, including project manager, portfolio manager, regional manager, and country manager. As the focus is not at the project level but on institutional logic, and because all interviewees have overseeing responsibilities and are involved in distributing project management tasks across the project cycle from the side of the development agency, they are referred to collectively as project managers. This does not apply to mainly project-hired consultants who do not necessarily belong or respond to the organizational structure of the development agency.

The WB is a multilateral agency and the largest development bank in the world, with offices in more than 180 locations. WB provides loans, guarantees, and numerous risk management products and advisory services to middle- and low-income countries and has 189 member countries that act as shareholders and are represented by a board of governors which is a key decision-making body (worldbank.org). IDB is a multilateral development bank that provides loans, grants, technical assistance, and research on environmental and development topics (iadb.org). Their projects are designed in their headquarters in Washington, DC, and they have country representation offices in most countries in Latin America (iadb.org). The number of employees in each office depends on the size of the project portfolio. In countries with small project portfolios, there might be just one project manager (country officer), whereas in Mexico, their largest portfolio, there are four (IDB1).

KfW is a bilateral development bank with all upper management based in Frankfurt. There are two main financial instruments: the bank's resources and the public budget resources (from German taxpayers) (KfW SG 2022). They do concessional finance, concessional credits (subsidizes the interest rate of loans), and work with grants. While there are approximately 500 employees in Frankfurt, there are also approximately 75 offices outside Germany, albeit KfW is not as prominent in country representation as IDB and the WB. Finally, USAID is a bilateral aid agency that manages public funding and therefore needs to comply with the policy in the U.S. (USAID3). Similar circumstances apply to KfW. As goes for project staff, bilateral agencies such as USAID and KfW tend to have smaller beneficiary country representation but with greater flexibility in terms of management, roles, and responsibilities.

3.2 Data collection

We contacted ongoing programs and projects with a dual conservation and development objective from the WB, USAID, KfW, and IADB. We acknowledge that some of the projects cannot be strictly considered ICDPs because their environmental objective is the sustainable management of natural resources rather than biodiversity conservation per se. Projects were searched on the agency websites and selected based on three criteria: 1) had a minimum commitment of 10 million USD⁸, 2) were approved between 1980 and 2021⁹, and 3) were categorized within the topics of environmental protection, rural livelihoods, and development. Regional programs were excluded from the sample.

The WB has a comprehensive project database and data availability. Projects were identified by searching within the portfolio of active projects of each country in Latin America and the Caribbean (LAC) by a filter of two themes, ‘environment and natural resource management’ and ‘urban and rural development’. The LAC region was chosen since it has a high number of project activities which increases the sampling feasibility and provides a geographical focus for potential comparison in future research. This search yielded 19 projects, of which all but one project manager¹⁰ were contacted via email. While it was challenging to obtain the email addresses of entire project teams, the email was received positively by eight of the 18 project- and portfolio managers invited for an interview. With KfW, there is limited project information on the web page, and after having reached the manager of the LAC portfolio, the contact to project managers in the region was based on snowballing. Four KfW employees responded positively to the interview query. IDB projects were sampled by country (one search for each LAC country), by topic (Agriculture and rural development/environment and natural disasters/sustainable tourism), by implementation status, and by keywords in the title and description of the project objective (rural conservation and development component). This filtering yielded 44 projects. While many projects were contacted, the Mexico portfolio manager became the only IDB representative in the analysis. USAID is similar to KfW in terms of limited access to project overview, and contact information on USAID staff was not available on the agency’s project information webpage. Through general internet searches, portfolio managers from Honduras and Mexico and one consultant¹¹ from Colombia were reached and interviewed.

⁸ Albeit KfW was selected among a list of agencies under Germany and only represents part of their big aid portfolio.

⁹ Because biodiversity funding increased markedly from 1980 onwards (Miller 2014)

¹⁰ The project was already analyzed by the first author and presented in Busck-Lumholt (2022, in review)

¹¹ USAID project implementing partner and not USAID employed.

Semi-structured interviews with 17 development professionals managing projects in Latin America are included in the analysis (supplementary material4), and an additional 11 exploratory expert interviews with consultants, and technical and senior staff from WB, FAO, and USAID, amongst others. All interviews were conducted by the first author using an online teleconference platform. Of the total interviewees (28), half are female, and half are male. 14 are trained in environmental science, 6 in environmental science and economics, 3 have a background in social studies or development studies, and 3 within economics, law, or business administration (supplementary material3). There is a bias in the higher number of interviewees from the World Bank, but this is relative to the fact that project or task teams in the WB are much larger (15-20 people) than in, for example, KfW (1-3 people). Interviews were tailored to capture information on institutional logic regarding IPLC participation. They focused on obtaining information on development professionals' technical and process knowledge regarding workflow, decision-making procedures, stakeholder collaboration, and more interpretive knowledge related to personal attitudes towards IPLC decision-making and the role of financial institutions. Each interview was recorded, transcribed, and coded through a qualitative content analytical framework (supplementary material2).

3.3 Data analysis

We qualitatively captured patterns of institutional logic (Reay & Jones, 2016; Friedland Robert, 1991) through document review and analysis of individual interviews. We analyzed development agencies' relevant policies and project frameworks inductively in a software enabling content analysis, looking at word frequencies and co-occurrences of words related to project management and IPLC beneficiaries. The coding was guided by the topics listed in Table 1.

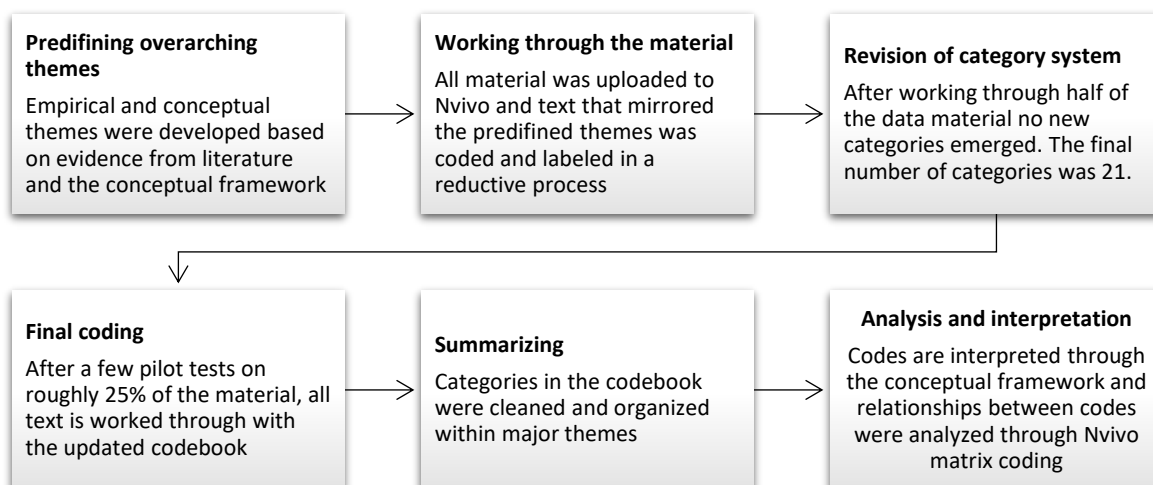
Table 1. Predefined coding categories guiding content analysis

Coding category	Description
Beneficiary target group	General statements on characteristics of project beneficiaries including local communities as a whole, indigenous peoples as a group or any specific sub-groups within them.
IPLC decision-making on activity selection and design	Statements regarding the ideal and/or de facto allocation of decision-making power to IPLC beneficiaries regarding project activity selection and design.
IPLC decision-making on activity implementation	Statements regarding the ideal and/or de facto allocation of decision-making power to IPLC beneficiaries regarding project implementation.

IPLC decision-making on monitoring and evaluation approach	Statements regarding the ideal and/or de facto allocation of decision-making power to IPLC beneficiaries regarding project monitoring and evaluation approach
Participation tools	Prioritized tools for including IPLCs in project management
Channels for beneficiary decision-making and feedback	Description of channels in the project system for IPLCs to provide feedback across the project cycle and suggest alternative activities.
Donor management responsibility and control	Statements regarding the opinion on and feeling of responsibility and control of project management across the project cycle, specifically with regards to IPLC beneficiaries
Donor priorities input	Statements regarding project input activities such as budgets and personnel
Donor priorities output	Statements regarding project output in terms of results and M&E focus

Information about the structure of allocated decision-making power was extracted from the individual project contracts with national governments since this is the primary mechanism through which international aid is delivered (Honig, 2020). Information on the official ideals for IPLC leadership or participation was retrieved from the four agencies' safeguards, social and environmental frameworks, and IPLC policies since the latter conceptualize the agencies' approach to local participation (supplementary material1; supplementary material2).

Figure 2. Content analysis of qualitative data



A qualitative content analytical approach was applied to guide the document- and interview analysis (figure 2) by including both written (frameworks and policies) and oral (individual interviews) statements regarding IPLC engagement, including stakeholder descriptions, decision-making structures, and participation tools. The analysis of the written and oral statements was guided by the same coding categories (table 1) to enable comparison and analysis of whether ideals, structures, and individual perceptions support or contradict one another and discussion of how institutional logic is expressed at an organizational and individual level. The elicitation of institutional logic was thus carried out indirectly (Jones et al., 2011). In addition to the inductive category formation, each coded text segment was provided with a label indicating its conceptual relevance to the institutional logic framework. The list of labels includes knowledge structures (associative and rule-based), individual orientation, motivation, and capacity. The final coding hierarchy, including the referenced data files and coded content, is available in supplementary materials.

4. Results

4.1 The organizational structure is hierarchical and highly complex

The workplaces of the interviewed development professionals appear hierarchical, both in their internal structures and relationships with external project actors. While the agencies are diverse, standards and regulations are generally plentiful, their operationalization demanding, and the associated distribution of roles and responsibilities is highly complex. USAID and KfW do not have extensive guidelines, rules, and regulations developed specifically for their agency. USAID adheres to US policy in that regard, while KfW applies many of the WB standards. The same goes for IDB, albeit they seem to apply WB guidelines to their own strategies rather than acknowledging that they adhere to WB. Due to their wide application across agencies, WB standards and regulations influence the institutional logic of development professionals beyond the WB organization. According to interviewed staff, the WB ensures international best practices (WB4). WB frameworks claim to support inclusion and collaborative management, and there is a strong participation discourse, albeit with little detail on the actors expected to participate and how. In parallel, standards development in the past years has focused on emphasizing client ownership of projects and a hands-off approach from development agencies who (in theory) only carry out supervision (WB ESF 2016).

Related to these variations in capacity is the disparity in project team structures and sizes across the agencies. While a KfW project team can consist of anything from one person to four people, WB project teams can be between 20 and 30 people or more, consisting of technical staff, consultants, and one or two project managers with overseeing responsibility. Project managers in all agencies typically have a

portfolio of several projects, and while some are based in the country where the projects are implemented, they are often based in the headquarters. This aspect of physical presence on the ground is frequently part of the explanation when development professionals share some of the opportunities and constraints of collaborating more closely with IPLC beneficiaries. In WB, there is an unofficial rotation rule whereby project managers can only be in the same country for a maximum of four years to generate a dynamic working environment and ensure the arrival of new knowledge to the post and the country where the project manager resides or operates in (WB5, WB12). On the contrary, KfW has project managers in local hires who have been working in the same country office for more than ten years, which reflects other priorities for the work environment:

When you have lived in a country for four years, you can pass on some things, but you cannot transmit your experience to the next manager. That is something different that I believe that KfW is doing well, contracting people from the country and letting them stay for a long time. (KfW1).

As such, working conditions differ, including the relationships with other project stakeholders. When based in a country office, maintaining good personal relationships and engaging in social activities are presented as a significant part of the job, but mainly with the government counterpart (WB7; WB10; KfW1; USAID2).

All four agencies are characterized by a high level of bureaucracy and a hierarchical structure that seems to place those in the highest positions and with the greatest decision-making power in the headquarters and not near project sites. There are great documentation demands reflecting the multiple environmental and social standards and regulations, implying that project preparation processes and contract negotiations are lengthy. The exact procedures triggered are defined in the contract between the development agency and the borrower or aid recipient. It is usually not until the stage where the aid or loan-receiving government asks the implementing agency to discuss and negotiate more specific project components that IPLC beneficiaries are invited to participate in decision-making. Before then, often IPLC beneficiaries had not yet been identified. The final project agreement can, in turn, be fragile, especially if it is a governmental counterpart since it represents current political priorities and recipient country administrations can change. This becomes particularly problematic for the role of IPLC beneficiaries as the targeted project sites, or activities can change because of project restructuring with new government counterparts (WB2; IDB1). These general tendencies in project designs and agreements support an institutional logic that views the inclusion of IPLCs as belonging to later stages in the project cycle.

While practical circumstances differ across agencies, sentiments and logic regarding roles, responsibilities, and limited capacity of individual development professionals are largely similar. According to a WB project manager, “Do more with less” is the Bank’s unofficial motto (WB7). The same is the case in USAID, where participation of IPLCs in the implementation of specific projects is also often determined by the time constraints of project managers (USAIDSP1). All interviewees expressed that working with multiple environmental and development issues is highly demanding, and there is a constant lack of time and inability to meet the demands of all the actors involved.

Working conditions influence the institutional logic of development professionals by defining deadlines and the time and resources available for various tasks. In the multilateral agencies (WB1-6; WBSP1-2; IDB1), there seem to be larger project portfolios, larger loans and teams, and extensive use of consultants (with short contracts) to oversee social and environmental compliance. With few exemptions (WB2), there is an official commitment to goals and political priorities from the central administration but also complaints regarding the higher management’s pressure for quick results and extensive reporting. Interaction with local beneficiaries is acknowledged as paramount but at the same time presented as a second-order aspect of the interviewees’ work, who express little or no involvement in this regard. In contrast, the bilateral agencies (KfW1-4; USAID1-3) are characterized by smaller portfolios but still by large-scale projects. The project teams are smaller, but there appears to be more frequent contact with local beneficiaries. In these cases, interviewees express a higher level of discretion as the bureaucracy is limited to specific project phases and tasks. While interviewees from WB are very risk-averse and concerned about international reputation (WB12), interviewees from the bilateral agencies appear to have a more critical perspective on the structure of development agencies and internal hierarchies. For example, a KfW staffer noted,

When we (local staff) have those gatherings (in Frankfurt), it is like the tribal gatherings of the underdogs, and everybody just complains and complains and complains and complains. We are all like, “we are not stupid. We know who we are, and we know we are minions in this world, but that does not make us stupid. We see things, and we have opinions. It is just that nobody ever asks them. (KfW3).

The project structure itself is somewhat streamlined across the agencies. As pointed out by an interviewee, a lot of money is available in the development agencies, and projects need to show relatively quickly that they are used properly, which is why a five-year project term is typically desired regardless of the type of operation. To this, the interviewee elaborated that,

(as a project manager) you cannot do much if the rules above you are those. I think (as) international cooperation, we need to think about it and say, "We might not be doing this correctly." We've worked a lot in the forest, for example, and there's no possible project that you will have that in five years will be completed. It is a forest. It just takes longer. (USAID3).

This time-management challenge becomes even more acute with changing counterpart governments, which may result in new counterpart teams with distinct priorities regarding development priorities and different approaches to community participation (WBSP2).

4.2 Collaboration is defined by capacity and individual priorities

A key issue that makes it challenging to generalize the ability of development agencies to influence IPLCs' participation is individuality and discretionary decision-making. It is expressed how good government relationships and networks with project stakeholders depend on the individual mentality of the development professional (KfW1; USAID2; WB2; WBSP1; WB12). The development agency's influence on project design and implementation, including how to work with consultants and the effort put into IPLC collaboration and prioritization of site visits, depends a lot on personality and experience (USAID2-3; WB2,6-8,10-12; WBSP2,6; KfW3). Some directly emphasize the importance of working closely with communities (USAID3; WB1; KfW2), while others perceive participation and community dialogue as an internal matter between the client and the community (KfW4).

The working environment generates a strong better-than-nothing rationale (WB10) and inevitable tradeoffs. As put by a KfW employee regarding cases where baseline studies are unavailable and local consultations infeasible, "I don't know... Would you rather lose the funds than use data that you know is not the best but it's some data or... you know what I'm saying?" (KfW3). Furthermore, presence in local communities is described either concerning standards and regulations or as an occasional activity that has added value for development professionals and brings "eye-opening" experiences with local people and environments that generate new knowledge, aesthetic pleasure, and motivation (WB10; KfW4). Still, this appears more as an expression of an institutional logic that views the role of the development professional as an overseeing body and only interacts directly with IPLCs during occasional visits, not necessarily a lack of awareness. Several of the interviewees were very articulated about challenges with IPLC decision-making. One project manager argued poor participation is a structural issue in projects but an almost inevitable premise and not something that can be controlled necessarily by the development agency (USAID3).

The general motivation for working with ICDPs seems linked to higher-level objectives. Success in meeting those objectives is measured through indicators, and results are monitored from the disbursement of project funds. This might explain why the interviewees focus on their own capacity to manage such mechanisms rather than on learning from and with local communities. Furthermore, most of them emphasized that they were focused on results, reaching higher-level goals, and large-scale impact where lack of baseline studies or fragmented participation sometimes needed to be assumed (KfW3; WB2; WB4; USAID2; KfW2).

As for why IPLCs are not included in the earliest decision-making, many interviewees speak of project objectives in a hierarchy. First, there is the overall objective and strategy, which is negotiated between the counterpart and the development agency, and then later, the smaller decisions, where it is more likely that local beneficiaries are involved. Of course, it varies greatly depending on whether or not the project is proposal driven. However, the tendency to exclude IPLCs from decision-making on higher-level objectives (such as whether there is a need for a forest conservation program, an infrastructure project, or a sanitation project, and which partners should be involved) appears broad (IDB1; KfW2-4; USAID1-3; WB1-2,6; WBSP1-2).

The collaboration that is prioritized to be as direct as possible across the whole project cycle is that of the contractual counterpart (mostly government), who is presented as the macro beneficiary (WB2). Interviewees also broadly shared that they needed such counterparts' capacity to implement projects. For this reason, a USAID staffer emphasized:

The people that we engage, they have like 20, 30, 10 years of experience working with the locals. I think that this is why we use them the most because they are the ones that have the connection. Particularly working with development, it is not easy to create that trust with the producers and the local people just in one second. (..) if we started a landscape (project) tomorrow, nobody would work with us. (USAID3).

Thus, collaboration with the local beneficiary is to be carried out by the counterpart or the implementing agency and not by the development agency who, instead, maintains a supervisory and overseeing role (WB1; WB11; WB7; WB12). One logic behind this position is that the development agency is usually located very far away from the project site (KfW2). Another argument is related to trust, "I wouldn't say it's our role to really control there. (..) we function based on trusting that we know who our counterparts are. We trust in their interest and objectives and motivation" (WB1). Still, project managers across all agencies agree that this trust is accompanied by assistance due to limited counterpart capacity across the

project cycle. As put by a WB project manager, “in appraising a project, we identify gaps. Most of the time, depending on the strength of the client and the implementing entities, we end up adjusting.”

(WB3). In cases where the national government shows low capacity, the development agency needs to step in and take more responsibility and do closer monitoring (WBSP2). As put by another interviewee, “The less capacity a subproject has, the more frequent we engage with them, and the more frequent we ask them to do a report for them to know how it is done, for them to know what their red flags are, where do I need to adjust?” (WB4).

When the contractual counterpart in the project has limited capacity to ensure local participation, the development agency can support through the hiring of external consultants to ensure that the counterpart lives up to participatory standards. Most of the interviewees argue that they mainly supervise, technical support, and negotiations on design in a diplomatic process based on their guidelines, safeguard policies, and government priorities (IDB1; WB5; WB12; KfW2; KfW1; USAID1). They admit to having limited means to deal with issues on the ground and that a central part of their job is to call in external experts – often international rather than local – to deal with various social and environmental challenges and technical tasks (WB12).

4.3 IPLC participation as a safeguarding task

While all interviewees perceive their responsibility to be of overseeing character and not involve direct collaboration with IPLCs, it is less clear how this overseeing role is thought to ensure direct collaboration across the project cycle. Standards and regulations are clearly influencing the institutional logic on the relationship to IPLCs as the interviewees all refer to these as representing their approach to IPLC engagement, especially social safeguards and the requirement of prior consultation when confronted with questions on their interaction with IPLC beneficiaries (IDB1; KfW2; WB2; WB4; WB5; WB6; WBSP2; WB9).

Interviewees mention the inclusion of IPLCs in decision-making in relation to community visits, the installation of grievance mechanisms (IDB1; WB6; WB10; WB11), solicitation processes (USAID3), social safeguards (WB5; WB12), and legal agreements on consultations (KfW2). However, there is no mention of IPLCs’ knowledge or opinions, and they are not described as equal project partners. Contrary to the expectations set in standards and regulations, interviewees consider consultations to share information about project activities (IDB1; KfW2; USAID1; WBSP2). The institutional requirements of managing multiple projects within tight deadlines and overseeing responsibilities of large areas seem to make it infeasible to invest more time in direct interaction with local beneficiaries.

The individual motivation is to focus collaboration on national-level actors and other counterparts with decision-making power, whereas direct local engagement is not a career expectation but a matter of social safeguard, it is not a general concern among the interviewees.

Among all agencies, standards and regulations related to stakeholder engagement are mainly focused on the government as the beneficiary project partner and IPLCs as project beneficiaries (IDB ESF 2020; KfW SG 2022; USAID ENRM; USAID SE 2018; WB ESF 2016). Standards for IPLC participation are described as dependent on the assessment of vulnerability, risk, and expected impact (IDB ESF 2020; KfW SG 2022; USAID SE 2018; WB ESF 2016). In IDB, WB, and KfW standards, IPLCs are described as vulnerable, and the logic expressed in standards and regulations is that this vulnerability is the reason that they need to be consulted to avoid the risk of adverse impacts (IDB ESF 2020; KfW SG 2022; WB ESF 2016). The word collaboration is not used concerning IPLCs; instead, there is ‘participation’, ‘behavioral change’, and ‘capacity building’. Local beneficiaries are generally described by their needs, primarily economic (WB2-6; USAID1-3; KfW1-3).

Some interviewees were attentive to power imbalances and to the fact that projects often victimize rather than empower local people (KfW1; KfW3). This power imbalance is reflected in the following rather patronizing statement on how projects have helped IPLCs:

The problem is how to implement when you have rules they need to understand. One of the major things was to open accounts in every community. You have to have a treasurer, amongst others. (...) They barely had a phone. Not a smartphone, and you have to open an account. They never had an account before. They did not know what a password was. (...) Now (because of the project) they understand a bit more what a bank is, and they are less afraid to go to the bank and deposit their money. (WB2).

In addition, interviewees made extensive use of participation buzzwords and also some more anachronistic expressions, e.g., the use of the term “mission” as the name for project offices (USAID, IDB) or project activities (WB, KfW). For example, a KfW project manager reflected on the connotations of the rhetoric “The development talk is very colonial. We still talk about missions. Like “We are on a mission to save you.” It's super colonial, it's very odd.” (KfW3). While some acknowledge these biases in development terminology, it is still broadly applied and likely to make up part of the institutional logic and thus the approach to accountability towards and collaboration with IPLC beneficiaries.

Despite the overall hands-off approach expressed to IPLCs, projects are still – by other stakeholders – referred to as IDB projects, WB projects, and so forth, partly because of the knowledge that feeds into the projects in the design and technical assistance (FAO1). According to a local employee, because projects need to live up to “western” standards, they are seen as representing western ideas that indigenous communities' ideas are more or less open to (KfW1). Knowledge and technical capacity, mediated through their participation in negotiations, the standards and regulations the project needs to comply with, and the training conducted, are by some described as the primary value of development agencies for project outcomes (WB8).

5. Discussion

Critics of participatory development have hinted at structural intentionality among international development agencies, but as noted by Williams (2000), such narratives tend to suffer from a reductionist view on power. Moreover, such a view often implies a homogenization of development professionals and disregard for the complexity that lies in their responsibility (or lack thereof) for participation and development failure. Our results are a contribution to providing such nuance.

Overall, we show that development professionals feel little institutional mandate to be part of the direct collaboration with IPLCs, but this may not be a problem *per se*. In theory, development agencies could express a low willingness to engage in the local context but still financially support a highly participatory project. In practice, however, situations can surface where development agencies enjoy a positive participatory reputation without taking responsibility for potentially negative output. This can make them a continuing powerful actor in a sector where they might not be the best performers. It is not without significance from where funding for conservation and development comes as development agencies set loan and aid requirements and are usually involved in knowledge generation (Enns, 2014) and decision-making processes at all project stages (Bernstein & Cashore, 2012; Winters, 2010). In turn, they perceive themselves as supervisors that do not form part of project design. Simultaneously, they reveal how they tend to meddle across the whole project cycle as they often find aspects that need restructuring. It can be deduced from interview statements that highly risk-oriented and technical approaches guide the approach to design, management procedures, and restructuring needs. In international development agencies, this is quite typical as they often adhere to the theory of change and application of logframes tailored to the organizational agenda (Schnable et al., 2020; Valters & Stein, 2012)

Our analysis makes evident an institutional logic that creates barriers to development professionals' downward accountability and direct collaboration with local beneficiaries, at least in four different ways. Firstly, such logic presents organizational and practical barriers. The underlying blueprint approach to ICDP procedures implies a strong focus on risks through safeguards and expectations for efficient implementation and quick results, large-scale investments, and big portfolios. This blueprint and tendency to focus on measurement and control can in part be attributed to the WB as a leading institution of environmental and social standards and regulations (Holland et al., 2004). It can hinder meaningful implementation progress as it undermines the need for more autonomous operational strategies (Honig, 2019) and creates discretion incentives (Gulrajani, 2014). Discretionary decision-making can be a reaction to too many rules (it becomes up to the individual which to follow as it is infeasible to follow all) or too few (the regulatory vacuum is filled with discretionary decision-making). Combined with the location and turnover of staff, the focus on risk and control is counterproductive for the trust-building necessary to build local leadership and direct collaboration with IPLCs, which is broadly acknowledged to require time, long-term commitment, and a redefinition of results and indicators. One important cause behind these organizational and practical barriers is the decoupling between performance and reward since the beneficiaries are often located in another country (Martens 2002; Gulrajani, 2015). This creates a "broken feedback loop" which also implies a broken information loop as the "geographical and political separation between these two groups (donors and beneficiaries) increases the costs and decreases the benefits of information." (Martens, 2002, p. 15).

Secondly, individual mentalities regarding performance pressure and ideas about institutional mandates make up part of the barrier to direct collaboration with IPLCs. The focus on risk management, technical fixes, and efficient implementation can be partly attributed to the careers of development professionals who are increasingly focused on results and committing and spending budgets since this task is easy to monitor and measure to demonstrate good performance (Harris, 2021). As put by Martens (2002) "when agents face multiple tasks that compete for their time, they will focus on those that are more likely to satisfy their career concerns." (p. 20). The drive for measurable results, disbursement, and large-scale activities is built into a bureaucratic development structure that can undermine participatory performance (Honig, 2019; Harris, 2021, 2022). It is, of course, directly linked to demands from higher administrative levels. This partly explains the organizational and individual priority of close collaboration with the counterpart and those project actors with decision-making powers since these are the ones they need to control and ensure they are living up to standards and regulations. A strong focus on risk is a common characteristic of development agencies that can be quite problematic. As argued by

Scoones (2019), while ‘risk’ is often the dimension formally addressed in policy designs, ambiguity, uncertainty, and ignorance are the three most common conditions in development.

Thirdly, the institutional logic presents barriers regarding internal hierarchies and the complexity of roles and responsibilities. The ability to make use of flexibility for decision-making is associated with authority. What is not documented in the results but has been pointed out as a tendency in international development (Gulrajani, 2014) is that the most significant authority in development agencies is often placed centrally in headquarters and thus far away from the IPLCs. Therefore, whatever flexibility there might be to increase and expand IPLC decision-making, even if the organizational structure does not facilitate this, it is unlikely to be taken advantage of if it is not advantageous for the career path.

Moreover, there seems to be a nested patron-client structure internally in the development agencies, which has a trickle-down effect on the approach to other project actors. The more locally grounded the development professional’s work is, the less prestige there is and, it seems, the less leverage they have in decision-making processes. To this, Martens (2002) has pointed out two types of principal-agent problems in the case of aid agencies, which also can be argued to apply for development banks when they channel public funding or grant money. One is that the development professionals need to work in the interest of those who have provided the financial support for the project or program. Another is that both the funders and the development professionals are officially motivated by the interests of local beneficiaries “but need to be given credible incentives to do so.” (Martens, 2002, p. 41) which will forever be a challenge and require checks and balances since “individuals, groups, and organizations try to use institutional orders to their own advantage.” (Friedland Robert, 1991, p. 251). Our findings show how these dynamics result in blurry roles and responsibilities among development professionals.

Finally, the institutional logic indicates barriers related to a hands-off paradigm to project management and a better-than-nothing rationale when it comes to the collaboration with IPLCs. This raises important questions about what role is left for the development agencies. According to Winters (2010), donor accountability to beneficiaries is a thorny issue, and “growing emphasis on country ownership of aid programs speaks to the donors’ awareness of their accountability to aid recipients.” (p. 224). However, it says more about the relationship with the country partner which appears to further increase the distance to the local level. Moreover, there is evidence that awareness of the importance of IPLC knowledge and decision-making is rarely realized in practice (Enns, 2014). A consequence of the detachment between development professionals and local beneficiaries and their environment is that development becomes imagined and political rather than practical, mirroring institutional logic and international discourse rather than local realities i.e., a so-called “developmentality” (Ilcan & Phillips, 2010).

Despite the hands-off paradigm, development professionals frequently use participatory language and are portrayed as “participatory professionals”. According to (Cooke, 2004), a development agency such as the WB directly appropriates participatory discourse and methods. Moreover, participation discourses tend to develop parallel with institutional needs and higher-level objectives in development agencies (Schnable et al., 2020). In a discussion of the fates and functions of international development buzzwords, Schnable et al. (2020) also highlight that a term like ‘accountability’ has had several meanings in the past decades and that development agencies typically end up adopting the definition that is most advantageous to their organizational agenda, “for the World Bank, an obligation for development actors to show results” (p. 16). This echoes the findings in this article that the institutional logic is strongly focused on demonstrating results in a timely manner to meet standards and regulations and higher-level objectives.

While the Western discourse and transfer of ‘western ideas’ (Scoones, 2019) can seem like an anachronistic topic, the results show that some development professionals acknowledge this as a persisting issue, which is also evident from their rhetoric on local beneficiaries. Another consequence is when development professionals have the problem definition-making power, very basic human needs, and circumstances tend to be highly politicized instead of immediately and directly addressed (Busck-Lumholt et al., 2022b). In turn, the persisting view of IPLCs as vulnerable people rather than project partners indicates a reproduction of patronage and victimization despite sentiments and signals from both the organizational structure and individual mentalities that such logic is history. This is also indicated by the fact that no interviewees used the term collaboration about IPLC beneficiaries.

We find that the institutional logic of development professionals with regard to accountability and direct collaboration with IPLC beneficiaries is bounded through the organizational and mental barriers highlighted above. These findings support the idea of bounded participation (Harris, 2021, 2022). Harris (2002) understands bounded decision-making as cases where project goals and higher-level objectives are pre-set mainly, and it is within this predefined framing that local beneficiaries are invited to participate in decisions on how to tailor predefined objectives to activities at the local level. Frequently, aid budgets are not spent simply because of this decoupling between the design (including the size of loan or grant) and the implementation system (Busck-Lumholt et al., 2022b).

While some express awareness of this bounded institutional logic, there is also a sentiment among development agencies that they support bottom-up and grassroots development by officially letting the counterpart fully take ownership of project design. However, receiving countries of conservation and development finance are often characterized by poor democracy, inequality, and corruption, making full

(e.g.) government ownership questionable insurance for IPLC participation. Voices against including IPLCs' values, knowledge, and needs across the project cycle are typically based on arguments related to such challenges of weak governance contexts, which, however, can be overcome by well-designed ICDPs (Brooks et al., 2013).

6. Conclusion

In this article, we have examined the extent to which the institutional logic of development professionals supports the mainstreaming of IPLCs' values, knowledge, needs, and accountability in ICDPs. We have shown that the challenge of using development agencies to support locally-led projects is not less complicated or urgent than when it became a mainstream approach to development cooperation from the 1960s onwards. The largest opportunity for conservation funding does not directly build on the strongest evidence of sustainable conservation success: local decision-making.

We have demonstrated that on the one hand, development professionals show awareness and knowledge regarding the theoretical importance of IPLC participation, while on the other hand do not view themselves as having more than an overseeing role in this regard and still express patronage and a view of IPLCs as vulnerable people rather than project partners. The novelty of the findings lies in the nuance and ambiguity of the two major institutional logics: bounded collaboration and hands-off management. These institutional logics are founded on organizational barriers, including a high-pressure work environment, blurry roles and responsibilities, results-focused and risk-oriented standards and regulations; and individual mentalities, including perceptions of the overseeing role of development agencies, career motivations, limited capacity, and knowledge structures geared to meet higher-level administrative management tasks. Therefore, for some, it might not be reasonable to speak of the failure of development agencies in interacting with IPLC beneficiaries since this is by development professionals not seen as their primary role or responsibility. For others, this logic only contributes to questioning the current set-up of international environment and development projects, particularly development agencies' role. Acknowledging the decision-making influence of development agencies, we argue that future research should explore mechanisms to make them more accountable to project beneficiaries and interact with IPLCs as equal partners across the project cycle.

6. Synopsis conclusions

6.1 Scientific contributions

This thesis has shown how telecoupling as an analytical lens can provide a flexible and holistic approach to causality in LSS and, specifically, to the analysis of participation in international conservation and development projects. A review of existing literature shows that this potential of telecoupling for understanding causality is not about proving causal relationships but about illuminating the complexity through which drivers and effects are linked. The framework can support the identification of leverage points and unsustainable practice in the many cases where the validation of a causal relationship is halted by the challenge of understanding its hyperconnected nature. Moreover, combining a telecoupling lens with qualitative methods and existing tools and concepts in LSS shows a great ability to detect more underlying structures, such as discourse and power dynamics.

In the case of ICDPs, the telecoupling framework can identify essential decouplings between sending and receiving systems and work as a heuristic to zoom in on how the resulting institutional distance is reflected in the institutional logic of development professionals. The finding that IPLCs and local NGOs are frequently left out of important decision-making processes in the project design phase despite participatory ambitions among project managers is not surprising. Issues with participation and accountability continue to reproduce, which is why it is paramount to remain attentive to misalignment between participatory claims and de facto management procedures. Moreover, mainstream management procedures and project designs are frequently based on technical approaches such as the theory of change and logframes (Valters & Stein, 2012), more likely to be tailored to the agendas of development agencies than those of IPLCs (Schnable et al., 2020).

Looking at development professionals' responsibility and accountability towards IPLCs' decision-making in ICDPs from analysis of organizational structures and individual mentalities demonstrates significant ambiguities. While there is a strong participation discourse, the institutional logic is that macro-level decision-making belongs to higher administrative levels. The potential consequence of a design phase that does not immediately ensure the mainstreaming of IPLC values, knowledge, and needs (Tengö et al., 2014) is that the conservation and development project or program becomes poorly embedded in the socioeconomic reality and biocultural diversity at the local scale (Satyal et al., 2018). In addition to the challenge of realizing participation in practice, fundamental contradictions surface regarding the concept itself. While the official understanding of participation by development agencies is related to local ownership, the operationalization of the concept is often limited to meeting minimum

requirements in social safeguards (McDermott et al., 2012) and more frequently speaks about issues of representation than decision-making authority (Dyer et al., 2014).

Overall, this thesis shows indications of colonial reminiscence regarding rhetoric around IPLCs. The structural backbone in development agencies can appear as a dinosaur compared to the knowledge there is today on the importance of locally embedded initiatives and long-term planning horizons. However, to various degrees, individual development professionals express interest in institutional change and more direct investments and collaboration with local beneficiaries. This finding emphasizes the need to provide more nuance to the understanding of causes behind international conservation and development failure rather than limiting the discussion of participation to top-down and bottom-up dichotomies.

Finally, while the new management trends among development agencies like the World Bank, KfW, USAID, and IDB claim to be hands-off, this does not imply that these agencies have become less powerful or influential. Instead, it makes their roles and responsibilities less transparent and, thus, more challenging to hold accountable. That said, the movement away from strong decision-making authority of development agencies might be a paradigm shift that can benefit IPLCs inclusion in ICDPs, provided the design is collectively developed, locally embedded, and that authority freed from development agencies is not simply handed over to governments and the private sector and (Brooks et al., 2013).

6.2 Policy recommendations and future research

The operationalization of telecoupling and the analytical frameworks presented in this thesis can inspire laypeople and researchers alike. Telecoupling as an analytical tool can support policymakers in navigating complex sustainability challenges broadly, within LSS, and more specifically concerning IPLCs' role in international development. As goes for the latter, future research could benefit from combining the analysis of institutional logic with participatory observation of social practice to understand better the discrepancies between 'espoused theory' (what development actors say) and 'theory in use' (what development actors do) (Jones et al., 2011). Such analysis can draw on discursive institutionalism to sharpen the focus on the interplay between discourse and social practice and how this constrains or enables behavioral choices (Arts & Buizer, 2009). Performing case studies that observe the management of projects throughout all project cycles until and ideally beyond the final evaluation stage can meet the call in this thesis to develop analytical frameworks in LSS and social science that better account for the temporal dimension. Concerning ICDPs, this can facilitate an analysis of the extent to which current efforts build on past learning and provide evidence on whether and how actor positioning and power asymmetries have developed over time. In so doing, it would be ideal for scientists in the field to commit to the same analytical toolbox for a more extended period and coordinate a collective

effort to compare success and failure across regions and organizations in different sectors and scales. Such effort would enable more specific policy recommendations on what type of institutional change is relevant for which empirical context.

As goes for policy development, three key recommendations can be elicited from this thesis. First, the sometimes inevitable uncertainty and intangibility of causality in land systems and land use telecouplings should not postpone conservation actions. In cases where documentation of causes is unclear or ambiguous, scientific contribution to policy should be in the form of continuous dialogue rather than limited to input to the early conceptualization of interventions. The challenge of navigating the complexity and uncertainty involved with hyperconnected social-ecological systems only becomes greater if scientific insights are restricted to specific scoping and evaluation activities. Second, constituencies and board members of development agencies should demand stronger third-party monitoring of collaboration across ICDP project cycles. The monitoring procedure must be accessible and applicable to all project stakeholders. The diagnostic tool presented in research article 2 could be inspirational to developing a streamlined visualization tool that can digitally or manually indicate the distance between stakeholders and, thus, where action is needed. We need to move beyond participation and towards collaboration. To participate is not to own or initiate decisions but to engage in an activity. The question of ownership and decision-making authority can be exemplified by asking who defined the activity and the need for the activity.

Finally, the thesis advocates for critically evaluating development agencies' so-called "hands-off" management. It leaves an institutional vacuum with unanswered questions about the de jure and de facto mandate of development professionals, a vacuum that agencies can use to claim little responsibility for failure and great responsibility for success. Concrete and publicly disclosed information on the role of different actors across project cycles is a first step to holding individuals and agencies accountable and responsible for misalignment between project design and practice. Another critical step is to dissect the high staff turnover in project teams and the tendency that those actors working directly with local circumstances on the ground are those who have the least decision-making authority in the design and management of ICDPs. If the interest in institutional change among selected development professionals is not encouraged and rewarded through professional career paths, projects decoupled from the lives and needs of local beneficiaries are likely to remain the norm when they should be the exception.

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8. Appendices

Appendix A. Book chapter: Environmental Justice in Telecoupling Research

Environmental Justice in Telecoupling Research

Esteve Corbera^a, Louise Marie Busck-Lumholt^b, Finn Mempel^c, Beatriz Rodríguez-Labajos^{d}*

^{abcd}Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona (ICTA-UAB), 08193 Bellaterra, Spain.

** Authors have contributed equally to this chapter.*

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1. Introduction

In the 1980s, Vietnam was one of the few Asian countries involved in the global coffee market, but its contribution was minimal. However, by the late 1990s it had become the second largest producer and exporter of one of the most important coffee varieties (i.e. Robusta), after Brazil. Vietnam's coffee boom was accompanied by a rapid process of land-use change in the country's central highlands, particularly during the 1980s and 1990s. Originally populated by the indigenous K'ho peoples, the highlands were later colonised by the Vietnamese Kinh who arrived in the region after the Vietnam War (1955-1975), incentivised by government economic reforms that subsidised agricultural expansion and export-oriented crops during the 1980s. This resulted in large-scale forest conversion, increasing soil erosion and water pollution, and a loss of access to land for the indigenous K'ho benefitting the Kinh. Both the regional and national agrarian economies grew exponentially with rising levels of farmers' income, at the cost of indebtedness to intermediaries and financial institutions (Hardy 2003; De Koninck 2006). Vietnam's coffee boom also involved costs and benefits elsewhere. For example, an increased share of the world's coffee market buffered against the historical volatility of the crop's price, which is mostly determined by climatic shocks in producing countries. Conversely, an increased share of the global Robusta market also stimulated an increase of global competition, which coupled with specific demographic and economic conditions resulted in higher levels of poverty and coffee-growing abandonment elsewhere, for example in Mexico (Eakin et al. 2009).

This case of changing patterns in coffee production and trade serves as a clear example of why justice matters in the study of telecoupled systems. In understanding the relationships between sending, receiving and spillover systems —through specific flows of coffee beans, money and information— and focusing on agents, causes and effects (Liu, this book), questions of justice

inevitably come to the fore. For example, who has benefited or lost the most from the changing geographies of the world's coffee market over the last three decades? Which flows of benefits across and within systems —e.g. coffee beans, land rights, farm income, money from trade— were derived or altered from such new geography and how have these benefits been distributed? Which environmental impacts have resulted from the expansion or contraction of coffee production, and who has borne them?

One could also ask: how are the terms of the coffee trade negotiated, and whose interests and views are ignored? Who should be involved in the design of strategic policy interventions to sustain rural livelihoods in Mexico, or to acknowledge and address the impacts of environmental change in Vietnam, both nationally and internationally? Which criteria and rules should govern these decision-making processes? These are some questions related to issues of participation. When unravelling procedural aspects questions of recognition also emerge. For example, to what extent were the values and culture of various actors involved in land-use management and coffee planting recognised in the highlands' land-use change processes, or in the protection of the terms of exchange in Mexico's coffee trade?

These questions demonstrate that justice issues are important for telecoupling research, but as we will show below, they remain marginal in empirical analyses of telecoupled systems. To make telecoupling research more sensitive to justice issues, this chapter overviews the historical and theoretical foundations of environmental justice and suggests practical ways for telecoupling research to incorporate these foundations, whilst also identifying the challenges of doing so. We refer to environmental justice rather than to justice in general for three reasons. First, land- and resource-use dynamics are commonly found at the core of telecoupled systems, and such dynamics entail a (re-)distribution of property rights and environmental management approaches that can be considered by some actors unfair and detrimental to their well-being. Second, telecoupled systems usually result in environmental impacts that affect both humans and non-humans, across different spatial and temporal scales. These effects on wellbeing and ecosystems encourage social actors to seek compensation or to advocate for the restoration of formerly existing rights and environmental conditions. Third and finally, both environmental justice and telecoupling research deal with the management of and the interactions between coupled human-environment systems and the resulting effects of such processes, which makes it possible to integrate both frameworks.

The remaining of this chapter is structured as follows. Section two reviews the origins of environmental justice thought and shows how it has over time transcended the study of distribution issues to now encompass the study of recognition and participation issues, at multiple scales and multiple contexts of environmental problems. Section three reviews empirical literature on telecoupled systems to illustrate how such literature has dealt with issues of distribution, recognition and participation. Section four sketches the analytical and practical challenges that the operationalisation of environmental justice in telecoupling research might involve. Section five concludes the chapter.

2. Environmental justice: from distribution to recognition and participation

In 1982, residents of Warren County, North Carolina, mobilised against the project of building a landfill for contaminated soils in their largely African-American community. The civil rights leader Benjamin Chavis coined the term ‘environmental racism’ to describe the deliberate exposure of ethnic minority communities to environmental risks (Lazarus, 2000). This event is often considered the origin of the environmental justice scholarship and activism (Figure 11.1). Several studies later confirmed the disproportionately high number of toxic facilities in the United States (e.g., landfills, incinerators, industrial zones) located in areas with a majority of black, *latino* or other immigrant populations (Bullard 1994; Agyeman *et al.* 2003).

Environmental justice thus emerged as a social movement promoted by those affected by toxic facilities, led by social organisations and academics who mobilised concepts of social justice and equality in the access to a safe environment and the equal protection of all communities (Pulido 2017). In 1991, delegates from different grassroots movements adopted seventeen ‘Principles of Environmental Justice’ in Washington, D.C. This political agenda would progressively enter the environmental regulations and policies promoted by the US Environmental Protection Agency (EPA), which currently defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies”, where fair treatment means “no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies.”¹



Figure 11.1. Timeline of milestones in the recent history of environmental justice

Distribution has always been at the core of environmental justice scholarship and activism, yet both have evolved to incorporate other pillars of social justice in their analyses and demands, namely the recognition and participation of subjects of justice. By subjects of justice, we mean those who can make legitimate claims related to environmental and social harms in telecoupled systems and whose rights are taken into consideration in a given governance setting. These can include individuals, communities, and even nature if an ecological justice perspective is also embraced. Ecological justice considers nature a moral entity for which the pillars of justice also apply (Baxter, 2004; Schlosberg 2007).

Recognition appears important when the voice of those affected by a particular environmental or social outcome resulting from the (change in) management of land and natural resources is ignored, misrepresented or nullified so it is not heard or recognised in decision-making processes (Martin *et al.* 2016). Indigenous communities, women or children are often found in lack of recognition. Lack of recognition can be linked to the ignorance of and disrespect for such groups' often exploited economic position, knowledge, language, and claims by geographically, politically, economically and/or culturally distant actors and institutions (Fraser 1997). This is a major challenge in Africa, where a approximately two-thirds of the recent global land grabs have taken place due to a lack of legal recognition of customary land rights (Kabia 2014).

A strategy to address the lack of recognition is to demand direct and meaningful participation in decision-making processes. Participation thus requires that the rules and criteria underpinning decision-making processes are not biased against specific groups or individuals and that these rules and criteria are both understood and perceived as legitimate by all participants. This request for participation, and fair and legitimate procedure, is frequent among community members or activists. However, today it remains rare; for instance, indigenous peoples participating directly in international institutions concerned with international trade or environmental governance, specifically in discussions over equitable benefit-sharing (De Jonge 2011). Where they do participate, their agency remains weak (Schroeder 2010).

Lack of recognition and participation can ultimately undermine the capabilities of those who are not being recognised as subjects of justice and thus are being excluded from decision-making processes. For example, if a large-scale deforestation process occurs on public or privately-owned lands where indigenous peoples had customarily lived for years, and these peoples are not recognised as key affected actors and therefore unable to make decisions over the scale or the righteousness of the deforestation process, their food security, livelihoods, culture and well-being may be negatively impacted. If they did not find similar forests to live nearby, they might face the risk of disappearing, either figuratively or physically. This image is captured in Steve Lerner (2010)'s portrayal of 'sacrifice zones', where peoples from areas persistently exposed to environmental damage take action to try to avoid being forgotten.

Nowadays an increasing number of environmental and land-use related issues have been analysed through the lens of environmental justice; including mining, monoculture crops, water management, waste management, air pollution, and public health. For example, the practice of biodiversity conservation in protected areas where indigenous peoples live should be sensitive to the fact that the economic benefits that protected areas generate for the affected local populations are often lower than the benefits derived from other activities, such as agriculture or logging. Inattentive conservation strategies may result in unequal development opportunities and spatial economic unfairness (Dawson and Martin 2015). Conservation practice also requires embracing the cultures and traditions of protected area inhabitants and to merge these with the scientific knowledge underpinning protected area management (Rodríguez *et al.* 2013). In rural China, villagers claim for their land rights to protect their livelihoods from government-driven land grabs, in a context of banned private ownership but increased land value (Grammaticas 2013). Pastoralists all around the world observe with despair how traditional tenure arrangements were

disregarded in the global land acquisition rush (Elhadary and Abdelatti 2016), while indigenous peoples have been struggling for decades to recover their lands after they were seized for industrial and mining development initiatives (Overbeek *et al.* 2012). These examples illustrate that many environmental and land-use conflicts have distributive implications and reflect struggles over recognition and participation. The following section shows how the empirical literature on telecoupled systems has addressed matters of environmental justice to date.

3. Environmental justice: evidence from telecoupling literature

In order to identify to what extent empirical research on telecoupled systems has either explicitly integrated an environmental justice approach or implicitly engaged with the different conceptual dimensions of environmental justice, we searched for academic articles published until 3rd of October 2018. These were selected through Scopus, Web of Science, Google Scholar and Mendeley's catalogue of academic literature. 86 academic articles were found by searching for "telecoupling" in either the article's title, abstract or keywords.

After reading the articles, we excluded those which only referred to telecoupling or telecouplings theoretically and did not use empirical findings from specific cases. Applying these criteria returned 48 journal articles, which were codified based on the following questions: 1) Does the article integrate justice in its analysis and, if so, how? 2) Does it address issues of distribution, recognition and/or participation and, if so, how? Additionally, data were also collected regarding the type of methodology employed in the article. The review also looked if references were made to environmental impacts and/or whether the article embraced the notion of ecological justice more specifically (see the digital repository²).

The reviewed articles ranged from local to global scale analyses, dealing with anything from international trade in metals to ecosystem services provided by migratory species. Only three papers explicitly integrated justice into their analytical approach, while the rest referred to justice only implicitly: 35 articles used key terms related to distributive justice, while only 14 addressed recognition and 17 addressed participation. With respect to research methods, 25 of the reviewed papers were based only on quantitative data, 3 were only based on qualitative data, 6 used mixed methods, and the remaining 14 were based on a review of documents and data sets, including peer-reviewed articles and grey literature. Purely quantitative papers did not address recognition and participation.

Table 11.1 presents keywords extracted from the reviewed articles, found to be associated with implicit accounts of environmental justice. These keywords were identified by scanning each article for words associated with distribution, recognition and participation concerns addressed in the article. We acknowledge that the words identified in Table 11.1 overlap between different dimensions of justice to some degree, which suggests that the various dimensions are often interlaced in the articles reviewed, and therefore cannot be entirely collapsed into each other. The table mirrors the many elements in existing empirical telecoupling research that can be addressed by environmental justice, thus representing the potential for integration.

Table 11.1. Keywords related to dimensions of justice in the reviewed articles

Distribution	Participation	Recognition
Fairness, winners, losers, hidden costs, economic equity, responsibilities, imbalances, displacement, access, livelihood, land grabbing, insufficient income, replacement, food insecurity, socio-economic well-being, dependencies, opportunities, unequally distributed, inequalities, compensation, food security, vulnerability, footprint, social exclusion, needs, poverty, social equity, concentrated, monopolisation, distribution, costs and benefits, positive and negative effects, land conflicts, health impacts, disadvantaging, asymmetries, disproportionately, privileged, marginalisation, externalisation, redistribute, advantageous, disadvantageous, unequal exchange, discrepancies, mismatches, unfavourable, marginal.	Control, influence, hierarchy, multi-stakeholder, asymmetries, power distribution, ability, accountability, corruption, patron/client, agency, non-transparent, participation, exclusion, all-affected principle, deliberations, power-dynamics, collaborative, inequality, representation, voices, opportunities, consultation, illiteracy, inclusion, advocacy, dictate rules, fair, recourse, rights, dispositions.	Cultural importance, (un)recognised, entitlement, identity, traditional livelihoods, cultural values, human rights, traditions, cultural norms, social status, symbolic meanings, place dependence, gender, customary rights, recognition, community, informal rights, attention.

An example in the use of keywords related to environmental justice approach is Eakin et al. (2017), who analyse food system governance and use terms such as ‘livelihood disruption’, ‘social exclusion’, ‘national food sovereignty’ and ‘fair trade’ (related e.g. to issues of distribution), ‘multi-stakeholder governance’ and ‘asymmetries of influence’ (related e.g. to issues of participation), and finally ‘accountability’ and ‘human rights’ (related e.g. to issues of recognition). Another example is Zimmerer et al. (2018), who identify the key challenges and

opportunities faced by smallholders in telecoupled systems, and they implicitly address distribution with relation to ‘land grabbing’ and ‘unfavourable terms of trade’. They also briefly refer to the ‘low capacity’ to influence national and international economic policies and underscore the need to pay attention to ‘the needs and capacities of smallholders’, which in justice terminology are issues that can be associated with participation and recognition respectively.

As noted above, only three of the 48 articles reviewed explicitly integrate telecoupling and justice in their analysis. Oberlack et al. (2018) integrate telecoupling with the concept of “network of action situations” to capture the dynamics of polycentric governance. They propose a framework to diagnose action situations, which depending on the given research objective potentially include elements of justice. They apply this framework to the case of a transnational biofuel investment in Sierra Leone and identify “increased inequalities within communities” as an analytical focal point (Oberlack et al., 2018, p. 7). Through this analytical interest they explicitly integrate the three dimensions of justice: distribution, participation and recognition. Six action situations are identified that affect community inequality and together make up the polycentric system. Zimmerer et al. (2018) draw on several case studies of smallholder telecouplings to identify challenges and opportunities for increased fairness. While not explicitly referring to the various dimensions of justice, they highlight the importance of addressing justice when studying the impacts of global socioeconomic and environmental changes, since “environmental and social justice issues directly affect the majority of the world’s smallholder populations” (Idem.: 12). Lastly, Schröter et al. (2018) use various examples to create a typology of interregional ecosystem flows. They establish a set of principles to guide governance arrangements for these flows, which are largely based on the three dimensions of justice: “equitable intra-generational distribution”, “fair procedures” and “recognition” (Idem.: 238).

Many of the reviewed articles address the distribution of environmental benefits and burdens by analysing trade relationships. Their findings are closely related to the notion of ‘ecologically unequal exchange’ (Hornborg and Martinez-Alier 2016). Xiong et al. (2018) use this term in their study of international trade in metals, in which they demonstrate that countries of the global North are frequently net importers of embedded emissions and net exporters of value added. Similarly, Kastner et al. (2015: 832) analyse land-use effects of the European Union’s consumption of biomass products in terms of their embodied human appropriation of net primary production (eHANPP) and observe that “the EU benefits disproportionately in monetary terms from agricultural trade whereas ecological impacts of trade, in terms of eHANPP, occur to a

disproportionately large share outside the EU”. However, there are examples in the reviewed cases which demand close attention to the analysis of distributive mechanisms and outcomes to avoid falling easily for the narrative that importing countries necessarily shift environmental burdens to those exporting primary goods. For example, Sun et al. (2018) show that by importing large amounts of soybeans, China has shifted domestic cultivation from nitrogen-fixing soybeans to other crops which require large inputs of nitrogen fertilizer. This has led to increased nitrogen loads, which now threaten to intensify the pollution of the country’s water bodies, soils and the atmosphere.

Conflicting views on distributive outcomes can be found depending on the analytical scale. Gasparri et al. (2016) describe the emerging soybean frontier in Southern Africa as an example of what they call ‘south-south telecouplings’. The role of countries such as Brazil and Argentina in knowledge and technology transfers or infrastructural improvements for soy expansion in Southern Africa can be interpreted as a breaking up of core-periphery dynamics described in dependency theory, towards more multipolar constellations and therefore to a more equitable distribution of value extracted from global production processes among countries. Yet at the local scale, as mentioned by Gasparri et al. (2016), the soybean frontier in Southern Africa is likely to replicate similar dynamics of land ownership concentration and conflict salient in the South-American region.

While featured less frequently in the reviewed articles, issues of recognition and participation are also present in various publications. Bagstad et al. (2018: 5) estimate the ecosystem services provided by a migratory species at different locations and admit that their monetary estimate “does not address the cultural importance of pintail harvesting for indigenous communities”. By treating the harvest of a migratory bird as a monetary equivalent of store-bought chicken, the methodology is not designed to account for the specific cultural value a given ecosystem service has for indigenous communities. Interestingly, the same issue of recognition that the authors address with respect to their own methodology is then also found in current policy-making: the authors observe that subsistence harvest “is currently unrecognised in harvest policy deliberations” (Idem.: 7) due to its relatively minor monetary value compared to sports harvest.

Eakin et al. (2017) reflect on the importance of being sensitive to recognition and participation when devising governance mechanisms for telecoupled food systems. Discussing the case of maize production dynamics in Mexico and the United States, they argue that the deep cultural and symbolic significance of maize in Mexico has not been recognised in the governance

arrangements after the implementation of the North American Free Trade Agreement. Specifically, the USA farm and energy policy with its strong implications for corn prices in Mexico does not consider this cultural attachment, and Mexican smallholders have had no influence in the sectoral governance mechanisms that have been dominated by large commercial producers.

In summary, environmental justice has only been explicitly integrated into three telecoupling-focused articles to date. Many other publications have implicitly addressed matters related to the different dimensions of justice, with distributive issues being more predominant. Environmental impacts within and across systems are addressed in many of the papers reviewed, but we found no explicit attention to the concept of ecological justice. In the following section, we discuss how to further mainstream environmental justice thinking in telecoupling research and reflect upon the challenges that such mainstreaming might entail.

4. Discussion

The evolution of environmental justice movements and scholarship (section two) is similar to land system science, and telecoupling in particular (Meyfroidt, this book). Land system science research originally focused on proximate explanations of land-use manifestations, similar to the early focus of environmental justice on locally unwanted land uses and distributive issues (Freudenberg and Steinsapir 1991). The concept of telecoupling explicitly addresses both proximate and distant drivers of land-use and can focus on multiple types of flows (e.g. material, information, financial) within each of the considered social-ecological systems. Environmental justice is currently similarly focused on the analysis of the causes, effects and connections of environmental problems and struggles across scales (Aydin *et al.* 2017). This reflects that both approaches have a systemic and global view on social-ecological systems which has transcended the study of a single system.

These parallel developments reveal a promising potential to integrate questions of environmental justice into telecoupling research. An initial yet critical step in this direction would be to make environmental justice a central element of the ‘telecoupling toolbox’, rather than a secondary analytical approach. This would, in turn, imply adopting the language of environmental justice and an awareness that land-use and resource management processes involve more or less visible struggles over recognition, participation and distribution. Looking at telecoupled systems with the lenses of environmental justice can help to identify relevant questions. These questions can be

adjusted to the nature of the study at hand, taking into account the system(s) boundaries and/or the flows chosen. This will influence which justice dimensions become relevant, which related questions matter, at which scale, and which subjects of justice and governance and legal frameworks are considered.

For example, interested in understanding how rising soy demand in China and Europe has changed rural livelihoods, Lima *et al.* (2011) document that soy farmers, labourers and non-soy farmers in specific regions of Brazil have a positive view of soy expansion, rooted in the fact that soy has translated in higher local incomes. The authors pay attention to the distribution of benefits derived from soy cultivation and commercialisation, which in this particular case appear to be distributed in a way perceived as fair by local agents. In contrast, Leguizamón (2016) describes how soy cultivation in Argentina's northern provinces has resulted in negative environmental and social costs mostly borne by small-scale farmers, cattle ranchers and indigenous peoples. The author underscores that these actors struggle for recognition as cost-bearers and as legitimate actors in the design of the country's agricultural development policy.

Interested in the indirect impacts of soy cultivation in other farming systems, Silva *et al.* (2017) show that soy expansion in Brazil has affected domestic maize markets, leading to increased food insecurity and farmers' higher exposure to climatic risks. From a justice perspective, the authors highlight that the connection between soy and maize cultivation can have detrimental effects on food distribution resulting from escalating prices. Consequentially, these can be borne by distant actors, for example, in urban areas. Their research suggests that the network of actors to be recognised and accounted for in the distribution of the impacts of changing soy and maize cultivation patterns should be expanded to encompass those directly involved in resource management practices, in related value chains and in the more distant locales where these crops are consumed and processed.

Finally, there are also justice considerations to have in mind when analysing receiving systems. Major global receiving systems are not just passive recipients of material flows. They often drive the changes through increasing material demands that could be managed so as to promote more just exchanges (Kastner *et al.* 2015). The acceptance of double standards in land use management, the design and implementation of certification schemes for imported materials, and the lack of moderation of material consumption are all mechanisms that can be observed through the lens of environmental justice.

The necessary integration of environmental justice in telecoupling research, however, is not without challenges. An important one is to overcome what to date is an almost explicit focus on distributive justice, as shown in section three. This prevalence is perhaps related to the dominance of quantitative approaches that analyse material and financial flows in telecoupled systems. But while quantitative data can shed light on distributive issues, qualitative data is often needed to examine and address participation and recognition issues. These data can, for example, capture the views of the agents ignored or marginalised in telecoupled systems as well as the extent to which decision-making processes have contributed to change their social or political status, improved or undermined their livelihoods, wellbeing and environment (Boillat *et al.* 2018). This claim for a stronger focus on recognition and participation issues aligns with Friis *et al.*'s (2016: 143-144) suggestion of mainstreaming political ecology in telecoupling research in order to shed light onto the social and political relations which explain the uneven control and access to resources in a given system, including relations based on gender, caste, and economic and political power, among others.

A final remark to be made is that environmental justice adds a normative element to telecoupling research, in the sense that processes of *recognition*, *participation* and *distribution* tend to be linked to moral principles. For example: which principles should govern a fair decision-making process related to the allocation of land resources, or the distribution of specific flows? Should actors be *consulted*, *informed*, or also *empowered*? How should the distribution of a given flow, or a given resource in telecoupled systems be governed, by the principle of *equality*, *merit*, or *need*? What if these principles of fair procedure and distribution diverge between actors, including the researcher? Which is then the one that needs to be advocated for or deserve focus? In this regard, a researcher might prefer to approach the analysis of environmental justice without adopting any of these principles *a priori* and focus instead on describing the principles adopted and preferred by the subjects of justice identified, and how these principles differ across subjects. An alternative is to approach the study of environmental justice in telecoupled systems with an *a priori* preferred set of principles and compare how these align or conflict with the principles governing justices observed. In summary, it is important to be aware that the relative nature of justice in telecoupling research remains an unexplored and complicated terrain, because it implies working across different cultural norms and moral systems at different scales.

5. Conclusions

This chapter has shown why questions of environmental justice matters in telecoupling research. It has been argued that the land-use processes that underpin telecoupled systems often generate or reproduce social injustices that deserve attention and scrutiny. These injustices might concern recognition, participation or distribution issues, and most probably a combination of these three dimensions. Our review of literature on empirical cases of telecoupled systems indicate that distributive concerns are the most commonly addressed to date, while recognition and participation figure less prominently. Even when addressed, most of the empirical literature does not refer to these issues as environmental justice considerations and it has not systematically adopted an environmental justice lens in the research process.

Centrally adopting the language of justice in telecoupling research can contribute to devise justice-related questions according to the system and the flows of analytical concern. However, integrating environmental justice in telecoupling research is by no means an easy task. A critical reflection on the focus of the research must precede the research design. A key message from the discussion in this chapter is that raising concern related to injustices does not in itself generate an understanding of their causes, nor of the means to redress them. Integrating environmental justice in the study of telecoupled systems requires careful consideration of the analytical approach and the combination of different methods.

The normative dimension of environmental justice politicises telecoupling research. However, doing so might also increase the societal relevance of the research process. An environmental justice lens can move telecoupling research beyond a broad description of a complex world towards an in-depth normative approach that reflects upon the injustices that result from these complexities. Together, environmental justice and telecoupling can make up a strong framework for analysing a hyper-connected world and offer a detailed picture of its related social and ecological challenges.

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End notes

1. See US Environmental Protection Agency. “Learn About Environmental Justice,” accessed October 16, 2018. <https://www.epa.gov/environmental-justice/learn-about-environmental-justice>.
2. See reviewed references listed on the digital repository of Universitat Autònoma de Barcelona, <https://ddd.uab.cat/record/199238>.

Appendix B. Collective report 1: Exploring impacts and causality in telecoupling research: Emerging evidence and knowledge gaps

Exploring impacts and causality in telecoupling research: Emerging evidence and knowledge gaps

Busck-Lumholt, L.^a, Coenen, J.^b, Pedersen, A.F.^c, Persson, J.^d, Malik, S.^e, and Corbera, E.^a.

^aUniversitat Autònoma de Barcelona; ^bLeuphana University of Lüneburg; ^cHumboldt University Berlin; ^dUniversity of Copenhagen; ^eEarthworm Foundation

* Authors have contributed equally to this report.

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1. Introduction

The EU-ITN COUPLED Work Package 5 (WP5) aims to explore causality across scales and distances in telecoupling research, and to determine why a particular impact occurs and quantify trade-offs across and within telecouplings. This report constitutes a first step in this direction, and it draws upon the discussions held among WP5 members in the context of the project's Virtual Meeting Series 5 (VMS 5). As noted in the COUPLED's project proposal, the objective of VMS 5 was to analyse “methodologies to attribute impacts to drivers in telecoupled human-environment systems” and to assess “the strengths and weaknesses of approaches to impute causality, and thus to quantify sustainability in telecoupled systems” (p. 22).

Telecoupling offers a framework for understanding the world as a large interconnected system while breaking its constituent parts into manageable units, enabling situated analysis that accounts for local level details while acknowledging transboundary flows and interactions across places and scales. Therefore, research aimed at engaging with causality issues, for instance what drives a given land use change process, or what determines the outcomes of such a process, will be challenging given the cross-scalar and variegated nature of the social, environmental, political and economic interactions that make up the world today. That said, telecoupling researchers should take up this challenge because the identification of drivers of a given land use, or land use change process, is crucial to develop relevant and realistic policy recommendations that can lead to more sustainable land uses.

To our understanding, impact assessment, trade-off analysis, and methods for identifying causal relationships are areas that have not yet been widely explored from a telecoupling perspective. Only Carlson et al. (2018) have examined the state of causal attribution in telecoupling literature

and offered suggestions for improved rigor in analysis of causal relationships. However, in contrast with our report, they have not examined the types of impacts arising from causal processes.

The research questions guiding this report are:

- 1) How do existing theoretical and conceptual approaches to telecoupling understand and analyse impacts, trade-offs and causality?
- 2) How do empirical telecoupling research papers approach impacts, trade-offs and causality?

We addressed the first question through a review of landmark conceptual articles in the growing telecoupling literature and the second through a systematic review of empirical telecoupling research. The former supports existing attempts to qualify and expand concepts and methodologies in telecoupling, while the latter illuminates current knowledge gaps in terms of impact assessment, analysis of trade-offs, and methods for identifying causality.

2. Theory development and conceptualisation in telecoupling research

This section is based on a review of seminal articles in telecoupling research which have aimed at advancing telecoupling theory, specifically definitions and terminology relevant to the design of “telecoupling-informed” land use (social) science (Table 1 - Source column). Our reading of these articles was driven by questions such as: how is telecoupling understood? What is understood by impacts, causality, and trade-offs? Which other relevant concepts appear in this literature and how are these defined or understood? The observations that follow are either informed by literal transcriptions of the reviewed articles or by our own interpretation of the articles’ content.

The first issue to notice in Table 1 is that the articles reviewed diverge in their understanding of telecoupling. The latter can be understood as an ontological given (see Liu et al. 2015), as a heuristic (Friis et al. 2017a; Niewöhner et al. 2016) or as both (Carlson et al. 2018). For Carlson et al. (2018), for example, the causes for an observed land use or environmental change can have their origin in a different location, sector, time or institution, which makes it difficult to establish a single cause of such change, or to establish the relative influence of these potentially distinct origins. In this regard, the literature identifies a number of concepts that in one way or another denote the complexity of causal attribution. As shown in Table 1, these concepts include scalar, temporal and spatial patterns that characterise land-use and environmental systems, as well as a variety of effects that can accompany land use or environmental change.

Table 1. Patterns and effects that complicate the attribution of causality in telecoupled land use systems.

Term	Definition	Source
Causes		
Multi-causality	Any given pattern may be caused by several different processes, and the action of each is dependent on context.	Chapman et al., 2017
Proximate (or direct) causes	Human activities or immediate actions at the local level that originate from the observed change and directly impact the observed change.	Geist & Lambin, 2002
Underlying (or indirect) causes	Fundamental forces that underpin the more proximate causes.	Geist & Lambin, 2002
Effects		
Cascading effect	Process by which a system affects other multiple systems in sequence as a result of telecoupling dynamics; occurs when a change of one element of a system drives a chain of events leading to many other changes in the system.	Baird & Fox, 2015; Parra Paitan & Verburg, 2019
Cumulative effect	Impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency [...] or person undertakes such other actions.	Clark, 1994
Legacy effect	Effects that do not disappear until many years to decades after the emergence of a telecoupling.	Liu, 2014
Non-linearity	Social and ecological patterns do not gradually change as a linear function of relevant processes but rather display thresholds, time lags, and generally complex behavior (including regime shifts).	Chapman et al., 2017

Threshold effects	Seemingly stable systems can suddenly undergo comprehensive transformations into something entirely new, with internal controls and characteristics that are profoundly different from those of the original. Small events might trigger changes that are difficult or even impossible to reverse.	Duit & Galaz, 2008
Time lags (or inertia)	Effects that do not emerge until years or even decades after the initiation of a telecoupling.	Liu, 2014
Cause and effect		
Feedback	Feedbacks occur between systems when effects of the first system on a second system feed back to affect the first system. Feedbacks can be negative (damping) or positive (amplifying).	Liu et al., 2013; Rotmans & Loorbach, 2009
Multi-scalarity	Relevant processes are simultaneously operating at a diversity of scales, manifesting in patterns at multiple scales (both temporal and spatial).	Chapman et al., 2017

Source: own elaboration based on listed references.

The majority of the reviewed articles provide clear definitions of the different types of effects that potentially emerge in telecoupled systems. As shown in Table 1, these include direct effects, indirect effects, cascading effects, legacy effects and feedback effects (Liu et al., 2014; Niewöhner et al., 2016). However, we have noted that the term “effects” is often understood differently by the authors; for example, while Carlson et al. (2018) refer to them as “events”, “variables”, or even “facts”, Liu et al. (2013) point to effects as being the results of flows, including both positive and negative, socio-economic and environmental effects.

In the reviewed articles, the impacts in telecoupled systems also vary in their characteristics: form (direct or indirect), direction (positive, negative or undetermined), duration (short, medium or long-term, temporary or permanent), reversibility (reversible or irreversible), spatial scale (local, regional, national or global), and magnitude (high, medium, low). Spillovers are generally considered a particular form of impact, which occur in a system that is not central to the interactions between the sending and receiving systems. While it is difficult to delineate relevant

spillover systems, it is even more demanding to accurately and comprehensively evaluate causes, effects and associated causal mechanisms of spillovers (Table 2).

Table 2. Definitions for spillovers and related concepts in telecoupling research.

Displacement	Geographical shift of land use from one place to another. It can result in spatial separation between the land used for agricultural or wood production and the place of consumption of these products, as it occurs with trade; it can also result from population movements.	Meyfroidt et al., 2013
Indirect land use change	Indirect land-use change is a land-use change in one place caused by a land-use change in another place. Indirect land use change is a form of spillover.	Meyfroidt et al., 2018
Land-use spillovers	Land-use spillovers refer to situations where land-use changes or direct interventions on land use (e.g., policy, program, new technologies) in one place have impacts on land use in another place.	Meyfroidt et al., 2018
(Land-use) Leakage	Leakage refers to a displacement of the environmental impact, thereby counteracting the intended effects of the initial policy or intervention. Land-use leakage occurs when a land-use intervention, such as an environmental conservation policy, which triggers land-use change elsewhere that reduces the overall benefit of the local intervention. A leakage is a form of spillover.	Meyfroidt, Lambin, Erb, & Hertel, 2013; Meyfroidt et al., 2018
Rebound effect	A rebound effect occurs when technological improvements create decreased costs, subsequently leading to increased demand. A rebound effect can occur when a technological change leads to an increase in efficiency, thereby increasing profits and leading to more	le Polain de Waroux et al., 2017; Nilsson, Bergquist, & Schultz, 2017

	agricultural expansion. A rebound effect is a form of spillover.	
Spillover effects	A spillover is an effect of an intervention (e.g. policy, campaign, program) on subsequent behaviors not targeted by the intervention. Spillover effects can be both positive and negative.	Truelove et al., 2014
Spillover systems	Spillover systems are those that affect, or are affected by, local, regional, or international interactions between sending and receiving systems.	Liu et al., 2013

Source: own elaboration based on listed references.

In the reviewed articles for developing Tables 1 and 2, causes are the socio-economic, political, cultural or ecological processes that drive the flows (Liu et al., 2015), and such causes are considered the source of dynamism in the flows of telecoupled systems, which often have multiple and interacting causes (Niewöhner et al., 2016). Carlson et al. (2018) define causes from six criteria: sector, system of origin, agent, distance, response time and direction. To them, the cause is what explains the effect. Causality is, they argue, a temporal component that links cause and effect empirically (Carlson et al., 2018).

All these contributions taken together suggest that researchers have developed multiple typologies and categories to break down telecoupled impacts into graspable units for analysis. They also imply that different methods or epistemologies will be required to analyze such multiplicity of possible impacts resulting from telecoupling(s).

3. Review of telecoupling research: data collection and analysis

As noted above, this report addressed its second research question through a systematic review of telecoupling *empirical* literature. We aimed to investigate how empirical analyses have to date approached impacts, tradeoffs and causality. Through a broad search string in the scientific database Scopus looking for all published material up until April 2019 containing the term ‘telecoupl*’, we were able to identify 106 articles. We then read all abstracts and selected only those which included at least one empirical case, which rendered 87 articles.

Subsequently, we selected randomly 15 articles among the second sample, and we read the articles in full in order to develop a codebook which guided the remaining of the systematic review. A principal observation and consequence of this process was realizing that telecoupling empirical research was highly disciplinarily and methodologically diverse, and often incomparable, which meant that the codebook had to be flexible enough to accommodate both qualitative and quantitative insights from the published articles.

The review of these 15 articles was organized as a preparation for the systematic review. It was rather informal: each author read four papers selected randomly and took individual notes guided by questions reflected upon during the preparatory group meetings including, how authors qualify an impact, which type of impact they are talking about (e.g. social, economic, ecological, etc.), which measurement indicators they consider, at which scale they measure and consider such impact(s) (individual, community, municipality or the like, region, country etc.). We annotated applied methods and took notes on which chains of causality the authors identify, which trade-offs they consider, and whether these are quantified and with use of which indicators.

However, during this preliminary review, such details were not appearing in the telecoupling research and the aspects were broadly found to represent a knowledge gap in the literature. The findings were added to a common worksheet on google drive and discussed continuously during several Skype meetings. We also used the preliminary review to reflect on the literature search protocol in terms of criteria on which papers to include and exclude in the systematic review. It turned out to be quite challenging to make a clear distinction between ‘empirical’ and ‘conceptual’ papers, which was the initial idea. Even though it added a certain complexity to the review and selection of papers, it was decided to look through all papers and make the decision on inclusion/exclusion paper by paper. The criteria for inclusion and the resulting codebook can be found on the provided link in this report’s Appendix 1.

After this preliminary review process, we started the systematic review which - as of June 2019 - we have not yet concluded. We have reviewed so far 27 of the 87 articles found, with each of us reading an average of 5 papers. We strived to avoid subjective interpretation of the articles’ content and, for this reason, we only documented impacts, trade-offs and causality links identified by the author(s), and not those that we could think of from reviewing the paper, if any. This meant that we only inserted information included in the articles reviewed, as shown in the data-entry guide we developed (see Appendix 2).

We also strived to achieve triangulation between reviewers by letting at least every fifth paper be reviewed by two people who review the paper individually and then crosscheck for differences. When differences were observed, these were discussed among the reviewers and a consensus response was found. We argue that this leads to findings that better reflect the actual trends in the literature. In cases where the reviewer had further comments and observations, these appear in the “comments” column. This information is as valuable as the systematic codes but will be processed more qualitatively in the future -when the review is concluded in the form of an academic article.

4. Review of telecoupling empirical research

This section synthesizes the main findings of our review of 27 articles, which will be expanded in the coming months to incorporate the remaining 60 articles. We structure the analysis on five parts that distill the articles’ focus, theoretical and methodological lenses; the ecological, social, economic impacts identified; and their approach to understanding and analysing causality and trade-offs.

4.1. Articles’ analytical focus, theoretical framing, data and methods

The analytical focus of the reviewed articles is diverse: a large share of contributions analyze telecouplings(s) arising from farming systems (e.g. soybean, bananas) (e.g. Lenschow et al., 2016; Baird et al., 2015; Garrett et al., 2013) and fisheries (e.g. Carlson et al., 2018); some focus on telecouplings arising from different forms of conservation policy and practice (e.g. Boillat et al., 2018), and others look at water, species, timber and other ecosystem services flows (e.g. Parish et al., 2018). One third of the articles are global in scope, which does not necessarily mean that their level of empirical observation is global per se. Some of these articles, for example, draw global lessons from the analysis of telecoupled systems that span across two or more countries (e.g. Pace et al., 2017). Four articles focus only on a specific region of the world, i.e. Asia, North America, collecting data across two or more countries from these regions (e.g. Pezzoli et al., 2014), while the rest of the articles rely on empirical data collection from sending or receiving system at national or sub-national levels (e.g. Chen et al., 2019).

The theoretical framework or conceptual lenses of the reviewed articles refers to the main concepts, frameworks, theories used to frame the research and/or explain the empirical observations of the particular study. As expected, due to the cross-disciplinary nature of researchers in telecoupling, there is a wide range of theories applied. However, a large proportion of studies in the sample seem to be grounded in the post-positivist tradition of land system

science, either not referring to any theoretical framework or using the Coupled Human and Natural Systems (CHANS) framework or an equivalent, such as Ecosystem Services. Only a few studies ground their work in social sciences using, for instance, theories related to polycentric governance and human geography. Moreover, all use or refer to the telecoupling framework (or at minimum, apply the terminology) for some part of the article. There is a wide range of terminology used by authors to describe, explain and qualify impacts arising from telecouplings. This suggests that the use of a standardised language for the systematic analysis of distant socioeconomic and environmental interactions has not yet been established, which for some might result problematic since it might foreclose fruitful and richer interdisciplinary research (Nielsen et al., 2019).

Methodologically, we see a roughly equal spread across qualitative, quantitative and mixed data types in the reviewed articles. Papers using a single method dominate our sample (12 out of 27), with six of these employing quantitative or spatial methods. The other six used non-systematic literature reviews as their sole method, while another four combined a literature review with one or more other methods, indicating a preference for using secondary literature to develop new insights using the telecoupling framework. Qualitative methods were always used in congruence with other methods, apart from literature reviews. There are four qualitative multi-method studies including interviews, focus-group discussions, household surveys and participant observation.

Generally, we see a spread of methods across our sample, ranging from geospatial modelling, choice experiments, carbon calculations and regression analysis to the suite of qualitative methods. It was often challenging to extract useful information about the specific details of the data collection, including the number and size of where and how data was collected, as well as the size of the sample (number of people, archival data, datasets, etc.) consulted by the authors. The use of multiple methods often implies multiple sampling strategies and approaches, and authors are not always clear in distinguishing the sampling approaches for the various methods employed. This lack of detail has been acknowledged for interdisciplinary research in climate change, for example (Nielsen and D'haen, 2014). In our sample, the articles using only literature review, being non-systematic, often did not record their sampling approach for the literature. For nine articles, it is not clear what the sample size or source is.

However, for the papers with details that indicate the scale and source of data collection, we see a wide spread of sample sizes and approaches to sampling. Sampling based on geospatial characteristics was prominent (typically administrative boundaries), and so was the use of

national-level statistics. Overall, we can categorise the sampling as follows: household level (1); village-level (3); one or more protected areas (2); one or more sub-national regions (spatial and/or administrative) area (in Mexico-US, Brazil, Germany, China, and Indonesia) (5); sub-national land parcel (in one case land concessions); country statistics (exporting-importing countries) from e.g. FAO for certain commodities (fish, soy bean) (3); certain animal species (1); and literature using a certain string of words and criteria (e.g. 38 peer-reviewed papers). In the following sections, we are more explicit on the methodologies used by different authors to identify different types of impacts and to establish causality and trade-offs in telecoupled systems.

4.2. Ecological impacts

All reviewed articles describe at least one ecological impact of the studied telecoupled system, including land use changes (e.g. deforestation, afforestation, fragmentation, intensification), or changes in soil conditions, water quality and quantity, air quality, climate, biodiversity, species dynamics, nutrient cycling or biomass changes. Most articles describe negative impacts, whereas some also refer to positive impacts. For example, Parish et al. (2018) describe that the telecoupled transatlantic wood pellet trade has many observed positive environmental effects, such as the preservation of European Union forested land and associated ecosystems or the reduction in toxic air emissions related to coal combustion. In addition, other studies refer to positive impacts such as reduced pest infestation and pollination (López-Hoffman et al., 2017), reduction in flood risks (Quan et al. 2016), or afforestation (Yang et al. 2018).

Telecoupling research assesses impacts in four different ways: (1) descriptions in other literature, (2) observations from the field, (3) quantitative measurements or estimations, and/or (4) models. First, many studies on telecoupling quote other secondary literature. Our literature review reveals that many articles on telecoupling use descriptive evidence to portray impacts, but do not conduct empirical assessments (e.g. Baumann & Kuemmerle, 2016; Gasparri & de Waroux, 2015; Liu et al., 2015; Pace & Gephart, 2017). Lenschow et al. (2016), for example, summarize the environmental implications of the interregional soybean trade by referring to secondary literature. If studies refer to environmental impacts described in other literature, it often remains unclear whether the depicted impacts are empirically established or only hypothetical. Many articles describe the potential present and future ecological impacts of a certain commodity trade in very general terms, which entails the risk of attributing the observed effects of a certain process to the telecoupling under investigation without assessing causality. For instance, Parish et al. (2018) claim that the preservation of European Union forestland and associated ecosystems is an effect of

the telecoupled transatlantic wood pellet trade, without conducting any causal analysis or investigating any causal mechanisms.

Second, scholars describe impacts by referring to direct observations from the field (e.g. Andriamihaja, Metz, Zaehring, Fischer, & Messerli, 2019; Baird & Fox, 2015; Friis & Nielsen, 2017b; Tapia-Lewin et al., 2017). Case studies that rely on field research for impact assessments often do not make causal claims about the observed impacts because they rely on descriptive qualitative statements, but do not employ rigorous methods to identify impacts. While some researchers describe the actual observed effects made during fieldwork, such as rapid landscape changes (e.g. Baird & Fox, 2015), other researchers illustrate potential impacts based on their field research. For example, Friis and Nielsen, (2017b) show that banana cultivation in Laos can potentially lead to land and soil degradation if a banana fungus infects the plants. Likewise, Tapia-Lewin et al. (2017) describe that human gathering and trade of sandhopper has potential detrimental effect on the trophic chain by affecting the intertidal sandy beach food web and community structure.

A third group of reviewed papers identify ecological impacts on the basis of quantitative measurements or estimations. Studies may use descriptive statistical indicators to assess environmental impacts, such as Liu et al. (2015) who illustrate the environmental effects of panda loans by estimating the CO₂ emissions associated with the transportation of pandas and their feed, as well as with the travel of tourists to see the pandas. Two commonly used methods to measure environmental impacts are life cycle assessments and environmental footprints. For example, Marston and Konar (2017) calculate the virtual water footprints and water transfers from the Central Valley of California during the drought, indicating that drought may strengthen the telecoupling between groundwater withdrawal and distant consumers of agricultural commodities. Additionally, deforestation is commonly quantified using remote-sensing-based approaches (e.g. Sun, Tong, & Liu, 2017), which can be combined with participatory approaches based on workshops and field walks (Zaehring, Llopis, Latthachack, Thein, & Heinemann, 2018).

Finally, a fourth group of studies calculate ecological impacts using modelling techniques. Examples include scenario development (e.g. Norder et al., 2017), statistical models (e.g. Fuller et al., 2018) and/or land system models (e.g. Rulli et al., 2019). Parra Paitan & Verburg (2019) present a comprehensive overview of various different models to account for the direct and indirect environmental impacts caused by agricultural production (e.g. agent-based models, system dynamics models, equilibrium models and land use models).

In sum, we find that very few publications on telecoupling make use of rigorous causal analysis to determine ecological impacts. In addition, most telecoupling research makes no or vague assertions about the form (direct or indirect), direction (positive, negative or undetermined), duration (short, medium or long-term, temporary or permanent), reversibility (reversible or irreversible), spatial scale (local, regional, national or global) and magnitude (high, medium, low) of environmental impacts.

4.3. Social impacts

Most of the papers reviewed identify social impacts of telecoupled systems, but only four specify whether these are direct or indirect impacts. The impacts identified in the review papers are various and include both positive and negative ones. The majority of the negative impacts relate to loss of accessibility and scarcity of resources, particularly limited access to and increased competition for food (Pace et al. 2017; Friis & Nielsen 2017b) and land (Alexander et al. 2018; Andriamihaja et al. 2019; Baird & Fox 2015; Bolliat et al. 2018). Other negative impacts include changing economic conditions (Boillat et al. 2018; Cease et al. 2015; Carlson et al. 2018; Baumann & Kummerle 2016), issues of justice and equity (Bolliat et al. 2018), exclusion (Boillat et al. 2018), poor management of resources (Quan et al. 2016), illegal activities (Boillat et al. 2018; Baumann & Kummerle 2016), issues of labour (Carlson et al. 2018; Baird & Fox 2015), migration (Baumann & Kummerle 2016), displacement (Baird & Fox 2015) and health issues (Lenschow et al. 2016; Cease et al. 2015; Friis & Nielsen 2017b).

However, it is not only negative impacts that are identified in telecoupled research: 14 of the 27 papers identify certain positive impacts. These include improved knowledge, awareness and participation (Liu et al. 2015; Tapia-Lewin et al. 2017; Yang et al. 2018; Carlson et al. 2018) and better access to capital, labour and natural resources for certain groups (Marston and Konar 2017; Quan et al. 2016; Liu et al. 2015; Bolliat et al. 2018; Friis & Nielsen 2017b; Parish et al. 2018; Carlson et al. 2018; Bagstad et al. 2019).

In 9 out of 27 papers, literature review and use of secondary data are the main methods used to identify impacts. The second most common methodology for identifying social impacts is field research including surveys, interviews and observation (5). Also modelling (2) and choice experiments (1) are methods that have been employed in the papers reviewed. Only 5 papers refer directly to the indicators of the impacts mentioned. These are either statistical indicators, or a referral to criteria of equity.

4.4. Economic impacts

As regards economic impacts, which we acknowledge constitute a subset of social impacts, almost two-thirds of the articles identify both positive and negative economic impacts associated with the telecoupling interaction(s) under observation, which are classified in the form of either direct or indirect impacts. Positive economic impacts identified include: job creation, increased income, investments in new technologies, and overall economic growth of regions or countries. Most of these were largely related by the authors to the social wellbeing, while some of them linked these impacts to environmental aspects as well. For example, Pezzoli et al. (2014) identified interconnectedness between socioeconomic conditions and environmental health, whilst Garrett et al. (2013) identified the incentives for environmental certifications by producers. Hence the review also revealed the interlinkages among the environmental, social and economic impacts of telecoupled interactions and processes. Among the negative impacts identified, there are detrimental effects on income and terms of trade for specific social groups. Cease et al. (2015), for example, highlight how coupled agricultural markets have, in some contexts, resulted in locust outbreaks which have in turn damaged crops, reduced productivity, farmers' income and threatened regional food supply.

In the reviewed articles, the methods to qualify and/or quantify economic impacts include: literature reviews, interviews and surveys, secondary data analysis, quantitative analysis and modelling, and field observations. Only a few studies are based on data collected through interviews or surveys to collect data (e.g. Boillat et al., 2018; Friis & Nielsen, 2017b; Baird & Fox, 2015; and Tapia-Lewin et al., 2017), while the rest of the articles are based on either literature review or secondary data. Some articles rely on mixed methods to identify economic impacts: Baird & Fox (2015) use both interviews and field observations; Boillat et al. (2018) combine a literature review with expert interviews; Friis & Nielsen (2017b) rely on both interviews and secondary data; and Baumann et al. (2016) combine a literature review with spatial data analysis.

4.5. Causality and trade-offs

Telecoupling research strives to explore how things are connected across distances. Demonstrating these connections through links of causality thus represents a key task. From the sample of 27 papers included for the early review, 14 papers deal with attribution of causality. However, they do so with very different levels of detail, methodology and analytical focus. In an early version of the codebook, we asked if the authors were attributing causality systematically.

We changed the entry to ‘causality attribution’ to capture authors who attributed causality more argumentatively and less systematically.

By *systematically*, we understand the appliance of methods specifically directed at demonstrating links between drivers and impacts. By *argumentatively*, we mean that the authors discuss drivers and argue for causation, albeit in a less systematic and more speculative manner. In practice, the distinction is however far from straightforward. The term ‘systematically’ does not in itself guarantee higher level of detail or accuracy. An example is Alexander et al. (2018), where causation between global land management intensity and changes in climate and atmospheric carbon dioxide is explored through modelling and probability analysis. This approach permits to visualize and quantify broad trends in a systematic way and point to relevant study objects for future research, but it does not capture the less direct, less predictable, or more complex cause-effect relations.

A more qualitative approach is represented by Friis and Nielsen (2017b), who examine the main causes of a banana plantation expansion in Laos, and how this expansion is influenced by telecouplings. The authors map causal relations based on knowledge from interviews, fieldwork, and personal experiences. The approach is more argumentative than systematic but is based on empirical evidence and considers aspects not captured by those of the quantitative systematic approaches, such as influence from ‘elusive and immaterial interactions’.

Several of the other papers were difficult to categorize as either or in terms of attributing causality. One of the reasons is that the telecoupling language strive to embed causation when framing ‘drivers’, ‘impacts’, and the influence of different ‘flows’ between different systems. Therefore, it can be difficult to discern when a research paper does not establish or assess causality as such but does apply a terminology and/or visualization tools to the case of study that indirectly argues for causal links; for example the reviews and flow charts presented in Pace and Gephart (2017) or Bolliat et al. (2018).

Finally, out of the 27 articles reviewed so far, 11 addressed trade-offs directly or indirectly as part of their discussions, but none of them did so systematically and through quantification. An example of a very indirect account of trade-offs is Andriamihaja et al. (2019) who discuss pros and cons in relation to how immediate positive impacts such as livelihood improvement through better access to cash crops can lead to deforestation because of expansion of cash crop cultivation. This relationship of potential trade-offs between conservation and livelihood improvement

through forest use could benefit from more systematic assessment e.g. by quantifying the change in stock of different forest resources when different groups of people get access to extraction. Liu et al. (2015) address trade-offs more explicitly in relation to telecoupling by pointing out how they may offset each other. They highlight, for example, in relation to trade of agricultural and industrial products that

(..) the decrease in the amount of plastic film used may in part be due to an over 50% reduction in an average household's agricultural land as a result of the Grain- to-Green Program. Tourism also provides a source of nonfarm income that may discourage agricultural development, and in turn, agricultural trade. (Liu et al., 2015, p. 44).

It is also sometimes challenging to distinguish between trade-offs and other types of impact categories. For example, Yang et al. (2018) explore the case of a payments for ecosystem services (PES) program and argue that more deforestation will lead to more crop raiding, which in turn will lead to more off-farm activity, including tourism, which over time will lead to a potentially negative ecosystem health in the long run. These could be looked at as trade-offs but could also be considered as cascading effects. We argue here, that the terminology is not important in itself but we advocate that telecoupling research is explicit about which impacts are assessed, how the impacts are categorized and why.

5. Conclusion

Our literature review shows that current assessments of impacts, causality and trade-offs in telecoupling research have been mostly descriptive, which is in line with the findings by Carlson and colleagues (2018). The impacts observed from telecoupled systems are several, and span across ecological, economic, and social considerations. The analysis of causality in telecoupled systems is challenging because telecoupled systems are usually characterized by a decoupling of drivers and impacts, meaning that causes and effects can be spatially, temporally, institutionally and sectorally separated. This also explains why the analytical boundaries of the telecoupled system(s) are usually set at country or multi-country level, rather than taking an empirically global perspective where patterns of a given trade flow, for example soybeans, are analyzed in their full spatial complexity.

In this report, we have been able to identify a number of research challenges and gaps, which will be further qualified and explored when we conclude the review. First, we observe that telecoupling research needs to distinguish more clearly between the assessment of empirically

observed or measured impacts and the assessment of the risks of the occurrence of impacts. Second, it also needs to improve the rigour of causality attribution for the different impacts identified, by for example explaining in detail what kind of data is used to establish causality, and how this data is collected, and thus give an idea of the empirical evidence and the validity of the argued causation. Our own assessment of such causation was challenging because of the many variations and level of detail in which authors dealt with impacts and, at what level they were detected and assessed. Third and finally, telecoupling research has not yet considered trade-offs a central aspect of enquiry, with most analyses addressing these qualitatively rather than quantitatively and with grounded data.

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Supplementary materials

Appendix 1: Weblink for codebook

https://docs.google.com/spreadsheets/d/1-AE2LdThqDB5-HA4_FITRd-P_R11Gvx-reIIZ-UjWil/edit#gid=0

Appendix 2: Definition of central categories in the codebook

Analytical focus	This refers to the main system, process, issue or research problem addressed in the article. It is usually referred to in the article's research objective, and/or the Introduction of the paper.
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Research objective	This indicates the objective of the article as stated in the publication, i.e. copy-paste sentence from the research objective, usually found in Introduction/Abstract. It is necessary to have the research objective in mind before judging a certain impact focus and vice versa, focus on certain impacts in a certain way might be explained by a broader tendency in research focus.
Reference to a flow	Reference or not to a “flow” in the studied system, process, issue, or problem addressed in the article. The flow can be explicitly defined by the authors in the paper, or interpreted by the reviewer based on the paper contents.
Countries of analytical focus	These columns list the countries which are directly or indirectly part of the paper's analysis, as they are relevant for the studied system, process, issue, or research problem. These countries are usually found in the Introduction and Methods sections, or in the Results when the findings are presented. When papers refer to multiple countries that are affected by specific telecouplings, but these are not part of the analysis, i.e. they are only mentioned using secondary data or the like, should not be listed in these columns.
Analytical scale	This refers to the geographies of the authors' empirical engagement, i.e. where they conduct their empirical research or what is the geographical scope of the data they use in their article. We have defined 5 categories: local, sub-national, national, regional (more than one country from a larger region/continent, e.g. Asia), and global (from multiple countries from around the world). This information can be directly found in the Introduction and/or Methods section, and it can also be interpreted by the reviewer. For example, an article that involves interviews at community, regional and federal levels to understand sugarcane trade in a given country would be classified here as “national”. An article that looks at a given global teleconnection relying on global datasets would be classified as “global”.
Data type	This refers to the type of data collected by the authors to write their article. We have identified four broad categories: qualitative, quantitative, spatial, and mixed (if the former are somewhat combined). Surveys designed to collect only quantitative data have been considered a quantitative approach, and when used to collect both qualitative and quantitative data have been considered a mixed approach.
Number of methods	This refers to the plurality of methods used by the author(s) in the article. We have identified two broad categories: multiple, if the author(s) use more than one method, and single if they only use one.
Methods	These columns specifically describe each of the methods used in the article.
Sample size	This refers to the specific details of the data collection methods, specifically regarding the number of locations where research has been conducted and the number of people, archival data, datasets, etc. the authors have liaised with to write the article.
Theoretical framework or conceptual lenses	This refers to the main concepts, frameworks, theories used to frame the research, if any. For example, an article might be using Liu et al's telecoupling framework, while another might be using value chain analysis or more broadly concepts like Coupled Human and Natural Systems. This information is usually present in the Introduction or in a dedicated theoretical section, and this column

	should describe here the theoretical approach highlighting the principal theoretical framework or concepts used.
Terminology for impacts	This refers to the term(s) used by the author(s) to qualify the impacts directly or indirectly resulting from the system, process or issue being studied. These can include terms like “impact, outcome, effect, consequence, etc.”
Impacts (ecological, social, economic)	This refers to the impacts in these three domains as identified by the author(s). These columns should list the identified impacts, with the correspondent qualifications, e.g. increased soil erosion, enhanced knowledge, or reduced income. This information is usually found in the Results and Discussion sections of the article.
Types of impacts	This refers to the qualification of the impact by the author(s) in relation to how tightly connected such impact is to the system, process or issue being analysed, i.e. how strong the relation of causality actually is. We can distinguish here between direct and indirect impacts, between first and second order impacts, etc. If the author(s) do not make such distinction, the column can be left blank. This distinction between impacts of different kinds might not be made, or might be noted somewhere in the manuscript, more likely in the Introduction, Results and/or Discussion section(s).
Methods and indicators	This refers to the author(s) employed methods to qualify the identified impacts, and the indicators used for such qualification (if any).
Causality attribution	This refers to whether the author(s) establish a direct causality relationship between the system, process or issue being studied and a specific impact. For example, this should indicate if the author(s) attribute certain level of income change to a specific land-use change process being studied. If so, this column should also indicate how such attribution is made.
Trade-offs analysis	This refers to whether the author(s) analyse trade-offs of some kind, between processes, impacts, or the like. For example, a paper might note that increased land-use change has driven increased local income, at the expense of local forest cover, whilst reducing deforestation elsewhere through market-based interactions. Trade-offs should be identified and described in this column.
Institutions	This refers to whether the author(s) include institutions -in the more general sense of the term, i.e. both formal and informal rule-making, government, policy and the like- as part of their understanding of a telecoupled system, or as part of their analysis. If so, this column should indicate in which way institutions are part of the analysis.
Review notes	This column can include any reflection of the reviewer about the paper that might be relevant for the purpose of the review.
Author(s) understanding of telecoupling	This column can include a reflection of the reviewer about how author(s) seem to understand telecoupling(s), teleconnections, or the like in the reviewed paper.

Appendix C. Collective report 2: Exploring approaches to actor characterization and analysis telecoupling research

Exploring approaches to actor characterization and analysis telecoupling research

Busck-Lumholt, L.M.^a, Persson, J.^b, Sonderegger, G.^c, Pravalprukskul, P.^d, Reis, T.^e, Schulp, N.^f, Kuemmerle, T.^g

^aUniversitat Autònoma de Barcelona (UAB); ^bUniversity of Copenhagen (UCPH); ^cUniversity of Bern (UNIBE); ^dUniversity of Copenhagen (UCPH); ^eUniversity of Louvain (UCL); ^fVrije Universiteit Amsterdam (VUA); ^gHumboldt-Universität zu Berlin (UBER)

* Authors have contributed equally to this report.

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1. Introduction

Telecoupled systems can be conceptualized through systems, flows, causes, effects and actors (Liu et al., 2013). The Virtual Meeting Series (VMS) aim for a better understanding of these telecoupling concepts through insights from practical research examples and the telecoupling literature. This VMS-report specifically focuses on actors, which are considered a key component of the telecoupling processes that produce dependencies between land-use systems (Liu et al., 2013; Eakin et al., 2014). Yet, actors seem to receive varied levels of attention in existing telecoupling studies (Kapsar et al., 2018). The report outlines different ways of how actors are addressed in telecoupling research and discusses the specific challenges that arise from conducting research on actors in a telecoupling context. The aim is to address the following research question:

Which actors create telecouplings that produce dependencies between land-use systems?

To answer this question in any empirical context requires careful reflection on concepts and methods relevant for the identification and analysis of telecoupling actors, which therefore is at the core of this report. This objective is approached by exploring examples of actor characterization in different telecoupling research projects. The data presented is discussed for the purpose of illuminating opportunities of different conceptual and methodological approaches to analyzing actors in telecoupling processes. The findings can inform and guide future research to be better prepared for the challenge of capturing relevant actors in telecoupled empirical settings where it can be difficult to draw the line of which actors to focus on, and how. After presenting the findings of the study, we discuss commonalities and potentials in methods to analyze actors,

issues related to conceptualizing actors according to different categories, and how the researchers' analytical entry point influences both the methods and conceptualization of actors.

2. Methodology

2.1 Data collection

This report draws on three sources to explore the relevance and application of actor-perspectives in telecoupling research: 1) a survey among the ESRs of the COUPLED project; 2) an inventory of telecoupling visualizations, and 3) four detailed case studies (by those ESR most strongly involved in this deliverable).

The ESR survey was carried out with all 14 COUPLED ESRs. The survey was conducted in December 2019 to get an overview of the role actor identification and analysis plays in research practices among COUPLED fellows. The questionnaire opened by inquiring if actors played a role in the respondent's work. Upon an affirmative answer, the questionnaire inventoried the flows addressed in the research, the actors identified, and the methods for actor identification applied (table 1). The results are not representative of telecoupling research, but they are indicative of the weight given to this aspect of telecoupling analysis within different disciplines, using different methods and having different research foci. A review of a sub-sample of telecoupling literature that deals with visualizations in telecoupling provides additional input.

A visualization inventory was conducted within the context of a study that systematically reviews and analyzes telecoupling visualizations (Sonderregger et al., in press). It involves a sample of 118 visualizations from 62 scientific articles/book chapters that display empirical information on telecoupling phenomena. For the purpose of this report, the selected visualizations were coded with regards to their presentation of actors and/or actor networks, as well as the different visualization approaches used to do so.

More detailed descriptions from four individual ESR case studies are included to illustrate different approaches to actor identification and analysis in telecoupling research. Two of these focus on commodity flows from trade: one in Brazil dealing with soy exports and one focusing on maize booms in Thailand. The remaining two case studies are examples of research on more immaterial flows; one focusing on discursive flows influencing conservation efforts in Laos and one conceptualizing information flows between actors in a development project in Argentina.

2.2 Data processing

The data from the ESR survey is structured and presented in two tables. The first table describes the telecoupling phenomenon, flows, and relevant actor groups of the different research projects. This supports identifying patterns and relationships between research topics and actors included in the analysis. The second table relates methods and flows to the level of detail that the different approaches are likely to reach with respect to actor identification and analysis. The case studies are presented and discussed in relation to following generic categories commonly used for actor characterization in the broader literature.

- a. Sector: Public / private / civil society
- b. Scale: Local / national / international
- c. Agency: Formal / informal behavior - including their role in decision-making and their level of control of flows

We critically examine these categories by grounding them in the four case studies to determine to what extent and how they are useful and applicable in these contexts, as well as considering their potential shortcomings and/or strengths in informing a telecoupling perspective.

3. Results

3.1 Actor-perspectives in COUPLED research

Our inventory of research practices among the 14 ESRs reveals that actors play an important role in COUPLED research. Eleven ESRs indicate that actors play an important role in their research and identify key actor types relevant for (some of) the respective telecoupling phenomena they study. Seven of them take this further and specifically investigate the role of these actors within the telecoupled system, as well as dynamics and interrelations among actors. Table 1 briefly presents a selection of ESR research projects that focus on actor dynamics. They commonly investigate conservation or commodity trade telecouplings, and thereby consider information, commodity and/or financial flows in their analyses. These insights from COUPLED research practice indicate that telecoupling research typically deals with a large range and diversity of actors that are situated in multiple geographic regions and at different scales. They also belong to different sectors (public, private, civil society), and relevant actors have different roles within the telecoupling phenomena (e.g. actively shaping telecouplings or being affected by their impacts).

To highlight a few observations from these ESR survey results: the scope of actors considered in commodity trade studies varies considerably, ranging from a primary focus on key supply chain actors to a broader set of actors that goes beyond the supply chain (e.g. public authorities of the affected jurisdictions, NGOs, or lobbyists). Analyses of conservation telecouplings have a clear focus on information and discursive flows, and generally take account of a broad, slightly different set of actors, with increased focus on international organizations and advisors (consultants, research).

Table 1: Actors/actor groups identified for a selection of ESR research projects

Telecoupling phenomenon	Flow type & detailed flow content	Relevant actors or actor groups
Conservation projects (ESR 15)	<p><u>Information flows:</u> Environmental discourses; Policy models for protected area management</p>	<p>Smallholding farmers, herders, and forest-dependent communities</p> <p>Local village authorities</p> <p>Conservation actors in Laos: (I)NGOs at central level; park management unit; technical advisors; consultants</p> <p>New actors in this space: development (I)NGOs, private sector companies,</p> <p>Government officials: Central, provincial, and district levels</p> <p>Others: Lao and international media; Academia</p> <p>International conservation organizations in the UK, Denmark, Thailand, Laos</p>
Conservation projects (ESR 13)	<p>Information flows:</p> <p>Policy, project information, management plans, project deliverables, training, etc.</p>	<p>Local forest-dependent communities (Wíchi and Campesinos)</p> <p>Local NGOs; Government institutions (national and provincial)</p> <p>The World Bank (DC and Buenos Aires branch), IMF, FAO</p> <p>Other international organizations involved with development projects in Argentina</p>

<p>Infrastructure investments (ESR 12)</p>	<p>Financial flows: Loans for infrastructure investments <u>Information flows</u>: knowledge, ideas, discourse, policies</p>	<p>Governmental actors (e.g. policymakers) NGO representatives EU policymakers/bureaucrats UNESCO representatives Researchers, consultants Construction company</p>
<p>Commodity trade (ESR 3)</p>	<p><u>Information flows</u>: Zero-deforestation commitments Commodity flows: Coffee</p>	<p>Private-sector companies with a zero-deforestation commitment Value chain actors (producers, traders, roasters, retailers).</p>
<p>Commodity trade (ESR 10)</p>	<p>Commodity flows: Soybeans</p>	<p>Grain farmers Input suppliers Grain brokers Logistics companies, logistics infrastructure Providers of agricultural consultancy, planning and market intelligence Leaders and heads of agriculture associations Agriculture lobbyists, Grains trading companies, grains crushers and processors Cereal cooperatives and small companies</p>
<p>Commodity trade (ESR 6)</p>	<p>Commodity flows: Maize</p>	<p>Maize chain actors Government agriculture and conservation departments, regimes Armed military groups Conservation NGOs, community development NGOs, Banks</p>

		Media
Commodity trade (ESR 4)	Commodity flows: Rubber	Tire manufacturers Rubber processors Smallholders rubber producers Consumers
Commodity trade (ESR 11)	<u>Discursive/ information flows:</u> Narratives and information on sustainability, transparency, resource management, and the gold value chain Commodity flows: Gold	Small scale gold miners Government officials NGOs, Civil Society Organizations Lawyers, consultants, brokers, dealers, geologists large scale mining companies, sponsors, suppliers
Commodity trade (ESR 7)	Commodity flows: Cocoa beans	Farmers Government institutions (COCOBOD, Forest Commissions, etc.) Private sector (trading companies, LBCs) NGOs

3.2 Actor identification and analysis: Methods used in COUPLED research

Actors is the key analytical focus in many disciplines. Consequently, a multitude of methodological approaches exist to identify and analyze relevant actors within a given research context. In telecoupling research, the identification of key actors is particularly challenging because telecoupling phenomena often involve a diverse set of actors, that are embedded in networks spanning across multiple scales and geographic locations. Table 2 presents an overview of the methods used in COUPLED research to collect and analyze actor-specific data. We thereby distinguish between the two main research purposes: the identification of key actors and the in-depth study of individual actors/actor groups (including potentially their networks).

Table 2: Methods used in COUPLED research to investigate telecoupling actors

	Identify actors	Study actors	Methods to study flows	References from telecoupling literature
Data collection				
Web searches	✓		Information, Commodity	
Stakeholder mapping	✓		Information, Financial	
Snowball sampling	✓		Information, Commodity	
Secondary data review	✓	✓	Information, Financial, Commodity	Boillat et al., 2018
Surveys	✓	✓	Information	Nielsen et al., 2019
Focus group discussions	✓	✓	Information, Financial	Nielsen et al. 2019
Interviews	✓	✓	Information, Financial, Commodity	Nielsen et al., 2019; Friis & Nielsen 2017; Baird & Fox 2015; Boillat et al., 2018
Participant observation	✓	✓	Information, Commodity flows	Hauer & Nielsen, 2020; Nielsen et al., 2019;
Data analysis				
Social network analysis		✓	Information, Financial, Commodity	Andriamihaja et al., 2019; Seaquist & Johansson 2019; Prell et al. 2017, Schaffer-Smith et al. 2018

Content analysis		✓	Information, Financial	
Discourse analysis		✓	Information, Commodity	Persson & Mertz, 2019
Institutional analysis		✓	Information	Oberlack et al., 2018
Regression analysis		✓	Commodity	Bager & Lambin, 2020

3.3 Actor-perspectives in telecoupling visualizations

Visualizations are powerful tools to depict, analyze and communicate information on complex and intangible subjects (McInerney et al. 2014). They are commonly used in telecoupling research (see e.g. the telecoupling toolbox (Tonini and Liu 2017, McCord et al. 2018)). Yet, a recent systematic review of telecoupling visualizations (Sonderegger et al., in press) reveals that actor perspectives are frequently missing in visualizations that portray telecoupling phenomena. The study reviewed 118 empirically-based visualizations from 62 scientific articles and book chapters. Of the 118 visualizations, merely 26 visualizations present information on the actors or actor types that are relevant for the respective telecoupling phenomena. As illustrated in Figure 1, approaches to visually represent actors and/or actor networks and the emphasis placed on them within the telecoupling visualizations differs considerably. Often, actor information is presented in graphs that (to some extent) apply the design of the conceptual telecoupling framework introduced by Liu et al. (2013) to an empirical phenomenon. Thereby, actors are portrayed as components of telecoupled systems (e.g. Chignell & Laituri, 2016; Parish et al., 2018; see Figure 1a). In some instances, actors are also presented within the context of action situations, rather than delineated socio-ecological systems (Boillat et al., 2018; Oberlack et al. 2018; see Figure 1b). Actor-network information is less commonly shown, with merely seven visualizations presenting such information. Three of these present actor networks within specific telecoupled systems (Eakin et al., 2017; Hulina et al., 2017; see Figure 1c), while the remaining four show actor-networks that spans across telecoupled systems (Gasparri et al., 2016; Andriamihaja et al. 2019; see Figure 1d).

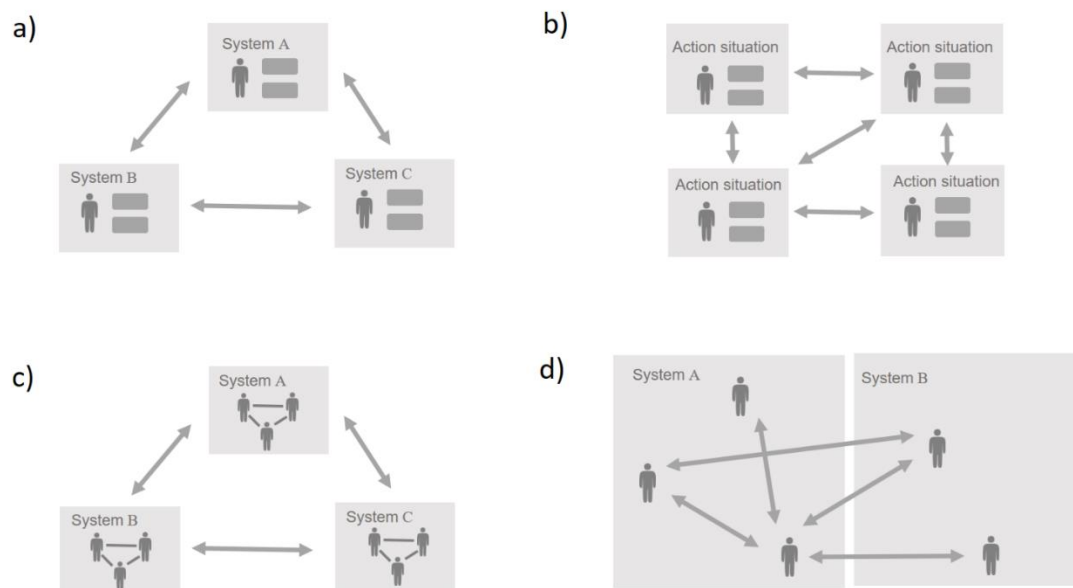


Figure 1: Schematic representation of different approaches used to present actor information in telecoupling visualizations

Sonderegger et al. (2020) discuss potential factors that may influence the presence of actor information in telecoupling visualizations. For instance, it may be challenging to accommodate actor information in the visualization, besides the many other elements and perspectives that telecoupling researchers aim to present jointly. Further, the lack of actor perspectives in telecoupling visualizations may also stem from disciplinary biases. On the one hand, disciplines that place more emphasis on actor perspectives (e.g. anthropology or sociology) may less frequently use visualizations to communicate their research results. On the other hand, those disciplines that more frequently tend to use visualizations (e.g. geography or economics), may prioritize the display of other research contents, such as solid commodity flow visualization over that of actor-specific information.

3.4 Case studies

This section provides a more in-depth characterization of actors in four case studies. Each subsection presents a general background to the case, including the main methods used, followed by a description of the actors present and analyzed. Finally, each case considers three actor characteristics: scale, sector and agency. The tables presented in these case studies apply actor categories and attributes to illuminate different research problems in different ways.

3.4.1 CASE STUDY 1: Maize spillovers in the Mekong region

Introduction - This case study examines the flows of feed maize between Thailand and its neighboring countries, Lao PDR and Myanmar. While maize production in Thailand is undergoing a bust (characterized by a sharp decrease in supply), partly due to government crackdown on upland agriculture in forest reserves (Wongsamuth, 2016), localized maize booms have emerged in the past decade in bordering areas: Xayabouri province in northern Lao PDR, and Myawaddy district of Kayin State, Myanmar. These booms have been driven by different modalities and constellations of actors and with vastly different governance settings (Table 3). Maize flows from Xayabouri followed official cross-border trade routes and customs procedures, with traditional supply chain actors such as maize traders and silos. This boom recently busted due to a mix of land degradation and a growing demand for other higher-value agricultural commodities from China. Maize flows from Myawaddy have followed informal channels across the Moei River, facilitated by informal relations between cross-border Karen traders and farmers, ethnic armed groups, Thai agribusiness investors and buyers, and local Thai government officials. These informal flows are differentiated from the formal maize flows that originate from Shan State and traded through official channels from Myawaddy to Mae Sot in Thailand, which are usually designated for China except for when the Myanmar-China border closes (e.g. due to disease outbreaks). More recently, the informal flows of maize from Myawaddy to Thailand have halted due to COVID-19 border closings. This case therefore shows how maize boom spillovers from Thailand to neighboring countries can take place very differently in terms of actors and governance contexts, and the volatility of these telecoupled flows due to forces beyond the sending and receiving countries.

The main method employed for identifying actors in this case study was snowball sampling based on interviews with silo, traders, local agricultural offices, and NGOs during a scoping trip.

Table 3. Key actors in transboundary Lao PDR-Thailand and Myanmar-Thailand maize value chains

Sector	Actors		
	Thailand	Lao PDR	Myanmar
Government	Ministry of Agriculture and Cooperatives Ministry of Natural Resources and Environment Ministry of Commerce National Council for Peace and Order	Ministry of Agriculture and Forestry Ministry of Commerce and Industry Thai Ministry of Commerce	Ethnic armed groups (Karen National Union, Democratic Karen Benevolent Army) State military (Tatmadaw, Border Guard Forces) Ministry of Agriculture, Livestock, and Irrigation Thai Ministry of Commerce Thai local government officials
Private sector	Farmers Traders Silos Agribusinesses	Farmers Traders Silos (Lao PDR, Thailand) Shipping companies (Lao PDR, Thailand)	Farmers Cross-border traders Silos (Thailand)
Civil society	Environmental NGOs Community development NGOs Media		Environmental NGOs Refugee and migrant NGOs

Actor characterization – Scale: Actors were not identified by scale but rather by their role in the value chains. However, there were noticeable differences in scale patterns between the different maize trade flows. In the Lao-Thailand maize value chain, as maize was transferred throughout the value chain, the actors involved grew in terms of scale, from smallholder farmers, local traders, and local and provincial silos to border shipping companies, regional silos, and national agribusiness companies. However, in the Myawaddy maize trade flow, illegal maize flows were

threaded through local-scale actors in a short cross-border supply chain before feeding into regional silos and national agribusiness companies on the Thai side.

Actor characterization – Sector: For formal maize flows, the key actors establishing and maintaining the flows are from the private sector (farmers, traders, silo operators, and agribusinesses). At the national level, the Thai government plays a major role in regulating official imports of maize into the country, as maize is a protected agricultural commodity. However, the Myawaddy maize trade flow shows the muddiness of sector divisions when it comes to illegal flows of maize when non-state armed groups acting as customs officials and local authorities as private investors.

Actor characterization – Agency: The informal behavior of actors in the Myawaddy maize trade flow facilitates maize and investment flows in several ways. First, crossing the border informally has been a long-time custom of the Karen people living on both sides of the border. Maize traders who cross the border rely on personal relationships on both sides of the border to establish connections with farmers, silos, and local authorities for buying and selling maize. Second, different ethnic armed groups and the Myanmar military hold overlapping jurisdictions in Myawaddy, and together enforce trade taxation and border control systems outside of the state's control, which help these groups facilitate and benefit from the illegal maize trade. Third, those in official roles, such as local Thai government officials, can use their connections and relative wealth to invest in maize production in Myawaddy.

3.4.2 CASE STUDY 2: Brazil's soy exports

Introduction - This case study looks at the relationships between supply chain actors and territories of production and trade. It aims at conceptualizing, measuring, and explaining the potential causes and implications of different patterns of these actor-geography relationships. In other words, it looks at the stability or volatility of the commercial relationships between supply chain actors and regions over time. After measuring these relationship patterns, it seeks to understand what are the local and market factors that influence or drive these relationships to be more or less stable. Then, it seeks to understand what are the outcomes of these various relationship patterns, *i.e.*, does more stability lead to more trustworthy, long-term, and constructive relationships from the social, economic, and environmental points-of-view or not? For conducting this research, the Brazilian soy supply chain is analyzed empirically as a case study, and actors were identified and interviewed as primary research.

We chose the soybeans supply chain in Brazil as a case study because of its relevance. Soy has become a global commodity widely used as animal feed, biofuel, and as input for various end-consumer products such as dairy, toothpaste, cooking oil, and vegan products, to name a few. Brazil is currently the world's largest soy producer and exporter, having overtaken the U.S. in production in 2019 (Trase, 2020a). Brazil also hosts the world's most extensive biodiversity and native vegetation carbon stocks, both below and aboveground (Freitas et al., 2018; Metzger et al., 2019). Harmonizing soy production and expansion with Brazil's biodiversity, climate change mitigation potentials and efforts, water cycles that feed the enormous rain-fed agriculture, and the country's global role as food provider is a great challenge that justifies choosing this case study. Providing a conceptual and methodological tool to analyze actor-geography relationships, in addition to an empirical assessment of supply chain relationships in the largest producer and exporter of the largest global agricultural commodity in volume and value, is crucial to advancing supply chain knowledge and policy-making. The flows analyzed here are soy exports in the form of raw beans, oil, meal, and cake.

The essential data for this case study is the Trase dataset (Trase, 2020a), which is a compilation of Brazil's public data such as trade and export, customs, and the national tax registry. With these data, we calculate the stickiness index, which is a measurement of the strength of the actor-geography relationships in Brazil's soy supply chain (Reis et al., 2020). The strength of the actor-geography relationships refers to how frequent, persistent or stable the relationships between supply chain actors, *e.g.*, companies, and territories, represented by jurisdictions that gather a group of commodity producers, have been over time. Brazil exported soy to 127 countries between 2003 and 2017, which is the period of analysis. The main target destinations are China, the European Union, Russia, Japan, and Middle Eastern countries like Saudi Arabia, Israel, Lebanon, and Iran (Trase, 2020b). This research has found that “the soy traders with the largest market share are geographically stickier”, “stickier traders also show higher soy-deforestation risk”, and that “stickier traders are also signatories of zero-deforestation commitments” (Reis et al., 2020).

The main methods employed to analyze actors in Brazil's soy supply chain were temporal network analysis (Büttner et al., 2016; Nicosia et al., 2013) applied to data collected and modeled by Trase (Trase, 2018). Qualitatively, the methods involved fieldwork with a geographic stratification (Figure 1) to identify different soy production regions in Brazil, then snowballing to identify representative actors of multiple supply chain stakeholders, *e.g.*, farmers, input suppliers,

local managers and national directors of trading companies, infrastructure planners and lobbyists, and others as described in Table 1. These actors were interviewed with semi-structured guides (R. Henderson, 2011; Patton, 2002).

Table 4. Actors in Brazil's soy case study

Sector	Actors
	Brazil
Government	Logistics Infrastructure planners
Private sector	Grain farmers Input suppliers Grain brokers Logistics companies, logistics infra-structure lobbyists Providers of agricultural consultancy, planning, and market intelligence Agriculture lobbyists Grains trading companies Grains crushers and processors Small warehouse companies
Sector	Actors

Actor characterization – sector: The actors approached in this research pertain primarily to the private sector and interact at different market ends and different parts of the soy supply chain. They are grain farmers, input suppliers, grain brokers, logistics companies, providers of agricultural consultancy, planning and market intelligence, leaders and heads of agriculture associations, agriculture lobbyists, and logistics infrastructure lobbyists, grains trading companies, grains crushers, and processors, cereal cooperatives and small warehouse companies. Although public sector actors such as land-use planners, regulators, trade, and agricultural policymakers at

the international, national, and state levels also influence the supply chain, they are only indirectly targeted in this research. Third sector actors (i.e., NGOs) are only consulted as key informants and experts and have an even lesser role than governmental actors in this research.

Actor characterization – scale: The scale of interaction in this case study is local and global. The local scale includes the procurement of soy that takes place at the local level and within municipal, state, and national level governance schemes. It considers local circumstances and market factors such as local demand and freight availability. Nevertheless, this local procurement follows orders from a global set of market principles and norms to meet global demand. This global demand comprises various nuances and complexities stemming from the many national-level consumers that compose this complex global demand-side landscape of the supply chain. For example, China has different consumer patterns, habits, norms, rules, and regulations to purchase and import soy than Japan, South Korea, or Vietnam as examples of regional neighbors. These consumer patterns are even more different from key trade partners in other world regions, such as the Netherlands, Spain, South Africa, or Saudi Arabia. All trade partners have different consumer patterns that interact at the global level and deliver a multi-layered global demand for soy to producer countries like Brazil.

The governance setting is multi-scaled because there are supply-side and demand-side governance schemes. In the supply-side, Brazil has legislation for agricultural production practices, such as the use of chemicals, water, labor, territorial planning and land use, various land-tenure categories that can be grouped into public and private - the public categories cannot produce export commodities such as soy - and protection of native vegetation. These regulations are enforced at different levels of effectiveness, depending on the municipality and state enforcement agencies.

In addition to the public dimension of supply-side governance, there is private-sector governance. This governance dimension of soy production in Brazil includes certification schemes such as Pro-Terra and R.T.R.S, and individual and voluntary corporate sustainability declarations and commitments. These commitments, although stemming from the demand-side, affect production, such as the Amazon Soy Moratorium (occurring only in the forest types of native vegetation within the Amazon biome) and the individual zero-deforestation commitments (occurring only on forest types of native vegetation).

On the demand side, there are multi-stakeholder governance fora. They include the Amsterdam Declarations Group, the Tropical Forests Alliance, the Soft Commodities Forum, and the

Consumer Goods Forum. These, however, are all voluntary and incipient discussion groups. In mandatory terms, so far, we have the French Law of Vigilance and initial efforts taken by the European Commission to regulate the imports of forest-risk commodities, which is not in place yet.

Actor characterization – agency: The behavior of the actors in this case study follows mostly the rational-actor theory and principles (Ostrom, 2009), fundamentally producing and selling grains, processing, brokering, storing, transporting, providing inputs and technical assistance, and exporting. What this case study has been finding and showing us is that there are crucial social dimensions explaining the behavior, decisions, and market interaction patterns between these actors, such as embeddedness (Granovetter, 1985; Uzzi, 1997), trust (Skandrani et al., 2011), and transparency/opacity (Gardner et al., 2019; Heron et al., 2018; zu Ermgassen et al., 2020).

3.4.3 CASE STUDY 3: National park governance in Laos

The case study on Nam-Et Phou Louey (NEPL) national park in northern Lao PDR (Laos) is an investigation of the distant flows and interactions associated with strengthening Protected Area (PA) conservation as a mode of land-use governance. ‘Conservation telecoupling’, or flows of information and funding to enhance conservation efforts, can be understood in terms of responses by conservation-minded actors to identified threats to environmental resources with conservation value by directing flows to counter these threats (Kuemmerle et al., 2019). This research, meanwhile, takes as an outset that a phenomenon like Protected Area (PA) conservation is itself constituted by telecoupling processes that require empirical investigation, including positioning conservation as a land use that competes with alternative uses in land systems (Andriamihaja et al., 2019; Boillat et al., 2019). From this perspective, how conservation interventions are formulated and manifest in local interventions is a product of interactions between actors geographically remote from the social-environmental context in which they are implemented, and constituted by flows of funding, information, discourses, and knowledge. The flows of interest include: (i) Discursive flows legitimating particular interventions (e.g. narratives of the local human-environment practices and imagery of iconic species). (ii) Funding flows provided for actualizing conservation activities on multiple levels, mainly from institutional bilateral (e.g. US) and multilateral (e.g. Global Environment Facility), as well as organizational (e.g. WWF) sources. These funding flows come with targets, action plans and measures that not only influence but determine local contexts and social-environmental outcomes in some cases. (iii) Information flows related to monitoring and evaluating interventions and shared between actors. These flows

impact local contexts by changing and influencing practices. (iv) Flows of ‘expertise’ and policy models circulating at global-national levels that are adapted to and implemented in the local context.

We employed a mix of methods, including interviews with actors from local to global levels, documentary and archival analysis, participatory land-use mapping, and a structured survey with local villagers. We identified the actors and flows involved in creating, expanding, and consolidating PA conservation in the landscape, and traced this to a transnational apparatus consisting of actors that are loosely connected across scales. This apparatus creates the framework necessary for channeling flows from global to local arenas and vice versa.

Table 5. Actors that have been involved in telecoupling processes for PA conservation

	Scale				
Actor group	Global	National	Subnational	Local	Sector
A network of (I)NGOs*	IUCN; WCS; WWF; Tigers Forever Network	IUCN; WWF; TABI; GIZ; Lao Biodiversity Association; Lao Wildlife Association; Main supporting (I)NGO: WCS			Civil Society
Multilateral & bilateral funding institutions	World Bank; Darwin Initiative (UK government); GEF; EU; DANIDA; KfW				Public sector
Academia	Researchers on NEPL, Northern Laos, other PAs, etc.	FoF, NUOL; NAFR			Public sector
Consultants	Forest Carbon; Haas Business School, UC Berkeley				Tertiary sector

Governmental actors	Intergovernmental forums & conventions: CBD; CITES; UNFCCC COP; Illegal Wildlife Trade Conference	Convening bodies: National Assembly; EPF Laos	Subnational/Local government bodies: District governors; ministerial line agencies (DAFO, PAFO)	Local authorities & elites: Members of local committees e.g. Advisory council, village headmen, foresters; Party members	Public sector
Media outlets	The Guardian	Facebook; National News Channels			Tertiary sector
Civil society actors		Civil Society Actors: VFI; UNODC			Civil society
Private companies		Saffron Coffee; Hydropower companies (Nakai Nam Thern)			Private sector
Park Management			Staff from provincial & district agencies and supporting INGO		Civil society; Public sector
Land & resource users				Smallholder farmers, herders, foragers, hunters	Civil society

Actor characterization - sector: An interesting finding from the study is the integration of private sector actors into the telecoupling processes. A coffee supply chain company became involved in project activities in an Integrated Conservation and Development project at the community level to promote sustainable solutions to conservation by providing livelihood support in exchange for commitments to abide by the PA rules. Two aspects influenced this. First, the conservation NGO lacked the technical expertise to implement such a project. Second, it is part of a broader discourse of market-based solutions to conservation dilemmas, partly driven by donor funding. Also, while there is a clear rationale for distributing decision-making authority between

government and non-government actors, there is often a confluence of people within actor organizations, and sometimes very strong ties between non-government and government actors. For instance, the director of a conservation INGO, who has worked extensively on NEPL since joining the organization, maintains close ties with key individuals in the Ministry of Agriculture and Forestry and has represented the government of Lao PDR in official matters in global forums. The case shows how actor-networks involved in transmitting and influencing flows for PA conservation stretch across sectors.

Actor characterization - scale: The case study elucidates some of the complexities involved in ascribing actors to various scales and the fluidity that exists between actors, as indicated in table 5. Scale-ascriptions can usefully indicate the decision-making spaces to which actors' activities are geared and the cross-scale connections and channels through which exchanges of information and other flows are made. For instance, the INGO supporting the national park maintains an office at the central level and engages mainly with central government actors such as personnel in relevant ministries and other partnering organizations. However, they also employ staff based at the PA management unit and provide resources to the unit's activities. They maintain strong connections with the unit, including through monitoring frameworks and SMART technologies (Spatial Monitoring and Reporting Technologies), and interventions are rationalized according to environmental plans established at the national level. Meanwhile, the higher-level staff at the central office participate in regional and global workshops and forums to obtain resources and technical knowledge, network and make connections, and disseminate information about their activities in the national park. The individuals operating at these levels are also dynamic, in that they cross scales to exchange and network in various forums. Hence, while scale-ascriptions are useful in that they provide an idea of the main decision-making sites toward which they are oriented, links across scales are not stable and substantial fluidity typically prevails, particularly for actors that can be considered intermediaries of telecoupling flows.

Actor characterization – agency: There is a relatively clear formal arrangement for PA governance in Laos and NEPL specifically, where jurisdictional authority between government actors at multiple scales, including local communities, is clearly demarcated. However, at local scales, there are competing pressures for land-use that find their expression in more informal relationships and negotiations. For instance, the promotion of maize as a cash crop has led the local government to sometimes overlook conservation transgressions such as forest encroachment if it is to cultivate maize or other cash crops. Hence, interpretations of formal regulations are made

in light of socio-political relationships, which is important to consider in the context of PA conservation flows competing with flows from a competing system of practice. Moreover, conservation organizations, whose main role is to act as technical advisors to the government, have judicial authority only insofar as is granted by government counterparts and permitted by formal documentation in the form of, for instance, Memorandum of Understanding. Being the host institution for internationally funded grants and the gatekeeper of multilateral funding, moreover, these actors maintain a strong degree of bargaining power in negotiations. In the context of influencing decision-making on conservation-related flows, hence, actors maintain a number of formal and informal 'levers' they can employ.

3.4.4 CASE STUDY 4: Forest and Community project management in Argentina

This case study explores whether participatory project theory leads to collaborative project practice in the case of a Forest and Community project in Salta, Argentina. The investigation is done from a telecoupling perspective by looking at 1. Information flows (such as money transfers, information about project activities, and sharing of knowledge about associated policies and legislation), 2. Institutional behavior among project actors, and 3. Distance between project actors and the systems of project design and project implementation. The Forest and Community project is funded by a World Bank loan. The project is characterized as community-driven, but the decision-making and negotiations are top-down.

The findings of this case study challenge the notion that a project becomes participatory if the project design provides guidelines for participatory implementation. In the studied example, there are no direct and bidirectional information flows between actors dealing with design and decision-making, and actors supposed to carry out the implementation on the ground (including local beneficiary communities). The case study concludes that the inclusion of local project actors is needed already in the design phase to make project implementation collaborative, relevant, and socially just. The study advocates that future project assessments illuminate not just the mode of participation but at what stage in the project local participation is enabled.

Methodologically, the case study relied on secondary data in the form of official and internal project documents alongside primary data from qualitative interviews with relevant actors and actor groups (table 6).

Table 6. Key actors in Integrated Conservation and Development Projects (ICDP)

Actors	Typical roles and responsibilities	Sector	Scale
Donors or international financial actors	Support for projects through the provision of loans or grants; Negotiating project activities and distribution of project funds; Risk assessment and analysis of the client's country system and procurement capacity; Assist client with procurement planning; Provide training, technical assistance, and awareness-raising; Monitor compliance with a loan or grant agreement (Aldashev and Vallino, 2019) (Rahman et al., 2016)	Financial sector; Private sector	International
Consultants	Study, design or supervision of the project; Technical assistance; Institutional strengthening and capacity building	Tertiary sector	n.a.
National Government	Borrower; Identification of project need, strategy, planning, and design; Carrying out procurement activities following the loan or grant agreement (Rahman et al., 2016)	Public sector	National
Provincial or Local Government	Brokers and accountable representatives for the target population; Responsibility and decision-making power allocated to the local level government depends directly on the borrower (Rahman et al., 2016). In the F&C project, they are not involved with implementation arrangements.	Public sector	Provincial; Local
International NGO	Outside pressure or consultant depending on the project (Aldashev and Vallino, 2019)	Civil society	International
Local Implementing Unit	Teams of specialists and technicians hired by the ministry(ies) managing the project, to implement project activities. These units are ideally located in or very near the site(s) where activities are to be realized.	Public sector; Civil society; Tertiary sector	Local
Local NGO	Bottom-up pressure or implementing agency depending on the project; Broker and representative of the target population; Service providers to assist with project implementation; Consultancy (Aldashev and Vallino, 2019; Pasgaard, 2015)	Civil society	Local
Local Communities	Official target group/beneficiary; Subject to participatory activities (Pasgaard, 2015; Ravina et al., 2018)	Civil society	Local

Actor characterization – sector: The case study considers interactions between actors in the public sector, the voluntary sector, and civil society (cf. table 6) since these are the sectors directly involved in the studied project. That said, it would have been useful to expand the analytical boundary to include actors more indirectly involved with or influencing project development. This would imply the private sector, specifically logging companies and the mining industry, since these are present in the land of the target communities where the studied project is located. These industries are exploiting the land and resources that make up the objective in the Forest and Community project – to ensure sustainable use and relationship between local communities and their surrounding natural resources. Furthermore, this inclusion of the private sector in project actor identification could also benefit from attention towards the more informal sector/informal economy as these industries are subject to both institutionalized and random illegal activities and actor networks.

Actor characterization – scale: The scale where each actor is playing out its role in the project is key in the actor characterization in this case study. This is because the objective is to identify the mode of participation in a project that is funded and guided by an international actor (the World Bank), led by national actors (the Environmental Ministry and Financial Ministry of Argentina), managed at the provincial level by actors hired by the ministries, and implemented by and for local actors (NGOs, communities). While many telecoupling studies show that the issue of scale is a construct that needs rethinking when it comes to the analysis of flows, this case study showed clear boundaries between scales that reflected different positions in the project and different levels and types of decision-making power.

Actor characterization – agency: The case study shows a distance between theory and practice in the sense that project management practice deviated from the way project management procedures were prescribed in project design. This distance is created by indirect and one-way information flows between actors involved with design and decision-making and actors involved with implementation. The direction and directness of these information flows are decided by actors' formal and informal behavior, which is why the informal behavior was a focal point in the actor characterization and analysis. Formal behavior can more easily be observed in the field and detected in qualitative interviews. Identification of the influence of informal behavior is more challenging as it requires delicate attention towards (for example) situations where project actors make decisions based on discretion, personal relationships, or individual agendas rather than official rules or guidelines. Moreover, informal behavior might be hidden by the involved actors if

it is associated with illegal activities. The mapping of the direction and directness of information flows between project actors can indicate where it would make sense to be more attentive to the influence of informal behavior – for example in situations where many money flows are mapped as indirect either due to unknown intermediaries and/or lack of available information on the transfers.

4. Discussion

This section builds on the different research examples presented in the results section and discusses actor identification and analysis in a broader context of researching telecoupling processes. The focus is on opportunities and challenges related to methods to capture actor dynamics, categorization of actors according to the three dimensions examined in the case study examples, and how the analytical entry point into research influences actors.

4.1 Methods to capture actors in telecoupling

The type and quality of information generated on actors in telecoupling depend on the applied data collection methods. The ESR survey does not provide enough data to conclude which methods are more appropriate than others, but the results do illustrate the variation in data generated and the different levels of insight provided from the application of both qualitative, quantitative, and mixed methods approaches. The ESR overview table (table 1) indicates a difference between the use of data collection methods for identifying and providing an overview of actors, and the more in-depth study of actors.

Two cases focus on commodity flows, especially identifying and analyzing the actor-networks involved in supply chains connecting distant land-use systems. For the maize case, informant interviews help identify the actors involved in ‘formal’ compared to ‘informal’ maize trading relationships, where the latter operates under different conditions than the former. Without in-depth qualitative data, it would have been difficult to map out these two different networks. Similarly, interviews played a prominent role in the Brazilian soy case in generating a very detailed map of the complex actor-networks connecting local production areas at the micro-level to consuming countries. Employing both individual interviews and the TRASE dataset enabled the combination of qualitative information about the level of influence over flows and information on how these relationships have changed over time.

The two remaining case studies both combine document analysis and qualitative interviews with representatives of different actor groups involved in the governance networks stretching across space. Combining this with discourse analysis, the national park case was able to show how changes in the donor-funding strategies led to the integration of new actors into the particular landscape, for instance, a private sector actor and an NGO specializing in rural livelihood development. Comparing results from archival research on particular measures in the area with qualitative and quantitative data from local communities showed how different groups are impacted differently by the national park measures, and how they manifest in local changes. Finally, the Argentine case study shows how fieldwork and qualitative methods can generate information about the difference in the way actors in a development project scheme can influence the direction and directness of information flows.

In addition to the usual challenges of accessing informants, the identification of telecoupling actors often implies the issue of spatial distance between actors, which requires a lot of resources, for instance for fieldwork to ensure data completeness and overview of different decision-making arenas and actor networks across large distances.

These insights above suggest that it is key to first consider the analytical entry point and empirical scope of the research. One way to ensure data completeness in a telecoupling research case that involves actor identification over large geographical distance¹² is the use of digital data collection methods, including online interviews or digital forums. However, this is technically complex and there is a risk of inadvertently excluding some actor groups and creating a bias in the sense that there will be a tendency to collect more qualitative and detailed data from sites where fieldwork is carried out than from sites where data is collected digitally. A related challenge is ensuring the completeness of data and enough representation of actors within the same actor group. The question of representation is crucial to reflect upon in individual research cases in that it will always depend on the specific context. A priori identifying, for example, how many local farmers are adequate to ensure a wide range of perspectives, or how many traders to ensure enough perspectives on the commodity trade is impossible, as the full range of perspectives only emerges upon saturation during the data collection. A blueprint for this is to continue until saturation is achieved. This challenges the planning of fieldwork and other data collection efforts. One of the

¹² The application of the concept of distance in telecoupling research is still mostly applied as geographical distance but consideration of cultural, political, economic and institutional distance is equally important.

strengths of the telecoupling approach is empirical specificity in these networks since the investigations concern a place, which limits the potential actor groups involved.

There are other potential methods to analyze actor relationships that could yield further insights. A combination of quantitative and qualitative methods, for instance, combining qualitative interviews or focus group discussions to scope the actor-network, and then apply structured surveys to find patterns of relationships (see Andriamihaja et al. 2019). There is a distinction, however, between descriptive social network analysis and quantitative analysis. The former provides a good depiction of the actors involved in a network, while the latter provides robust measures to examine the strength and durability of these relationships (Seaquist & Johansson, 2019). The networks of action situations (NAS) approach (Oberlack et al. 2018, Boillat et al. 2018) could be useful for capturing cross-scale networks of actors influencing a particular landscape. Action situations refer to the social space in which actors interact and take interdependent and joint decisions that lead to specific outcomes (Ostrom 2010). As Oberlack et al. (2018) point out, “the NAS approach links the analysis of telecoupled resource systems and polycentric governance by disentangling the network of action situations in the focal region of a study, in connected distant regions, and in flow-centered governance arrangements that are connected through flows.” Combining interviews and other qualitative data collection with a NAS approach provides a useful lens for understanding the links between arenas in which land-use decisions are made and different actor networks.

Ultimately, the choice of methods depends on the analytical entry point to the study, as well as the flows of interest. Tracing and studying actors in cases of immaterial flows can be argued to call for more qualitative than quantitative methods. Furthermore, studying immaterial flows complicates the already complicated task of setting the system boundary since they might flow between more social than physical spaces. Moreover, informal behavior and institutions are often expressed in immaterial flows but are implicit and difficult to capture, which is why sensitive in-depth inventory and trust-building fieldwork might be preferable over large-scale surveys. As in all cases, transparency in methods and methodology is key for the studying of actors’ relations to immaterial flows because the researcher needs to draw theoretical boundaries (e.g. the concepts of flow, sending and receiving system, etc.) around boundary-crossing phenomena such as discourse and knowledge.

4.2 Categorization

In this report, we proposed using three types of categories to identify and analyze the actors in the case studies: scale, sector, and agency. These categories provide useful information on the actors and actor linkages in different ways. The scale category is useful in identifying decision-making spaces and types of decision-making power that different actors occupy and possess in relation to others. However, the scale is less useful for identifying actors in commodity trade studies, which tend to use value chain analysis to define actors according to their roles in the value chain. Categorizing an actor by scale is also difficult in the context of organizations that act at different scales, such as in the case of the INGO in the Lao national park governance case study that interacts with regional, national, and global actors through its different functional units. While cross-scale linkages are inherent to telecoupling, as seen in all four case studies, scale categories do not reflect the dynamism in the links between actors at different scales. The ESR study inventory showed that actors at the local scale are usually important in telecoupling studies and that the largest scale varies across studies.

Categorizing actors by sector gives immediate insight into the variety of roles that actors play in a study. From the ESR inventory, a similarity across the different types of telecoupling studies is the consideration of the local land managers, such as farmers, miners, forest-dependent communities. Private sector actors are important in all studies like the ones producing telecoupling linkages. At the same time, there seems to be a distinction between the sectors involved in commodity trade and conservation studies. Private sector actors, including lobbyists, play an especially important role in commodity trade studies, while civil society actors, such as international non-governmental organizations, researchers, and consultants, are more prominent in conservation project studies. Both types of studies pay attention to actors who directly manage the land, such as farmers, miners, and forest-dependent communities. However, these actors are difficult to identify using a simple private/public/civil society sector categorization, as some land managers are market-oriented, while others have partially or fully subsistence-based livelihoods. The case studies also show that sector categorizations do not provide a complete picture of an actor's behavior outside of their official role, especially in cases of informal flows and relationships.

The sector category could be further subdivided into e.g. market-oriented actors such as agribusiness and subsistence-oriented actors such as smallholders. However, attempts to provide broad overviews with the use of categorization and typologies often imply a compromise in terms

of capturing the reality on the ground which rarely fit directly into boxes; and in telecouplings it can be the small and context-dependent empirical variations that truly reveal the causality patterns, which is why they are so difficult to study. For example, in one system, agribusinesses and smallholders might represent these different agendas (market-orientation and subsistence-orientation respectively) in their use of natural resources. However, in another system, there can be smallholders who sell their products on the local market to get cash income and eventually enter agribusiness-actor groups. In terms of the categorization example provided here, it raises the question of which aspects should decide in which category an actor belongs. Is it the actor's agenda, capacity, formal and/or informal behavior, or the scale at which it operates? The researcher needs again to be specific and transparent about which information is desired. If the point is to discern between small/medium/and larger economies within the private sector (whether individuals or companies), then that subdivision would be useful. As goes for all decisions in research, the way an actor is identified, categorized, and analyzed should depend directly on the research objective. Finally, agency is a useful concept for analyzing actors as it highlights the power relations between actors that can give rise to telecoupling flows. Agency can explain how actors interact through informal and formal relationships that might not be detected through "official" role designations identified through scalar and sector analysis and are therefore useful in identifying leverage points in actor networks.

4.3 Analytical entry point

Actors are at the core of understanding and governing telecoupling phenomena (Liu et al. 2013; Eakin et al. 2014; 2017; Munroe et al. 2019). This report shows that actors receive considerable attention in COUPLED research, but also that the approaches used to identify and characterize actors, as well as the level of depth of analysis, varies considerably. While the majority of ESRs identify a range of actors from different sectors for their respective research, more in-depth studies of actors and their relationships are less common. This seems to be a common trend in telecoupling research. In their review study of five years of telecoupling research, Kapsar et al. (2019) point to a lack of more in-depth understandings of actors (including their agency and power-relations), while highlighting the importance of such knowledge for the governance of telecoupling phenomena (see also Zähringer et al., 2019). In addition, a review study of telecoupling visualizations reveals that information about actors and their networks receive relatively little attention in visual displays of telecouplings (Sonderegger et al., in press).

In our case studies, we zoom in on four telecoupling research projects that place an explicit emphasis on actors and actor relations. The different cases exemplify the diversity of approaches that can be used to study actors' dynamics in a telecoupling context. This applies not only to the methods used but also to more fundamental questions of which actors are included/excluded in the study and the type and level of information that is sought after. For instance, which starting point is used to identify relevant actors in telecoupling research? Are actors identified through the in-depth study of certain telecoupled systems? Or rather through tracing a specific flow? While it is difficult to make a clear distinction, the case studies show different tendencies in this regard. Three of the presented cases (i.e., Brazil's soy exports, National park governance in Laos, and the Forest and community project management in Argentina) use a socio-ecological system as an entry point to their study. It may be the receiving or sending systems of a telecoupling process, depending on the flows that are studied. The focal system presents the first set of relevant actors (e.g. actors involved in the Brazilian soy production and trade system). Furthermore, distant actors can then be identified through flows that are incoming or/and outgoing of the respective system (e.g. actors along the soy supply chain). The case of maize spillovers in the Mekong region, however, takes commodity flows (maize) as a starting point for identifying relevant telecoupled systems and the actors within. While both approaches eventually combine systemic and flow-based perspectives for the actor identification process, the starting point used may affect the range of actors that comes into play and is thus worth reflecting on.

Once potentially relevant actors are identified, researchers also need to define their scope of analysis in this regard. Which actors are to be considered in the study? What is the level of attention that they receive? Which actor characteristics are investigated in more depth? In this report, we presented two cases that investigate commodity trade telecouplings. Yet, we have shown that they consider a varied range of actors, and thereby focus on different aspects. While the study on soy trade focuses on the actors that are directly involved in the supply chain, the study on maize booms also emphasizes informal dynamics and relevant governance actors that facilitate the establishment and maintenance of the supply chain, and hence, land-use change in the supplying system. This illustrates that the telecoupling framework leaves much room in terms of the analytical foci used to identify and study actors in telecouplings, in alignment with the objectives of the research and the context in which it takes place.

5. Conclusions

This report explored *which actors create telecouplings that produce dependencies between land-use systems*. To answer this research question, we introduced and, in the context of four case studies, critically examined how actors are identified and analyzed in the research projects of the COUPLED ESRs. Telecoupling approaches provide an opportunity to understand actor dynamics beyond those contained within a place-based system that influences land-use. The results allowed us to identify common flows for which actors are involved and how they stretch across scales and occupying physically distant spaces. We found that there is a diversity of actors and actor types involved in telecoupling processes that can be understood in a variety of ways. We critically examined three dimensions of actor characterization: sector, scale, and agency, and identified potential methods that could be employed. We highlighted a pertinent challenge to capture actor relationships to immaterial flows compared to material flows, as well as capturing informal institutions and actor behaviors (such as illicit trade flows) in telecoupling processes. Here we emphasize the use of qualitative methods and utilizing agency conceptions rather than generic categories such as scale and sector.

Another important conclusion is considering the research question or analytical entry point when considering how to address actors in telecoupling research. In other words, research focuses on key, targeted elements of a bounded system, while recognising that defining system boundaries is an analytical process that necessitates trade-offs (Friis & Nielsen, 2017a). This is particularly important to avoid the ‘holistic trap’ of trying to capture everything but only doing so on a superficial level. All elements of a telecoupled system cannot be studied. A guiding research question is crucial for the integration of actor dynamics. Without a specific research focus, information on telecoupling actors is unlikely to contribute to conclusions relevant to policymaking.

Telecoupling is partly about showing the interconnectedness of causal relationships. The dynamics that create telecouplings, and the flows they are made up of, are thus often myriad and emerge from complex socio-environmental and economic interactions with important historical legacies. This means that the question can only be answered in context-specific cases where interests focus on questions of which actors have primary control over flows. Taking such a problem as an outset makes it possible to analyze how a telecoupled relationship emerges. Rather, it becomes more valuable to trace flows involved in a telecoupling to reveal actor dynamics enabling, altering, or disabling flows. This is related to the relevance of looking at the agency in

the interaction with flows rather than using the generic categories like sector and scale and list “typical” actors in such groups. Finally, in the context of analyzing actor dynamics involved in telecoupling processes, this report calls for more attention to 1. interdisciplinary research and employing multiple methods, and 2. transparency in the analytical approaches to capturing actor dynamics.

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Appendix D. Codebook (research article 1)

Name	Description	Files	References
A. Research topic		45	91
Biodiversity conservation		2	3
Deforestation		4	4
Energy transition		1	1
Finance and capital		2	2
Food consumption or food security		2	2
GHG emissions		2	3
Governance and institutions		4	5
International trade		15	18
Land acquisitions		2	3
Land use and or land use change		28	33
People and Wildlife coupling		2	2
Pest control		1	1
Species invasion and migration		3	5
Technology		1	1
Tourism		2	4

Name	Description	Files	References
Urbanization		2	2
Water transfer		1	1
B. Research objective	The research objective as described by the author in abstract and/or introduction	45	74
C. Research design		45	72
Both deductive and inductive		2	3
Deductive	Building generalizable statements from theories and extant literature	17	23
Descriptive		20	28
Inductive	Building generalizable statements from data and observations	13	16
D. Flows subject to analysis		45	148
Commodity		18	26
Discursive		2	2
Diseases		1	2
Energy		1	1

Name	Description	Files	References
Environmental and biophysical		8	11
Financial exchange and investments		12	20
Human migration		4	5
Information and knowledge		8	17
None		7	7
Pests		1	1
Policy		5	8
Social dynamics		1	1
Species dispersal or animal migration		4	7
Temporal		1	1
Tourism		3	8
Trade		19	30
E. Analytical focus	Whether the focus is on material or immaterial aspects of the study object. For example, a study might analyse a material flow (such as commodities) but focus on the immaterial aspects of this commodity flow such as local	45	61

Name	Description	Files	References
	attitudes in the receiving system or policital incentive structures in the sending system.		
Both		19	27
Immaterial		4	5
Material		20	26
Unclear		2	2
F. Type of data		45	139
Biophysical data		10	22
Consumption data		1	1
Economic and socio-economic data		5	9
Fieldwork, interviews, focus groups		9	13
Forest cover data		7	7
Historical archives or literature		10	11
Official statistics		11	17
Relational data		1	1
Spatial data		19	32

Name	Description	Files	References
Survey data		5	5
Trade data		14	21
G. Longitudinal perspective	Data is gathered for the same subjects over a period of time (can be years or decades, past or future)	45	64
No		15	16
Yes		30	42
H. Data source		45	115
Primary data source		10	14
Secondary data source		40	100
biophysical data		8	12
Geo data		9	11
Literature		13	17
maps		9	11
Official statistics		11	15
Social data		2	3
trade database		9	12

Name	Description	Files	References
I. Type of interpretation		45	101
Both qualitative and quantitative interpretation		15	39
Qualitative interpretation		4	5
Quantitative interpretation	Measurements, statistical techniques	27	56
J. Causal statements		45	223
Banana plantation expansion is influenced by economic, environmental, political and discursive interactions with distant systems		1	1
Justification and Evidence		0	0
2) observations from the field		1	6
Biophysical and socioeconomic telecouplings can explain treeline shifts and glacier recession which leads to new ecological zones		1	1
Justification and Evidence		0	0
1)descriptions in other literature		1	1
3) quantitative measurements and estimations		1	2

Name	Description	Files	References
5)maps		1	4
Change in land, productivity, carbonstock and habitat due to interactions between Brazil soy production and international demand, mainly China		1	1
Justification or Evidence		0	0
4) models		0	0
Change in Russian beef production and consumption leading to telecoupling relationship with Brazil and Russian CO2 import		1	2
Community and resident characteristics affect wildlife and vice versa		1	3
Justification or Evidence		1	1
4) models (or framework in this case)		1	1
Corporate deforestation commitments in the Amazon have led to spillover effects in the Cerrado biome		1	4
Justification or Evidence		1	4
(1) descriptions in other literature		1	1

Name	Description	Files	References
(3) quantitative measurements or estimations		1	1
(4) models		1	2
Different climate scenarios influence global land-use projections		1	2
Justification or Evidence		1	2
(4) models		1	2
Distant actor interests influences and accelerates local land competition in Madagascar		1	6
Justification or Evidence		1	5
2) observations from the field		1	3
3) models (SNA)		1	2
Environmental tradeoffs of low meat and no meat diets		1	5
3) quantitative measurements or estimations		1	1
Exchange between natural vegetation and agriculture creates a shifting mosaic in mountain regions		1	1

Name	Description	Files	References
2) quantitative measurements or estimations		1	2
5) maps		1	1
Farmland restoration policy influences quality and quantity of farmland		1	15
Justification or Evidence		1	15
(1) descriptions in other literature		1	3
(3) quantitative measurements or estimations		1	12
Financial giants influence climate stability through financing channels targeting particular ecosystems		1	5
Justification or Evidence		1	4
(2) observations from the field		1	3
(3) quantitative measurements or estimations		1	1
GHG emissions change in Sovjet Union linked to agricultural production, land-use change, trade, and consumption		1	34
Evidence & justification		1	31

Name	Description	Files	References
(1) descriptions in other literature		1	5
(2) observations from the field		1	2
(3) quantitative measurements or estimations		1	20
(4) models		1	4
Greater value of soybean exports is associated with greater deforestation in exporting countries		1	2
Justification or Evidence		1	2
(3) quantitative measurements or estimations		1	2
How change in soybean trade is driven by macroeconomics, soybean productivity, other crop productivity, pasture and forestry changes, and policy.		1	4
Justification or evidence		1	3
3) quantitative measurements or estimations		1	1
4) models		1	2

Name	Description	Files	References
How past human-environment interactions has negatively affected current ecosystem services		1	4
Justification or Evidence		1	3
4) models		1	3
How US demand for Chinese furniture is positively correlated Chinese wood imports from Congo basin and thus tree cover loss		1	7
Evidence or justification		1	4
1) descriptions in other literature		1	1
3) quantitative measurements and estimations		1	1
4) models		1	1
5) maps or imagery		1	1
Human land use causes changes in bird distribution and migration		1	8
Justification and Evidence		1	5
1) descriptions in other literature		1	2
x) little evidence		1	3

Name	Description	Files	References
Human pressure, domestic institutions, climate change impacts, and telecoupled land demand by international trade is driving global land use change		1	14
Justification or Evidence		1	13
(1) descriptions in other literature		1	11
(3) quantitative measurements or estimations		1	2
Increase in forest cover due to agricultural land abandonment		1	2
Justification or evidence		1	1
4)models		1	1
Increase in rubber plantations due to trade, prices, and increased seedling availability		1	2
Justification and Evidence		1	1
1) descriptions in other literature		1	1
Industry ownership and geographical patterns can explain clustered wine certification uptake in Chile and Australia		1	2
2) observations from the field		1	2

Name	Description	Files	References
3) quantitative measurements and estimations		1	1
5) spatial data		1	1
International food trade's effect on agricultural land-use changes		1	6
Justification or Evidence		1	4
3) Quantitative measurements or estimations		1	2
5) Spatial analysis		1	1
International trade's effect on biodiversity conservation		1	2
Justification or Evidence		1	2
1) descriptions in other literature		1	2
Land use decisions as result of global food trade and policy		1	1
Justification or evidence		1	1
4) models		1	1
Land-use impacts caused by socio-economic activities		1	3

Name	Description	Files	References
Justification or evidence		1	2
3) quantitative measurements and estimations		1	2
Link between panda loans, tourism and environmental effects		1	1
Link between trade interactions, supply chain structure, GM preferences and adoption of environmental certification schemes		1	8
Justification or Evidence		1	4
1) descriptions in other literature		1	1
4)models		1	3
Location of feedbacks, bottlenecks and potential cascades within the social-ecological system of terrestrial moisture recycling		1	13
Justification or Evidence		1	12
1) descriptions in other literature		1	6
4) models		1	6
Locusts and locust control affect livestock grazing through various mechanisms		1	3

Name	Description	Files	References
(competition, nutritional preferences, pesticide use, nutrient cycling)			
1) literature		1	1
n.a. (causality not in focus)		2	2
Palm oil production increases due to renewable energy policies in the US and EU		1	12
Justification and Evidence		1	5
1) descriptions in other literature		1	3
3) quantitative measurements and estimations		1	1
5) spatial analysis		1	1
Poor countries' export to wealthier countries often lead to the poorer countries stressing their lands		1	5
Justification or Evidence		1	3
3) quantitative measurements or estimations		1	1
4) models		1	1
5) maps		1	1

Name	Description	Files	References
Production of non-GM soybeans upgrades supply chains and create new conservation opportunities		1	6
Evidencedence and Justification		1	4
1) descriptions in other literature		1	1
4) models		1	3
Regimes in Bolivia and Brazil contribute to the intensity of a mega-drought in Colombia		1	1
1) literature		1	2
Rice fields and rice markets co-evolve		1	3
2) observations from the field		1	1
SAFR-SAM telecoupling causing soy expansion in SAFR		1	3
Justification or Evidence		1	2
3) quantitative measurements and estimations		1	2
Sino-Brazilian soybean trade's effect on Brazilian production systems and risk of extreme climate		1	7

Name	Description	Files	References
Justification or Evidence		1	6
2) observations from the field		1	1
3) quantitative estimations or measurements		1	5
Soybean and cattle production as coupled driver systems		1	3
Justification or Evidence		1	3
1) descriptions in other literature		1	1
4) models		1	2
Telecouplings of commodities, information and finance driving land use change		1	6
Justification or evidence		1	5
2) observations from the field		1	2
5) remote sensing		1	3
The influence of PAs and cash crop price boom on local well-being		1	2
2) observations from the field		1	1

Name	Description	Files	References
The telecoupling between Chinese soybean demand and Brazil's production changes land use in both countries		1	1
Justification and evidence		0	0
1) descriptions in other literature		1	5
3) quantitative measurements or estimations		1	1
Transnational investment increases inequality in affected communities		1	3
Justification or Evidence		1	1
(1) descriptions in other literature		1	1
UK climate change mitigation policies impact national and transnational food security		1	2
4) models		1	2
Urbanization facilitates species invasion		1	5
Justification and Evidence		1	3
1) descriptions in other literature		1	2
3) quantitative measurements and or estimations		1	1

Name	Description	Files	References
K. Source of justification for causal relationships		43	290
Conceptual construction of coupled systems		5	10
Field methods		9	45
Field inventory and measurements		2	3
Field observations		1	1
Focus group interviews		4	4
Historical interviews		1	1
Household questionnaire		2	2
Individual interviews		7	9
Participant observation		2	2
Participatory methods		1	3
Snowballing approach		4	4
Literature and existing evidence		22	60
Maps and satellite imagery		10	26
Models		14	47

Name	Description	Files	References
Agent-based model		1	1
Causal loop diagram		1	1
Climate model		1	1
GeoApp		1	2
Global Livestock Environmental Assessment Model GLEAM		1	1
GTAP-BIO model		1	1
IO model		1	1
Land use model		2	4
Linear regression model		1	1
Logistic regression model		1	1
Multiple models integration		2	3
Multivariate logistic model		2	2
Multivariate model		1	1
Panel regression		1	1
Partial equilibrium model		1	1
Presence-only modelling		1	1

Name	Description	Files	References
Simulation model		1	2
Stochastic actor-oriented model		1	1
SVM classification		1	1
Quantitative measurements or estimations		16	100
Decomposition analysis		2	3
Descriptive statistics		1	1
Footprint and other impact calculations		4	4
Landscape structure quantification		1	2
Matrix algebra		2	4
Quantitative network analysis		1	1
Statistical comparison		10	21
Time series		3	3
Social Network Analysis		1	2
L. Comments on telecoupling strengths & weaknesses		33	195
Direct use		19	143
Captures immaterial interactions		1	4

Name	Description	Files	References
Challenges existing conceptual notions		3	4
Gives a holistic and integrative perspective		7	26
Illuminates unknown, unexpected, or underlying interactions		8	15
Maps distant connections		15	45
Maps multiple actor relationships	Provides a means to associate land use change (LUC) with a broad variety and multitude of actors at different scales and distant systems.	3	5
Maps multiple systems interactions		14	35
Provides methodological flexibility		5	8
Indirect or limited use		14	27
M. Telecoupling approach		45	79
Heuristic	Focuses on networks, actors and processes with a more open analytical entry point, telecoupling as analytical lense rather than framework	17	25
Not Applicable	e.g. in case TC is understood as a phenomenon it will be not	16	18

Name	Description	Files	References
	applicable (e.g. only reference to TC once)		
Structured	Presents a type of ‘checklist’ of components to include in an exhaustive analysis that encourages, though does not require, the analysis to begin from the flow of interest	14	26
N. Level of telecoupling engagement	Discerning between papers that integrate telecoupling as part of the analysis, with active engagement with the telecoupling elements: actors, processes, systems, flows, effects, or causes, and papers that only mentions telecoupling a few times or solely as a “globalization” phenomena and context of the study object,	45	125
Explicit analytical engagement		21	81
Empirical application		13	17
Operationalized through existing concepts and tools		8	31
Narrative		24	44v

Appendix E. Literature sample and key characteristics (research article 1)

Paper ID/ type of analysis	Causal statements in focus	Flows presented	Temporal dimension	Types of tools applied to justify causal statements	Type of interpretation	Level of telecoupling engagement
Alexander et al. 2017	Climate scenarios influence land-use projections	None	✓	Land use model	Quantitative	Narrative
Andriamih aja et al. 2019	Distant actor interests influence and accelerate local land competition in Madagascar	Commodities; Financial exchange and investments		Field survey; Expert interviews; Focus group interviews; Snowballing approach; Social network analysis	Qualitative	Operationaliz ed through existing concepts and tools
Bicudo da Silva et al. 2017	Sino-Brazilian soybean trade has an effect on Brazilian production systems and the risk of extreme climate	Commodities; Information and knowledge	✓	Statistical comparison; Literature and existing evidence; Snowballing approach; Individual interviews; Household questionnaire	Both qualitative and quantitative	Empirical application
Carrasco et al. 2017	International trade affects biodiversity conservation	Financial exchange and investments; Information and knowledge; Trade		Literature and existing evidence	Both qualitative and quantitative	Empirical application
Carter et al. 2014	Community and resident characteristics affect wildlife and vice versa	Commodities; Human migration; Information and knowledge; Tourism	✓	Conceptual construction of coupled systems	Both qualitative and quantitative	Narrative

Chen et al. 2019	Farmland restoration policy influences the quality and quantity of farmland	Policy; Environmental and biophysical; Financial exchange and investments	✓	Statistical comparison; Literature and existing evidence	Quantitative	Empirical application
Creutzig et al. 2019	Human pressure, domestic institutions, climate change impacts, and telecoupled land demand by international trade is driving global land use change	Trade	✓	Literature and existing evidence; Maps and satellite imagery; Statistical comparison	Quantitative	Narrative
Dou et al. 2018	Corporate deforestation commitments in the Amazon have led to spillover effects in the Cerrado biome	Commodities; Financial exchange and investments; Policy	✓	Literature and existing evidence; Panel regression; Statistical comparison; Time series	Quantitative	Empirical application
Friis and Nielsen 2017	Banana plantation expansion is influenced by economic, environmental, political and discursive interactions with distant systems	Environmental and biophysical; Financial exchange and investments; Policy; Trade		Focus group interviews; Household questionnaire; Individual interviews; Participant observation; Snowballing approach	Qualitative	Empirical application
Fuller et al. 2018	How US demand for Chinese furniture is positively correlated with Chinese wood imports from the Congo basin and thus with tree cover loss	Commodities; Trade	✓	Literature and existing evidence; Maps and satellite imagery; Linear regression model; Multivariate model; Statistical comparison	Quantitative	Narrative

Galaz et al. 2018	Financial giants influence climate stability through financing channels targeting particular ecosystems	Financial exchange and investments		Conceptual construction of coupled systems; Statistical comparison	Both qualitative and quantitative	Narrative
Garrett et al. 2013	Production of non-GMO soybeans increases competitive advantage and creates new conservation opportunities through environmental certification	Commodities; Trade	✓	Literature and existing evidence; Multivariate logistic model; Partial equilibrium model	Quantitative	Narrative
Gasparri et al. 2015	South African-South American telecoupling causes soy expansion in South Africa	Financial exchange and investments; Information and knowledge; Trade	✓	Statistical comparison	Quantitative	Empirical application
Gasparri et al. 2015b	Soybean and cattle production are coupled and self-reinforcing drivers of land-use change	Commodities; Financial exchange and investments; Trade		Conceptual construction of coupled systems; Literature and existing evidence	Both qualitative and quantitative	Empirical application
Hauer and Nielsen 2020	Rice fields and rice markets co-evolve	Commodities		Individual interviews; Participant observation	Both qualitative and quantitative	Operationalized through existing concepts and tools

Hulina 2017	Human land-use causes changes in bird distribution and migration	Diseases; Energy; Environmental and biophysical; Financial exchange and investments; Information and knowledge; Species dispersal or animal migration; Tourism	✓	Literature and existing evidence	Both qualitative and quantitative	Empirical application
Kastner et al. 2015	Land-use impacts are caused by socio-economic activities	Environmental and biophysical; Trade	✓	Statistical comparison; Time series	Quantitative	Narrative
Keys and Wang Erlandsson 2018	Terrestrial moisture recycling causes feedbacks, bottlenecks, and potential cascades	Environmental and biophysical; Social dynamics		Conceptual construction of coupled systems; Literature and existing evidence	Both qualitative and quantitative	Operationalized through existing concepts and tools
Kozak and Szwagrzyk 2016	Forest cover increases due to agricultural land abandonment	None	✓	Simulation model	Quantitative	Narrative
Laroche et al. 2020	USA diets have a different footprint and environmental impacts on, for example, freshwater ecosystems and pollinator loss	Commodity; Environmental and biophysical; Trade		Footprint and other impact calculations; Matrix algebra; Statistical comparison	Quantitative	Narrative
Le Gall et al. 2019	Locusts and locust control affect livestock grazing through competition, nutritional preferences, pesticide use, and nutrient cycling	Species dispersal or animal migration; Pests		Literature and existing evidence	Quantitative	Narrative

Leisz et al. 2016	Telecouplings of commodities, information, and finance drive land-use change	Commodities; Financial exchange and investments; Human migration; Information and knowledge; Policy		Field observations; Focus group interviews; Historical interviews; Individual interviews; Participatory methods; Maps and satellite imagery	Both qualitative and quantitative	Empirical application
Llopis et al. 2020	The influence of Protected Areas and cash crop price boom on local well-being in Madagascar	None		Focus group interviews; Individual interviews	Both qualitative and quantitative	Narrative
Marola et al. 2020	Industry ownership and geographical patterns can explain clustered wine certification uptake in Chile and Australia	Information and knowledge		Individual interviews; Snowballing approach; Maps and satellite imagery; Logistic regression model	Both qualitative and quantitative	Narrative
McCord et al. 2018	Change in land, productivity, carbon stock and habitat due to interactions between Brazil's soy production and international demand	Commodity	✓	GeoApp; Multiple models integration	Quantitative	Operationalized through existing concepts and tools
Millington et al. 2017	How land-use decisions result from global food trade and policy	Trade		Multiple models integration	Quantitative	Operationalized through existing concepts and tools

Montti et al. 2017	Urbanization facilitates species invasion	Species dispersal or animal migration	✓	Field inventory and measurements; Literature and existing evidence; Maps and satellite imagery; Agent-based model; Multivariate logistic model; Presence-only modelling; SVM classification; Descriptive statistics; Landscape structure quantification; Statistical comparison	Quantitative	Narrative
Norder et al. 2017	Human-environment interactions have negatively affected current ecosystem services	Temporal	✓	Land use model	Quantitative	Narrative
Oberlack et al. 2018	Transnational investment increases inequality in affected communities	Financial exchange and investments; Discursive; Environmental and biophysical; Human migration; Information and knowledge	✓	Literature and existing evidence	Qualitative	Operationalized through existing concepts and tools
Prell et al. 2016	Poor countries' export to wealthier countries often lead to the poorer countries stressing their lands	Trade	✓	Maps and satellite imagery; IO model; Stochastic actor-oriented model; Time series	Quantitative	Narrative

Rulli 2019	Palm oil production increases due to renewable energy policies in the US and EU	Commodities; Trade	✓	Literature and existing evidence; Maps and satellite imagery; Footprint and other impact calculations	Quantitative	Narrative
Schaffer-Smith et al. 2018	Greater value of soybean exports is associated with greater deforestation in exporting countries	Trade	✓	Literature and existing evidence; Quantitative network analysis	Quantitative	Empirical application
Schierhorn et al. 2016	Change in Russian beef production and consumption leading to telecoupling relationship with Brazil and Russian CO2 import	Commodities; Trade	✓	Literature and existing evidence	Both qualitative and quantitative	Narrative
Schierhorn et al. 2019	GHG emissions change in the Soviet Union is linked to agricultural production, land-use change, trade, and consumption	Commodities; Environmental and biophysical; Trade	✓	Field inventory and measurements; Literature and existing evidence; Global Livestock Environmental Assessment Model GLEAM; Decomposition analysis; Footprint and other impact calculations; Matrix algebra	Quantitative	Narrative
Seaquist et al. 2016	n.a. (causality not in focus)	Trade		n.a.	Quantitative	Narrative

Silva et al. 2020	The exchange between natural vegetation and agriculture creates a shifting mosaic in mountain regions	None	✓	Maps and satellite imagery	Quantitative	Narrative
Sun et al. 2017	The international food trade affects agricultural land use	Commodities	✓	Maps and satellite imagery	Quantitative	Empirical application
Tonini and Liu 2017	There are links between panda loans, tourism and environmental effects	Financial exchange and investments; Species dispersal or animal migration; Tourism	✓	Conceptual construction of coupled systems; Footprint and other impact calculations	Quantitative	Empirical application
Torres et al. 2017	The telecoupling between Chinese soybean demand and Brazil's production changes land use in both countries	Commodities; Policy; Trade	✓	Literature and existing evidence	Qualitative	Empirical application
Weng et al. 2020	Regimes in Bolivia and Brazil contribute to the intensity of a mega-drought in Colombia	None		Literature and existing evidence	Both qualitative and quantitative	Narrative
Yao et al. 2018	Change in soybean trade is driven by macroeconomics, soybean productivity, other crop productivity, pasture and forestry changes, and policy	Commodities; Trade	✓	Literature and existing evidence; GTAP-BIO model; Decomposition analysis	Quantitative	Operationalized through existing concepts and tools
Yawson et al. 2020	UK climate change mitigation policies impact national and transnational food security	Trade	✓	Causal loop diagram; Climate model	Quantitative	Narrative

Young et al. 2016	Biophysical and socioeconomic telecouplings can explain treeline shifts and glacier recession which leads to new ecological zones	None	✓	Literature and existing evidence; Maps and satellite imagery	Quantitative	Narrative
Zaehringer et al. 2018	Increase in rubber plantations due to trade, prices, and increased seedling availability	None	✓	Literature and existing evidence	Both qualitative and quantitative	Narrative
Zimmerer et al. 2018	n.a. (causality not in focus)	Human migration; Commodity	✓	n.n.	Both qualitative and quantitative	Operationalized through existing concepts and tools

Appendix F. Interview guides (research article 2)

Interview Guide Project Director*

* The interviewee has been presented with the research agenda and signed consent letters for interview participation. The interviewee did not wish to be recorded, why only written notes were taken in this interview.

Interviewee: Project director

Language: English

Recording: Yes

(Introducing research and sharing fieldwork schedule)

1. How long have you been working in the WB and on the Forest and Community project?
2. How started the idea for the project? And when?
3. Who participated in the negotiations about the project objectives?
4. Why did the negotiating parties decide to pursue this project?
5. Does this project link to a program and/or other WB projects in Argentina?
6. What was the rationale behind selection of project sites?
7. Which institutions contribute to the financing of the project activities besides the WB?
8. Which international organizations are or have been involved in the project (directly or indirectly)?
9. What are the criteria of participation for organizations?
10. What are the criteria of participation for individual community members?
11. What is your role in the project?
12. Are you collaborating with other institutions in the project? Challenges/opportunities?
13. What do you see as the main potentials in this project?

14. What is the role of the WB? The need?
15. How is the project leadership structured?
16. Who makes decisions on project activities and implementation?
17. The role of PFM?
18. Role of participating communities?
19. How are project impacts assessed? By whom?
- 19b. Is there monitoring of management and decision-making? How?
20. What is, according to your opinion, the ideal future for the forests being targeted by this project?
22. How was the forest managed before the project?
23. How does the project link to the forest law and LUZ?
24. What was the role of the World Bank in the negotiations of the Forest Law and LUZ?
25. Are there any differences in priorities between the Forest Law, LUZ and the Forest and Community Project? Which?

Guía de entrevista para el personal del proyecto*

*All interviewees have been presented with the research agenda and signed consent letters for interview participation and recording

Entrevistado (s):

Idioma:

Grabación (S / N):

Descripción del trabajo

¿Cuánto tiempo lleva trabajando en este proyecto?

¿Con qué otros proyectos similares has estado trabajando?

¿Cuáles son tus tareas actuales?

¿Estás satisfecho con estas tareas? (Explique por qué)

¿Con qué instituciones está colaborando en el proyecto? (directa e indirectamente, local e internacional)

¿Está satisfecho con esta colaboración? (Explicar por qué)

Idea del proyecto

¿Cuál es la necesidad de este proyecto?

¿Cómo afecta este proyecto a la vida de los participantes del proyecto?

¿Cómo afecta este proyecto a los recursos forestales?

¿Este proyecto afecta a otras personas que las oficialmente participan en el proyecto? Si es así, ¿cómo?

¿Se espera que este proyecto conduzca a una mayor comercialización de productos forestales? Si es así, ¿cómo?

¿Se espera que este proyecto conduzca a una mayor conservación de los recursos forestales? Si es así, ¿cómo?

¿Se incluye a la gente local en el diseño de las actividades del proyecto? Si es así, ¿cómo?

Historia del proyecto

¿Cuánto tiempo ha habido proyectos similares de bosques y desarrollo en el área?

¿Qué resultados han logrado los proyectos anteriores?

Estado del proyecto

¿Cuáles son los principales desafíos para el proyecto hoy?

¿Por qué han ocurrido estos desafíos?

¿Los participantes del proyecto están informados sobre el desarrollo del proyecto?

¿Cuál es el camino a seguir?

¿Cómo afectará esto a los medios de vida de los participantes del proyecto?

¿Cómo afectará esto a la conservación de los recursos forestales?

Data:

Locación de participantes?

Numero de participantes?

The World Bank and the Ministry of Environment and Sustainable Development*

*All interviewees have been presented with the research agenda and signed consent letters for interview participation and recording

Introduction:

- COUPLED and telecoupling
- Reason for interest in the Forest and Community project

Introducción

1. ¿Cuántos años has trabajado con el proyecto Bosque y Comunidad?
2. ¿Cómo empezó la idea para el proyecto? Y cuando?
3. ¿Quiénes estuvieron en las negociaciones sobre los objetivos del proyecto?
4. ¿Por qué crees que decidieron continuar el proyecto?
5. ¿El proyecto es parte de un programa más grande o está conectado a otros proyectos in Argentina?

6. ¿Cuál fue la razón fundamental sobre la selección de los sitios del proyecto?

Actores

7. ¿Qué instituciones financian el proyecto?

8. ¿Qué organizaciones internacionales están o han estado en el proyecto?

9. ¿Cuáles son los criterios de participación para las organizaciones?

10. ¿Cuáles son los criterios de participación para los miembros individuales de la comunidad?

Agenda personal y mandato

11. ¿Cuál es tu papel en el proyecto?

12. ¿Estás colaborando con otras instituciones? Desafíos? Beneficios?

13. ¿Qué ves como el principal potencial de este proyecto?

14. ¿Por qué crees que el proyecto necesita el Banco Mundial?

Participación y gestión

15. ¿Cómo es la estructura administrativa del proyecto?

16. ¿Quién toma las decisiones sobre las actividades del proyecto?

17. ¿El papel de la gestión forestal participativa?

18. ¿Papel de las comunidades?

19. ¿Quién supervisa y documenta la gestión? ¿Y cómo?

El bosque

20. ¿Cuál es tu meta futura para el bosque? Desafíos? Oportunidades?

21. ¿Cómo se manejó el bosque antes del proyecto?

22. ¿Cómo están afectando el proyecto las políticas y leyes en Argentina?

23. ¿Cómo se monitorean y documentan los impactos del proyecto?

Entrevista individual* (IPLCs)

*All interviewees have been presented with the research agenda and signed consent letters for interview participation and recording

Introducción para los participantes:

- Explicar brevemente de que se trata el proyecto y el propósito de la recolección de información:
Se trata de un proyecto de Doctorado acerca de cómo los proyectos para el desarrollo (socio-económico) abordan las necesidades locales y la problemática (desafíos) de la conservación. Las respuestas que se obtengan serán analizadas para un mejor entendimiento de la opinión de los participantes del proyecto. Los resultados serán compartidos con las distintas OGs y ONGs involucradas en proyectos de desarrollo socio-económico similares al de Bosque y Comunidad. El objetivo principal es el de elaborar recomendaciones sobre cómo acercar más los proyectos a la población beneficiaria (población objetivo).
- Comentarles que no hay apuro en que respondan, que se tomen el tiempo que sea necesario. Aclararles que si hay algo que no desean o no saben responder que no hay ningún problema en absoluto y que en ese caso simplemente se pasa a la siguiente pregunta (declaración).
- Solicitar permiso para grabar las entrevistas bajo la promesa que los nombres personales no serán publicados, se mantendrán en el anonimato.

1. Información básica del encuestado/a

1.1 Encuesta N°		1.6 Idioma	
1.2 Fecha		1.7 Grabación	
1.3 Entrevistador		1.8 Nombre/s del/los entrevistado/s	
1.4 Traductor		1.9 Edad	

1.5a Comunidad (Aborígenes)		1.10 Nivel educativo (primaria, secundaria, terciario)	
1.5b Puesto (Criollos)			

2. Cargo o función del encuestado/a en la comunidad

<input type="checkbox"/> Cacique (Aborígen)	<input type="checkbox"/> Presidente (Criollo)	<input type="checkbox"/> Tesorero (Asociación)	<input type="checkbox"/> Agente de la policía (averiguar término correcto para Aborígenes)	<input type="checkbox"/> Protector del bosque (guardaparque) (averiguar término correcto para Aborígenes)	<input type="checkbox"/>
<input type="checkbox"/> Funcionario del gobierno	<input type="checkbox"/>	<input type="checkbox"/> Secretario	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Vocal / Vocero (Asociación)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> órgano de fiscalización	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> otro

3. Información de la Unidad Familiar (UF)

3.1 N° de personas (miembros) en la UF		3.4 N° de hombres / mujeres	
3.2 N° de hombres / mujeres participando en el proyecto		3.5 Etnia de la UF	
3.3 N° de miembros participantes con algún cargo o función en la comunidad / puesto		3.6 Cargo o función del miembro participante de la UF	

4. Uso del bosque

4.1 ¿Qué significa el bosque / monte para usted?

4.2 ¿Quiénes hacen uso del bosque?

4.3 ¿Que actividades realizan?

4.4 Cual considera que es la mayor amenaza para la conservación del bosque?

4.5 ¿Quién controla las actividades en el monte?

4.6 ¿Cómo?

4.7 ¿Conoce sobre la Ley de Bosques u ordenamiento territorial?

4.8 Si la respuesta es si: ¿qué zona es el bosque que usted usa?

4.8a Si la respuesta es si: ¿Cual actividades se puede realizar en las zonas?

4.8b Si la respuesta es sí: ¿De dónde obtiene la información?

5. Productos recolectados por la UF para consumo familiar y / o para venta durante el año pasado

	Leña	Madera	Hierbas medicinales	Frutos o especies	Pescado	Caza	Miel	Otro
De que Lugar obtiene el producto								
Frecuencia (año, mes, semana)								
Cuanto demora cada vez.								

Unidad (pieza, Kg, etc)								
Que cantidad es para consumo familiar %								
Que cantidad es para venta %								
Ingresos (del año pasado)								

*(1=llanura;2=restos de cosecha;3=bosque / monte;4=costados de la ruta)

5.1 Nota algún cambio en el use del bosque en los últimos 10 años? (cantidad/calidad)

5.2 Cual/cómo?

5.3 por que cree que ocurrieron estos cambios en el uso del monte?

6. ¿La comunidad/grupo ha recibido algún tipo de apoyo (ej.: subsidios, asesoramiento o capacitación en los siguientes temas durante los últimos 10 años?

Tipo	Año/s	De dónde? (Institución)	Relacionado con el PIC	¿Qué y cómo?
Agricultura				
Ganado				
Manejo Sustentable y Conservación del bosque				

Estrategias de mercado o productos del monte / bosque				
Negocios no relacionados con el monte				
Otro				

6.1 Considera que estos proyectos fueron beneficiosos para usted?

6.2 En que manera?

7. Proyecto de Bosques y Comunidades

7.1 ¿Conoce el proyecto Bosque nativo y comunidad?

7.1ª ¿Si no, conoce el PIC?

7.1b Si no, conoce a actividades sobre manejo sostenible del monte?

7.1c En caso afirmativo, cual actividades hace con ayuda del proyecto?

7.2 ¿Cuál es el propósito del Proyecto?

7.3 ¿Quiénes pueden participar?

7.4 ¿Sabe en qué actividades puede obtener apoyo del Proyecto?

7.5 En caso afirmativo, ¿de dónde obtuvo la información?

7.6 En caso negativo, ¿dónde buscaría tal información?

7.7 Existe una Buena relación entre su comunidad y la agencia responsable del Proyecto (colocar nombre)? (pregunta cual agencias)

7.8 Participo en la toma de decisiones respecto a las actividades del Proyecto, como?

7.9 ¿Cree que el Proyecto influye su relación con el bosque / monte? En caso afirmativo, explique cómo.

7.10 ¿Cree que el Proyecto influye la conservación del bosque / monte? Explique cómo.

7.11 ¿Cuál considera que es el mayor obstáculo para realizar el proyecto?

7.12 ¿Cómo cree que este desafío puede ser resuelto?

8. Declaraciones respecto al Proyecto

	Desacuerdo	De acuerdo	Neutral/ No se	¿Por qué? Como?
El proyecto es una buena herramienta para conservar el monte				
El proyecto es una buena herramienta para un desarrollo económico de la comunidad				
El proyecto genera obstáculos impedimentos para la conservación del monte				
El proyecto fomenta la gobernanza local				
El proyecto genera puestos de trabajo para los pobladores locales				
El proyecto solo beneficia a los mas posicionados				
El proyecto mejora el acceso al mercado				
El proyecto influye la extracción local de PFNM				

El proyecto influye la extracción local de madera				
El proyecto promueve actividades que no relacionado con el bosque				
El proyecto garantiza la participación de los miembros más pobres de la comunidad				
El proyecto genera conciencia sobre la conservación del monte				
El proyecto ayuda sobre el derecho de posesión de sus tierras				
El proyecto trabaja sobre las necesidades básicas de su comunidad				

8.1 De qué manera considera que puedan continuar desarrollándose las actividades sin el proyecto?

Entrevista indiidual* (Wichi)

*All interviewees have been presented with the research agenda and signed consent letters for interview participation and recording

Hablar sobre la importancia de la opinión de ellos para que las instituciones responsables de la implementación de los proyectos sepan lo que piensan sobre los diferentes proyectos que se desarrollan

1.1 Encuesta N°		1.6 Idioma	
1.2 Fecha		1.7 Grabación	
1.3 Entrevistador		1.8 Nombre/s del/los entrevistado/s	

1.4 Traductor		1.9 Edad	
1.5a Comunidad (Aborígenes)			

Usar preguntas para entrar en confianza: acompañar en las actividades o ver la huerta o el chiquero o el monte ver los animales o de donde sacan el agua ver que tienen

1. Desde hace cuanto que vive aquí? Cuantos son en la familia? A que se dedican?
2. Cargo o función del encuestado/a en la comunidad?
3. ¿Qué significa el bosque / monte para usted?
4. ¿Quiénes hacen uso del bosque?
5. ¿Que actividades realizan? (pregunta sobre materiales de la casa / de donde los obtiene/madera/lana, etc ¿Hay alguien que controla? ¿Cómo?
6. Nota algún cambio en el use del bosque en los últimos 10 años? (cantidad/calidad)
7. Por que cree que ocurrieron estos cambios en el uso del monte?
8. Se realizo algún tipo de proyectos en su comunidad (infraestructura, capacitaciones, talleres, etc) que institución los desarrollo? En que ano? De que manera? Cree que fueron beneficios para usted? Participo? De que manera?? (preguntar específicamente por manejo de bosque)
9. Se realizo o realizan algún tipo de reuniones? Que temáticas se tratan?
10. ¿Conoce el proyecto Bosque nativo y comunidad?
11. ¿Si no, conoce el PIC?
12. De que se trata? (conservación/uso del monte/ desarrollo económico/actividades productivas, etc)
13. El proyecto trabaja sobre las necesidades básicas de su comunidad?
14. Participo de alguna manera? ¿Quiénes pueden participar? (toma de decisiones)

15. Quien le informo sobre el proyecto PIC?

16. Hay alguna institución a cargo del proyecto? Como es la relación con la agencia?

17. Que espera del proyecto? (oportunidades/desafíos)

(Si hay tiempo....)

¿Conoce sobre la Ley de Bosques u ordenamiento territorial?

Si la respuesta es si: ¿qué zona es el bosque que usted usa?

Si la respuesta es si: ¿Cual actividades se puede realizar en las zonas?

Si la respuesta es sí: ¿De dónde obtiene la información?)

Appendix G. Qualitative coding of data from fieldwork in Salta, Argentina (research article 2)

Open coding was initiated already during data collection to push for early identification of issues relevant to the specification of the research objective. Subsequently, a more focused analysis of the qualitative data was carried out in Nvivo by inductive coding of transcribed interviews. Aside from a few individuals at the higher management levels who did not agree on recording, all individual and household-level interviews were recorded and transcribed. We have conducted qualitative coding drawing on Grounded Theory (Charmaz, 2014) by naming segments of the transcribed text with labels that categorizes and summarises the data. Each label makes up a category that ends up containing several sub-categories. For example, a category that emerged through the reading was ‘project implementation’ and a child node to that category was ‘high expectations in communities’. We did not summarize a list of ‘routine comments’ to work as a coding book for systematic and in-depth analysis of individual attitudes. We assessed that the responses we got from the interviews were very explicit and because the project turned out not yet to have materialized into anything tangible in the local communities, it was premature to evaluate local attitudes and levels of satisfaction. Therefore, the codes we constructed were not interpretative but extracted by identifying the most salient themes from direct quotes in the transcribed material and then used to get an overview of project information provided by the various stakeholders. The findings from the coding also inspired the development of our diagnostic approach.

Nvivo data processing: Categories identified from transcribed interviews

Parent nodes and child nodes
Forest quality and conservation
Animals' effect on forest quality
Cultural context
Deforestation and changing government
Environmental context

Parent nodes and child nodes
Lack of rain and water
More infrastructure more deforestation
Need for conservation
Forest use
Agriculture
Changed in forest use as compared to 10 years ago
Groups of people using the forest
Illegal forest use
Regulated forest use
Use and knowledge about forest resources
National legislation and policy
Forest law effect on forest quality
How the forest law influences and teaches management
If they feel adequately informed about the forest law
If they know the forest law
No EIA

Parent nodes and child nodes
Tenure and land rights
Wichi and Creole history
Zonation
Participation and local management
Awareness about the project
Community members are not speaking up
Elite capture
Local awareness about relation between forest law and PIC
Local management structure
Local participation in project
Low education level in communities
Project activities people participate in
Quickly loose interest in agricultural initiatives
Source of information about project
Teaching people about management
Project implementation

Parent nodes and child nodes
Bureaucracy and corruption as a barrier for implementation
Control and monitoring of forest use
Creation of PICs
Difficult access to communities
High expectations in communities
Importance of trust and confidence
Lack of water as barrier of implementation
No implementation on the ground
Other projects and assistance
Relation between project agency and community
The importance of finance
Understanding of project objective
Project management
Access to information
Budget cuts
Changing government

Parent nodes and child nodes
Changing leadership
Decision about project objective
Focus on technical assistance and commercialization
Ideas about development cause failure
Institutional conflicts
Institutions officially implementing F&C
INTA
Lack of time
Local experts
Origin of project idea
Structure
User group management

Appendix H. Interview template (*research article 3*)

Guiding template for interviews with development professionals

Introduction to interview

I read through what I had access to of (*insert donor*)-policies, safeguards, and frameworks related to project design and management to get a sense of IPLC decision-making on the project that it would be useful to explore. For us to talk about conservation and development projects and IPLC participation generally, it is useful to talk about the ways in which conservation and development objectives were set in the *XXX project* and the level of IPLC participation in those decision-making processes.

First, I'd like to start with a few background questions:

Personal background and orientation

1. How long have you been working with (*insert donor*)?
2. What is your role in the *XXX project*? Have you had other roles in other projects?
3. What is your training and background expertise?
4. Which of these skills are engaged in your current role and how?
5. Could you walk me through the typical mission structure in IDB in terms of project teams?
6. What was your motivation to start working with (*insert donor*)?
7. What is your motivation to work on a project like this?

Goals and expectation frame

8. Did you have any expectations to your role and responsibility in the project?
 - a. Are your actual tasks different from the desired ones? How?
9. Did you have any expectations to the engagement of local beneficiaries in the project?
 - a. What was the intended engagement?
 - b. Why?

10. Did you have any personal aspirations for the project's conservation and development outcome before you started implementation?

- a. What were the intended outcomes?
- b. Why?
- c. Are any specific skills and/or knowledge needed by local beneficiaries to meet these goals?
- d. Are any specific skills and/or knowledge needed by (insert donor) staff to meet these goals?

Project-specific

11. How did the project come about?

- a. Who proposed it? Why?

(What kind of knowledge underpins the rationale and assumptions of the project? [local, scientific, both])

Which kind of [scientific, practical, both] evidence drove the design or the idea about the project?)

- b. What is the development need for the project?
- c. What is the environmental need for the project?

12. I know that there is frequently a need to restructure projects do to the dynamic circumstances in which they are implemented. **Has this project's objective changed since project approval?**

13. **Could you walk me through the composition of the project's task/mission team?** (roles and responsibilities, contracts, physical locations, etc. – including yourself).

14. Could you help me better understand the local beneficiaries in the project?

- a. Which groups are beneficiaries in the project?
- b. What are their respective local territorial histories in the area?
- c. What are their respective livelihood activities?

- d. What is the local language? Culture, religion?
 - e. How is the local economy structured? And political/institutional structure?
15. How does the initial contract determine IPLC decision-making on project activities?
- a. When might decision-making be ‘added in’ where not in the contract?
 - b. Under what circumstances would it be ‘toned down’ or removed?
16. Did you visit the IPLC beneficiaries before starting the formulation of project activities?
(e.g. donors may never think about going to communities first to know what they want, but rather trust on key national/intentional informants to set their agenda, or scientists).
17. I know that often collaborating with grantees during their proposal development process allows grantees inexperienced with (*insert donor*) processes to complete successful applications. **Were there any such support activities that the project provided to local beneficiaries to help them provide input or activity decision-making?**
- i. If yes, how did this support influence the planning and activities?
 - ii. What challenges were faced during the process?
- b. When local decision-making did not occur, how were decisions made instead?
- i. Why were these decisions made?
18. For each of these areas where local decision-making occurred in the project:
- a. How were local beneficiary decisions received? Via what channels?
 - b. Who received information about the decisions and how was this input communicated with the project team?
 - c. Who has the final say in how to incorporate these decisions?
 - d. What sort of changes, if any, occurred to project activities and/or strategy as a result?
19. I conceptualize IPLC decision-making as ranging from 1. the opportunity to provide input, 2.

consultation with IPLCs, and 3. needs assessments or determination of priority or focus areas, to 4. Local beneficiary submissions of grant applications to implement activities they determine important, to 5. Local beneficiaries requesting specific technical assistance.

a. Where on the scale would the ideal local beneficiary decision-making fit in your opinion?

i. The design phase and contract formulation?

ii. The implementation phase?

iii. The evaluation phase?

iv. The monitoring?

b. Where on the scale does it fit in practice in the XXX project?

i. The design phase and contract formulation?

ii. The implementation phase?

iii. The evaluation phase?

iv. The monitoring?

20. For each project phase/activity:

a. Could you elaborate on *your influence* on the level of local decision-making in each project phase?

b. In cases where you do not experience any influence, who decides the level of local decision-making?

21. Which challenges for local beneficiary decision-making have you met in each phase/activity? In my experience, implementing IPLC decision-making and/or participation faces a number of challenges, ranging from time constraints to contract requirements and performance targets, to pressure to accomplish specific political goals, to limited local capacity.

a. Did you experience any of these challenges?

- b. Why do you think these challenges occur?
- c. Which of these challenges do you think that (*insert donor*) is responsible of or in control of?
- d. Which of these challenges do you think that you as (*insert role*) are in control of?
- e. How do you think these challenges affect the actual realization of the project's outcomes?

22. How do you think these challenges can be dealt with in future projects?

- a. Are there ways that you, in your role, worked with implementing partners to overcome these challenges?
- b. Could you walk me through the steps you have taken on this project to do so?
- c. What constraints did you face in doing so?

23. Are there some circumstances where local beneficiary decision-making on conservation and development project objectives is more or less appropriate?

- a. For which project goals is IPLC decision-making most important? Least important?
- b. Can you explain why?

24. What recommendations/input did you provide for local beneficiary decision-making?

- a. Please walk me through the reason for your recommendations/input.
- b. How was your input solicited? What was left out of the discussion?
- c. Was there any input you did not share? Why or why not?
- d. Did you feel compelled to express a particular preference? Why?
- e. Did you feel that your true preferences were a part of the final decisions on input?
- f. Did your input, perspective, or decisions change throughout the decision-making or formalization process from when you began? Why?

Broader perspectives

25. Accountability and priorities:

- a. Who do you report to?
- b. Does this influence the challenges you face?
- c. In your experience in this project, do project and (*insert donor*) priorities sometimes conflict? If so, what are the areas of conflict?

26. How do you experience the collaboration with implementing partners and other stakeholders in the project?

27. Do you build on efforts from- or collaborate with other projects/programs and/or development agencies? (to make sure efforts support each other and to create synergies at landscape level that can increase sustainability)

28. Where and with what do you see yourself working in 5-10 years?

Appendix I. Codebook (research article 3)

Categories generated from Nvivo-analysis of transcribed interviews and documents

Name	Description	Files	References
Collaboration among project actors		14	49
Awareness without direct interaction		4	5
Banks are easier than gvt		1	1
Different objectives among donors		3	3
Disagreement on the need to collaborate		3	16
Dislike between agencies		1	2
Financial partnerships		4	6
Gvt relationships depends on personality		4	5
Information exchange		1	1
Overlapping project activities		1	1
Stealing ideas from eachother		1	1

Name	Description	Files	References
Strong relationship with client		1	1
Working directly together on projects		2	2
Working with multiple stakeholders is time consuming		1	1
Financial mechanisms and budget		8	17
Finance and program rules		8	14
Financial instruments		1	1
World Bank is bigger		1	2
Implementing agencies		12	45
Capacity		7	19
Donor trust		1	1
Local trust		4	6
Inclusion of local beneficiaries		13	62

Name	Description	Files	References
Information from communities through the client		4	7
Local beneficiaries do not receive monitoring reports		1	1
Participation tools	Prioritized tools for including IPLCs in project management.	5	17
Peer to peer experience exchange		2	2
Project consultations as information sharing		4	5
Project execution more important than information on local needs		1	3
Project idea		12	27
Local beneficiaries		16	136
Cultural barriers		1	5
IPLC capacity		2	2
IPLC characteristics	General statements on characteristics of project beneficiaries including local communities as a whole, indigenous peoples as a group or any specific sub- groups within them.	10	44

Name	Description	Files	References
IPLCs need to be taught marketing		3	7
IPLCs need to be taught sustainability		7	15
Limited access and marginalization		6	8
Local feedback during project preparation		1	2
Local mistrust or dissatisfaction		7	20
Need water not social studies		1	1
Perception on local desires		2	4
Understanding local needs through community visits		7	24
Understanding local needs through standards		2	4
Mandate of dev professionals		17	225
Do not participate in consultations		1	2

Name	Description	Files	References
Donor and gvt predefine objective		1	2
Donor influence on participation		2	3
Donor management responsibility and control	Statements regarding the opinion on and feeling of responsibility and control of project management across the project cycle, specifically with regards to IPLC beneficiaries	16	54
Expectations		5	6
Experienced people do discretionary decision-making		1	1
Inclusion of consultants depends on personality		2	2
Local engagement depends on personalities		5	8
Local participation is an internal matter for communities and partner		1	4
Motivation		10	22
Requirements for query mechanisms		1	3

Name	Description	Files	References
Self perception		4	5
The role of country director		1	5
The role of portfolio manager		3	30
The role of Team Lead		4	15
The role of TTL		7	61
World Bank has limited means to deal with local issues		1	1
World Bank provides suggestions not recommendations		1	1
Opinions on project priorities		11	48
Balancing poverty and environmental objectives		3	4
Evaluation bias		1	4
Large scale easier but undermine local grounding		3	10

Name	Description	Files	References
Late feasibility and needs assessment		1	1
No baseline study		2	6
Participatory design		2	4
Participatory monitoring		2	4
Private sector involvement is key		1	2
Project objective depends on gvt priority		2	2
Projects should not be understood as charity		1	1
Slow implementation processes		4	4
The classic way is top-down		2	3
We need to work more closely with communities		3	3
Perceptions on project actors		12	36
Donor view on the World Bank		2	9

Name	Description	Files	References
Importance of World Bank reputation		1	1
Perception on local capacity		5	7
Perceptions on development prof		2	7
Political ties between gvt donor and implementing agencies		2	3
Supervision of implementing agency		2	2
View on the borrower		2	5
Project procedures		14	85
Budget spending and disbursement pace		3	3
Building on previous projects		1	4
Bureaucratic demands and technical complexity		3	13
Challenges with project and program funding		3	11

Name	Description	Files	References
International experts trying to solve local conflicts		1	4
New Node		0	0
Participatory methods can be identified in earlier projects		1	2
Project documentation and transparency		9	20
Projects have a standard template		1	1
Safeguards		4	7
Social studies		6	12
Target setting		6	6
WB safeguard people do not report to TTL		1	2
Standards and regulations		16	129
Contract agreements		2	5
Environmental and social guidelines		2	2

Name	Description	Files	References
From safeguards to ESF		4	6
Grievance mechanism		5	13
IDB structure		1	7
If the national gvt is weak then WB standards are used		1	2
Independent evaluation		3	4
KfW structure		4	35
Local engagement depends on standards and regulation		6	9
Local participation as a prerequisite for implementation		2	5
Mandatory local monitoring and evaluation meetings		1	2
Prior consultation requirement		7	11
USAID structure		3	21
Use of WB guidelines		1	3

Name	Description	Files	References
WB rule supersedes national law		1	1
World Bank structure		2	3
Working conditions		11	58
Consultants working conditions		4	23
Hierarchy and centralist		1	2
Outsourcing the responsibility of understanding local needs to consultants		4	4
Private sector engagement depends on personalities		1	1
Staff turnover		3	3
Task team structure		8	19
Technical team structure		1	1
Unclear accountability of consultants		2	5

Appendix J. Summary of qualitative content analysis (research article 3)

1. Predefining overarching themes and categories

Themes were developed based on the research question to guide the content analytical category formation. The predefined themes are presented in Table 1. For the themes, the right column breaks down the research question into sub-questions and associates these with the individual themes to highlight what type of information is needed. Table 1 also includes the four categories of 1. knowledge structure, 2. individual orientation, 3. motivation, and 4. capacity that is meant to label the coded content in terms of the type of information it represents. These categories are based on the mental model components presented in the conceptual framework.

2. Working through the material

The transcriptions were worked through line by line. In the first round of coding, text segments that fit the themes in Table 1 are identified and a category is constructed. The text segments are labeled with a term or a short sentence that characterizes the content and is as near to the formulation in the text as possible. This process is reductive as all material that does not fit the themes is left out unless a theme surfaces that have direct relevance to the research question but was not identified in the preparation of the analysis. When text segments fit the same theme, it is checked whether they fall under the same category, in which case it is subsumed. If not, a new category is created.

3. Revision of category system

After working through roughly half of the data material no new categories were identified and the category system was revised and checked for overlaps, clarity, and level of abstraction (i.e. if the number of categories is more than 30 or less than 10 it might need to be changed, but this was not the case as the final number of categories was 21), and relevance for the research questions and conceptual framework. Minor changes were made in the category system in terms of merging and subsuming categories and the whole text material was therefore worked through again with the use of the updated category system.

4. Final coding

After a few pilot loops, all material is worked through with the updated category system.

5. Summarizing

The categories are cleaned and organized within major themes. This step is processed more deductively by taking a point of departure in the predefined themes in Table 1 and adjusting these to mirror the inductive category formation.

6. Analysis and interpretation

The system of categories is interpreted qualitatively through the conceptual framework and quantitatively in Nvivo by exploring the frequency of words and categories and the links between them. The final node hierarchy is assigned with labels directly mirroring the conceptual pillars of the analytical framework (see Appendix F).