

## The multifaceted spectra of power – A participatory network analysis on power structures in diverse dryland regions

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### ABSTRACT

With intensifying climate change impacts on dryland regions, it is essential to better understand how actors relate to each other to sustainably manage natural resources. The literature on environmental governance networks has studied actor collaborations, but it is only starting to investigate networks that sustain conflictive situations. Moreover, while actors traditionally defined as powerful have received important scholarly attention, those who do not hold formal authority or key financial resources have not, as well as their sources of power. In this paper we analyse Net-Map data to better understand the sources of power of actor groups that traditionally are not perceived as influential, hence they are neglected in actor networks. We use social network analysis and a typology of power to understand these actors' links in the networks, aiming to decipher what might explain why the traditionally neglected actors are perceived as particularly influential. We apply these methods to local sites in three case countries, all located in dryland regions. Net-Map workshops with diverse groups of participants were held with a focus on agricultural production systems. The results reveal that a broad variety of actors that traditionally have been, and still are, neglected in decision making domains, are perceived as particularly influential in their regions, pointing to the various modes in which power is understood and exercised. The competing interests over natural resources shed light on the role that conflictive tensions played in power relations. Through this work a broader understanding of power asymmetries in actor networks is gained.

### 1. Introduction

With intensifying climate change impacts in dryland regions, it is essential to better understand how actors relate to each other in networks as a key to understand and support governance of the region. This is a particularly challenging task in settings that sustain conflictive situations as these are often viewed as impeding collaboration. Dryland regions are particularly prone to conflict over natural resources and pressures inherent to them, including droughts and water scarcity exacerbated by climate change (Sietz et al., 2011; Castro et al., 2018a,b). Natural resource governance is characterised by complexity, including a broad variety of actors embedded in networks in which conflicts of

interest and diverse power constellations are unavoidable (Mancilla Garcia & Bodin, 2018b). This implies that all actor networks, from formal organizations with management responsibilities to informal networks, are embedded in power asymmetries. Such networks may reinforce or challenge existing power dynamics, typically favouring the interests and goals of already powerful actors and excluding less powerful and vulnerable groups from decision-making (Boelens, 2014; Morrison et al., 2019; Vallet et al., 2020).

Social network analysis (SNA) is being proven to be an adequate tool to better comprehend how power relations play out in actor networks (Bodin et al., 2020; Henry & Volland, 2014; Mancilla García & Bodin, 2019). However, studying social networks in environmental governance

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and natural resource management is a rather recent phenomena in sustainability research (Bodin et al., 2020), and the use of SNA to study if and how collaborative efforts can lead to desirable environmental outcomes is an emerging field (Bodin et al., 2020; Henry & Vollan, 2014; Newig et al., 2017; Sayles et al., 2019). So far, SNA research has tended to focus on governance outcomes associated with the most powerful actors, from the private sector to government entities, with a lesser focus on non-state actors (Betsill & Corell 2008; Nasiritousi et al., 2014). However, when looking into the power endowment of a more diverse group of actors it is necessary to understand how a diversity of actor groups has the capacity to influence governance outcomes and collaborations (Molinengo 2022; Nasiritousi 2016). There is a gap in research on traditionally neglected and marginalised actor groups, such as civil society actors, Indigenous movements representatives and other community level stakeholders, and their role in network constellations and how they exercise power (Mancilla-Garcia & Bodin, 2018a; Scar-amuzzino, 2020; Chowdhury, 2021). Arguably, these actor groups are neglected and marginalised from decision-making negatively impacting their capacities to influence governance outcomes (Boelens, 2014; Comberti et al., 2019; Yashar, 2005). In this paper we focus on these traditionally neglected actors and what might explain their high levels of influence. Power is herein understood as the capacity to influence governance outcomes that benefits' one's agenda, interests or goals (Fischer & Sciarini, 2015) and the often-uneven capacity of different actors to influence the goals and processes of governance outcomes (Morrison et al., 2019). We understand influence as a proxy of power, and aim to better comprehend what might explain the sources of power of actors that traditionally are neglected in decision making, hence seen as less powerful (Mancilla Garcia & Bodin 2018a; Fischer & Sciarini, 2015). Understanding different actors' ways of exercising power help untangle some of their sources of power, focusing on network constellations where they are perceived as particularly influential (Hanaček & Rodríguez-Labajos, 2018).

A majority of network research reflects positive bias through focusing on collaborative relations and cooperation, neglecting the study of conflictive tensions in network settings (Bodin et al., 2020; Shumate & Cooper, 2021). Whilst conflict might be inherent to natural resource governance, and particularly so in dryland ecosystems, conflict entails more than its negative connotations. Previous literature calls attention to the collaborative structures produced as counter reactions to conflictual tensions, highlighting that conflict must also be studied through its mobilising capacities reinforcing cooperation and as a capacity to counter dominant perspectives, challenging predominant power structures (Castro & Nielsen, 2001). As a result, collaboration and conflict often occur in tandem through different actors' interests and conflict thereof. The necessity of collaborations and long-term relations that some actors are embedded in have therefore been pinpointed as key in natural resource management (Bodin et al., 2020). We argue that power asymmetries are inherent to broad actor network constellations that by default are embedded in complex economic, social and environmental processes, with the potential to increase tensions and potential conflicts (Hanaček & Rodríguez-Labajos, 2018). We take into consideration that in instances when conflict is unavoidable, it is imperative to also explore windows of opportunity for actors embedded in these tense relations. Windows of opportunity are herein understood as spaces or phases during which different actors in a network have an increased possibility to negotiate with other actors or stakeholders for change through e.g., building new collaborations or relations (Pakizer et al., 2023). For traditionally neglected actors, organizing and creating collaborative efforts to achieve a common goal such as contesting existing structures through conflict, might be a desirable strategy to move forward. Indeed, the capacity to withstand or trigger conflicts, as well as mobilizing capacities through gathering other actors to counter dominant perspectives, might hold explanatory keys on why marginalised and neglected actor groups are perceived as particularly influential by others, something that we aim to investigate in this paper.

Specifically, this paper aims to address the following research questions (RQ):

**RQ 1:** Are there any actors traditionally neglected in decision making (e.g. civil society actors and local stakeholders), that are perceived as particularly influential in the system under focus? If so, what factors might explain this?

**RQ 2:** Do these actors play specific roles in conflicts that might explain their perceived high level of influence?

We explore this in three countries: Brazil, Senegal and Spain. The countries were selected to account for different income levels (low, middle and high) and through them all having dryland regions in common. In each country, we selected one region of focus and three local study areas with agricultural systems challenged by water scarcity and unequal access to water, disfavoured certain actors and putting them into conflict. We worked at the regional level on the one hand, highlighting the dryland characteristics of the regions, and at the local level on the other, giving us a total of nine local study sites (three per case country). In section 3 (Case description and contextualisation) we give a fuller description of the cases and contextualization. The rest of the paper is structured as follows: First, we put relevant literature from the social sciences on multi-actor perspectives into dialogue with literature on power asymmetries in collaborative governance structures; next we describe the particularities of the empirical context, followed by descriptions of the data collection and analytical methods. Finally, we present the findings and discuss their implications for understanding the diverse power sources in multi-actor networks.

## 2. Analytical framework

### 2.1. Theorizations of power

Theorisations on power are manifold ranging from the ability of powerful actors to set the agenda in ways that benefit their own interests (Molinengo, 2022; Avelino & Rotmans, 2009) to the ability of minority and marginalised actors of civil society to mobilise and achieve collective goals (Avelino, 2017; Claeys & Delgado Pugley, 2017; Fritz & Meinherz, 2020). Some scholars consider power as embedded in resources, e.g. financial assets (Sémit, 2019; Schroeder, 2010), others insist on the role of resistance and domination (Scott 1989), or interactions between groups of people and the knowledge created through them (Benford & Snow, 2000). Others have considered state actors as the default dominant group due to their normative and legislative power, as they have the authority to represent the public, setting up legislative frameworks for others to follow (Morrison et al., 2017; Shumate & Cooper, 2021). Another well-established measure of power commonly used in political science, and that has recently been applied to the study of environmental governance systems through network analysis, is reputational power, i.e., an actor's capacity to influence others based on their reputation (Mancilla Garcia & Bodin, 2018b; Fischer & Sciarini, 2015; Fischer et al., 2009). This is the approach we take in the current paper because it allows us to investigate how actors perceive the power of other actors by focusing on their perceived levels of influence in a given system.

### 2.2. Actor groups in multi-actor networks

Collaborative governance systems imply that a broad variety of actors are embedded in a common network constellation, ranging from government organisations to private and non-state actors (Purdy, 2012). Distinguishing between different actor groups is therefore essential when analysing relations of power within and across sectors and institutions of which actor networks are composed (Avelino & Wittmayer, 2016; 2019). According to Avelino & Wittmayer (2016) societal changes are by definition based on a broad set of efforts from multiple actors. The diverse sets of actors are understood through institutional logics, separating actors in different sectors, namely the public sector; the private

sector; the third sector and the community level (Avelino & Wittmayer, 2016). These actor categories are in turn distinguished through being (1) formal – informal, (2) for profit – non-profit and (3) public – private (Ibid.). The Third sector is a particularly complex actor group through being composed by networks of formal and informal structures as well as for-profit and non-profit organisations, showcasing the broadness of this sector's institutional logics and power disparities within it. Meanwhile, groups of actors that traditionally have been neglected and perceived as powerless in actor networks are also included in the third sector, such as environmental and civil society organisations and social movements. The different organisational structures inherent in the third sector, as defined by Avelino and Wittmayer (2016) operate in different ways simultaneously, e.g., farmer cooperatives that actively defend the farmers interests versus companies registered as cooperatives that follow the logic of the market. We investigate the role of traditionally neglected actors within the third sector whilst recognizing that it also includes powerful structures, e.g., large market-oriented cooperatives and influential religious networks (Avelino & Wittmayer, 2016 pp. 639). In distinguishing between traditionally neglected actors within the third sector and the powerful structures embedded therein, we steer away from over- or underestimating the relative power of civil society by just taking it as one, and instead adding more detail into what that category contains (Avelino & Wittmayer, 2016: 2019) Fig. 1.

Lastly, the community level sector as defined is described as informal, non-profit and private. We take the definition of Avelino & Wittmayer's community level sector and refer to this actor group as community level stakeholders (CLS). Amongst these actors we have identified local communities, community networks and agricultural practitioners at the individual level that have an interest in, or are at stake of being affected by, a development project within their community and/or by mismanagement of natural resources (McGrath & Witty, 2017; Eskerod & Huemann, 2013). The actors identified within the definition of the community level sector are different from the third sector because they have different organizational structures. The third sector includes non-profit organisations, associations and unions, that

present a high degree of formality. Instead, the community level sector encompasses a broad set of community level stakeholders that constitute networks amongst specific individuals and that are informally organized. We focus on this community level sector and part of the third sector as traditionally neglected actors, since they are both relevant for our cases. For example, some cooperatives are one of the actor groups neglected from our cases, which is why focusing only on the community level sector wouldn't suffice to account for the complexity of power dynamics among those traditionally neglected in our cases.

### 2.3. Sources of power of traditionally neglected actors

Nasiritoussi et al. (2014) identify five sources of power as relevant for non-state actors, namely: *symbolic*, *cognitive*, *social*, *leverage* and *material* power (see Fig. 2). *Symbolic* power refers to actors' legitimacy or ability to invoke moral claims; *cognitive* power is associated with providing information and expertise; *social* power refers to actors' access to networks and mobilisation capacities whereas *leverage* power refers to actors' access to key agents in decision-making processes. Lastly, *material* power refers to financial resources or having a position in the global, national or local economy (Nasiritoussi et al., 2014:113). These sources of power give non-state actors different advantages on the political arena making them perceived as more or less influential (Nasiritoussi et al., 2014). We extend Nasiritoussi et al.'s (2014) framework to include additional parameters that might explain the high levels of influence of traditionally marginalised non-state actors, namely: *recognition*, *resistance*, *representation* and *opposing conflict*. Fig. 3. Fig. 4.

*Recognition* entails being recognised as having the ability to shape what is perceived as "normal" by other actors, thus influencing the agenda and outcomes thereof (Kavalski, 2013). Sustainability transformations literature has pointed to vision building – the ability to provide a common vision that attracts a diversity of supporters and creating new social imaginaries – as a key skill for successful natural resources stewardship (Westley et al., 2013), entailing that what is perceived or shaped as normal emerges in a context of interaction with

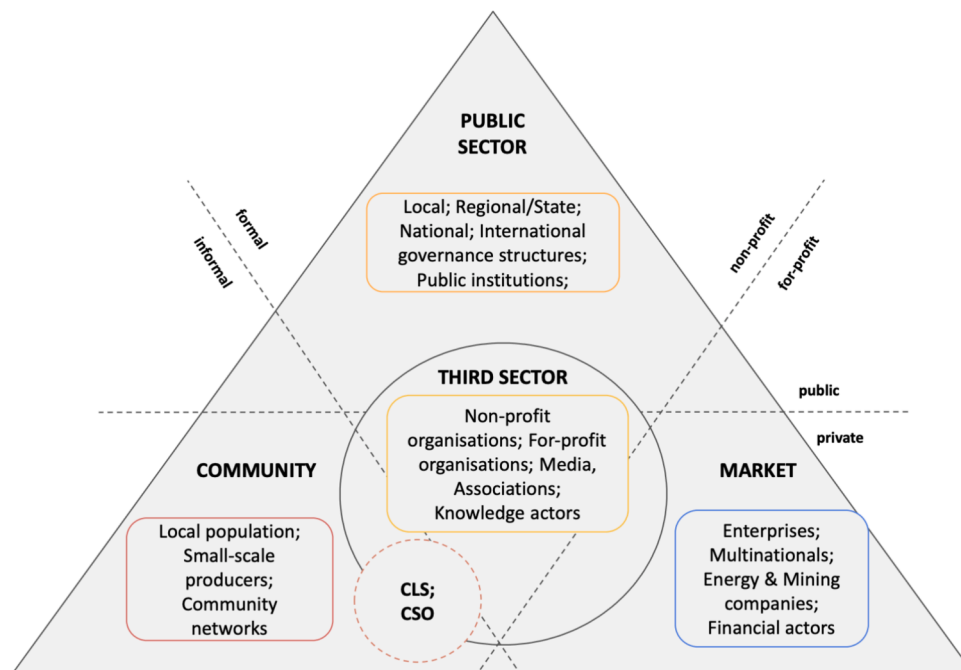


Fig. 1. Our adaptation of Avelino & Wittmayer (2016) multi-actor perspective (MAP) of sectors and institutional logics, including our identified sub-categories of actor groups, on which we have based our understanding of traditionally neglected actors. We refer to these actors as Community level stakeholders (CLS) and Civil society organizations and social movements (CSO). The CLS are composed by local populations and stakeholders, small-scale and family agricultural producers and informal community networks whereas the CSO are composed of organized civil society movements and social movements, e.g., Indigenous and environmental movements.










| Sources of power of non-state actors (Nasiritousi et al. 2014)                    |   |
|---|---|
|  | <i>Symbolic power</i> - Legitimacy and/or ability to invoke moral claims  |
|  | <i>Cognitive power</i> - Knowledge and expertise  |
|  | <i>Social power</i> - Access to networks  |
|  | <i>Leverage power</i> - Access to key agents and decision-making processes  |
|  | <i>Material power</i> Access to resources and position in the logical/regional/national economy   |
| Traditionally excluded actors sources of power additional typologies              |   |
|  | <b>Recognition as power</b> - Being recognised as having the ability to shape what is perceived as “normal” by other actors, challenging the dominant perspectives (Kavalski 2013)  |
|  | <b>Resistance as power</b> - Counter-reaction from subordinate actors directed towards, or in opposition to, the dominant actor(s) modes of exercising power (Barbalet, 1985; Heller 1996; Lilja et al. 2017)                                       |
|  | <b>Representation as power</b> - Raising awareness; resetting the agenda in favour of non-dominant perspectives (Nasiritousi et al. 2014; Chowdhury 2021); defending and self-representing marginalised perspectives (Yashar 2005; Chowdhury 2021). |
|  | <b>Opposing conflict as power</b> - Opposing dominant perspectives through conflict to challenge current agenda that fits the subordinate group (Vallet et al. 2020; Barbalet 1985)   |

Fig. 2. Table of Nasiritousi et al. (2014) typologies of non-state actors' sources of power and the additional typologies of power particularly relevant for traditionally neglected actors.

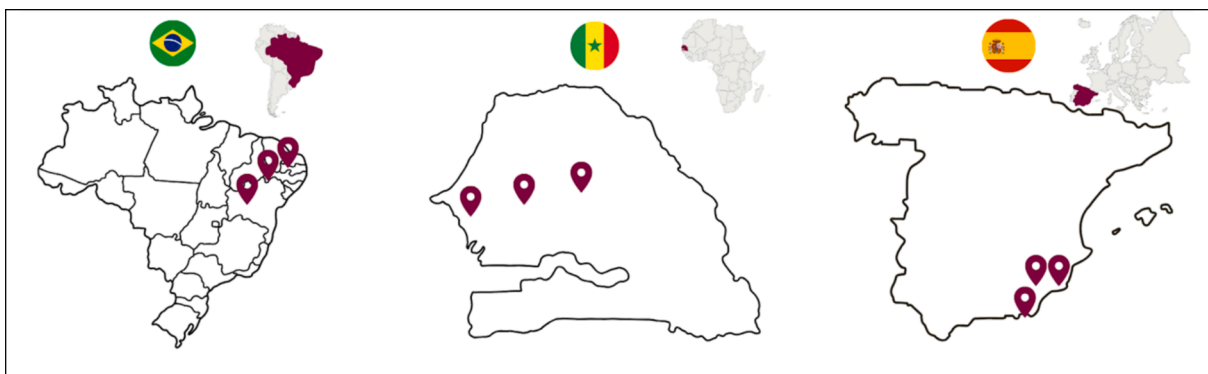


Fig. 3. Maps showing the local case study sited of each case country.

others. We hypothesise that such interactions are more recurrent between actors that share similar goals and agendas, particularly so when their visions and goals significantly differ from the dominant perspectives. Such interactions have the possibility to empower non-dominant perspectives, highlighting recognition's capacity to influence and challenge the current narrative.

*Resistance* is understood as a form of reaction from subordinate actors directed towards, or in opposition to, the dominant actor(s) modes of exercising power (Barbalet, 1985; Heller, 1996). The act of resistance implies an infliction on existing power dynamics, between the resisting side and the already powerful (Scott, 1989). The aim of resistance is to limit current power structures in order to influence the outcome of power relations that benefits the already dominant, implying a counter-hegemonic resistance to power (Barbalet, 1985; Scott, 1989; Lilja et al., 2017). Acts of resistance and protest from traditionally neglected actors can draw on different sources of power and serve as the means to change social processes and structures and build new alternatives (Moore et al., 2014; Brown, 2015). We hypothesise that this might lead to these actors being perceived as particularly powerful by others. Furthermore, resistance can be expanded to also include notions of *representation*.

Representation is herein understood as the ability to bring to the fore marginalised voices through raising awareness and attempting to reset the agenda in favour of the non-dominant perspectives (Nasiritousi et al., 2014; Chowdhury, 2021). Representing marginalised voices is thus a form of opposition to the dominant perspectives, closely linked to defending and self-representing marginalised perspectives and interests (Yashar, 2005; Chowdhury, 2021) and as an act of empowering marginalised groups (Mancilla Garcia & Bodin, 2019).

Lastly, resistance from a non-dominant actor implies a reaction from the already powerful. Depending on how the already dominant copes with resistance, conflictual tensions have the consequential possibility to arise. However, resistance in itself does not necessarily call for conflict, rather it contributes to a different outcome of existing power relations (Barbalet, 1985). We define *opposing conflict* as explicit or implicit conflictual tensions between dominant and alternative perspectives and highlight its potential to generate alternative modes of exercising power amongst traditionally neglected actors, which might explain certain perceptions on influence. Arguably, opposing dominant perspectives with the potential of conflictive tensions may be understood as a power move in the aim of setting an agenda that fits the

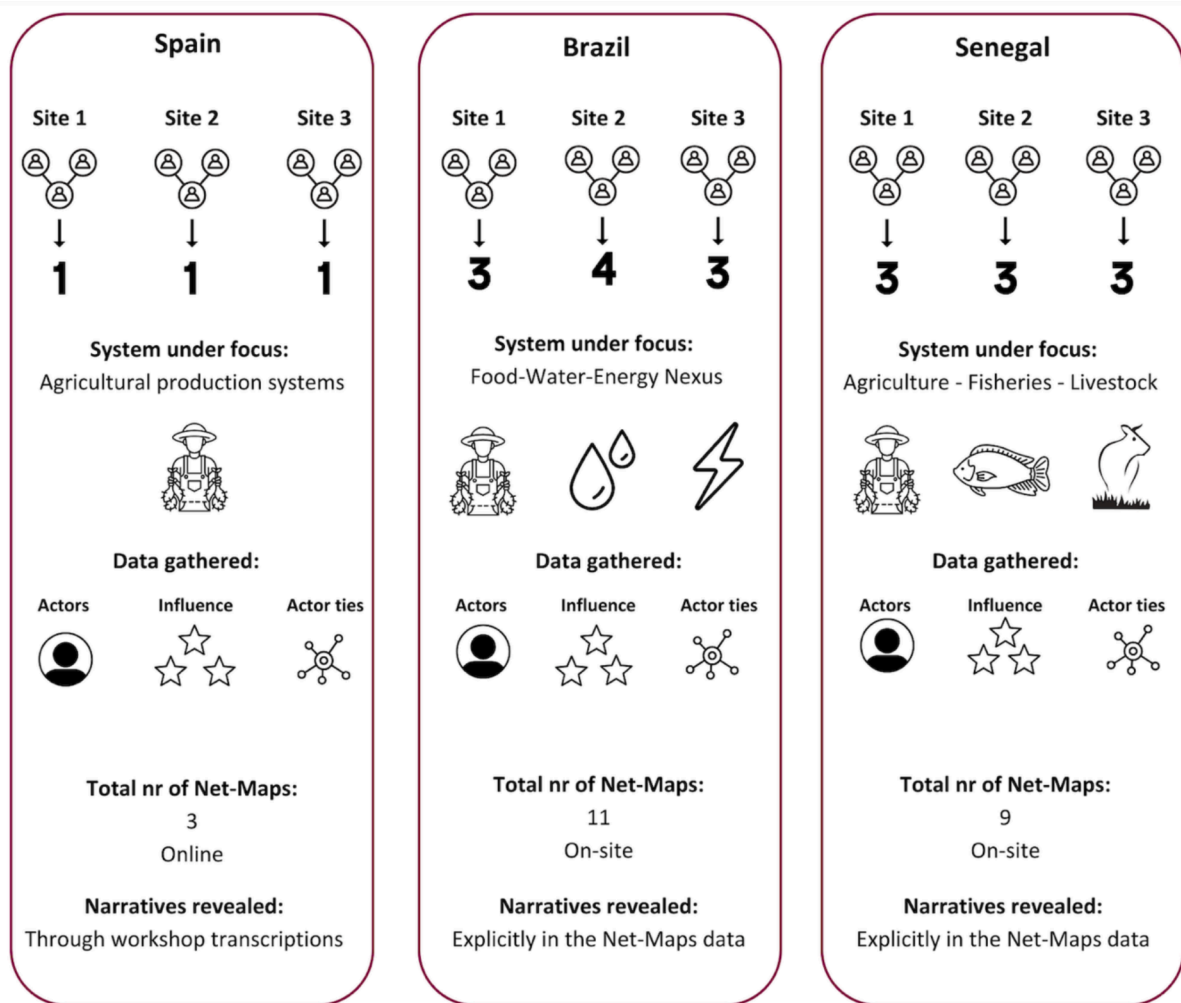


Fig. 4. Comparative table showing the data collected in each of the case countries.

subordinate group.

### 3. Case description and contextualisation

The case study sites of this study are all located in the dryland regions of countries spanning different income levels as well as institutional and historical contexts: Brazil, Senegal and Spain. The local sites in each country were selected on the basis that they include a diversity of dryland agricultural production systems challenged by water scarcity (particularly in Spain and Senegal) and unequal access to water, and with the presence of different actors and conflicts among them. We selected three sites (one per country) at the regional level in each country to understand the role that a diversity of sustainability challenges has on the constitution and maintenance of actor networks. From the regional level we zoomed in further to the local level, equivalent to municipal level, giving us a total of nine local cases study sites of focus for this study.

Brazil is selected as an example of a medium-income country. The Brazilian semi-arid region covers over 1 million km<sup>2</sup> encompassing the entire Caatinga biome and parts of the Cerrado biome, both characterised by high temperatures and low quantities of rainfall (Cerdas Vega & Teixeira Pitta, 2017). Our focus is on three areas within the São Francisco River Basin, the largest intermittent river in Brazil's semi-arid region, spanning both biomes. Land use change due to competing uses of land is excessive in our study sites, where extractivist activities are the main drivers of land use change and socio-environmental conflicts,

including agricultural expansion and rapid wind energy development (Arcoverde et al., 2023; de Paula Sousa Júnior et al., 2022; Grecchi et al., 2014; Turkovska et al., 2021). Brazil's economy is increasingly dependent on agricultural produce for export, and agriculture is particularly developed in our local study sites which face multiple challenges around water management, including water scarcity and contamination of groundwater due to the production of commodities and excessive use of pesticides (Francelino et al., 2023; da Silva Borges et al., 2021).

Senegal is selected as an example of a low-income country, and is located in the sub-Saharan African region that is beset by political and security crises. In this context, Senegal seems to be an exception due to its political stability and democratic strength which are enabling the political authorities' commitment to achieve the sustainable development goals (SDGs) (du Sénégal, 2018). The selected local sites have been chosen due to the contrast in their respective socio-ecological sub-systems with various different activities including agricultural production, fishing and livestock farming. Currently these activities are being undermined by gradual salinisation of the groundwater, scarcity of fish resources and the gradual establishment of agribusiness and extractive industries. Additionally, the selected local sites face issues of land related conflicts caused by large scale agroindustry and mining projects as well as water scarcity due to competing interests (EJAtlas, 2023).

Spain is selected as an example of a high-income country where arid and semiarid ecosystems located in the South-East face increased land use transformation, intensive use of natural resources, climate change impacts and rising socio-economic inequalities (Quintas-Soriano et al.,

2016; Castro et al., 2018; 2019). It is also the driest region in continental Europe (Castro et al., 2018). The region is characterised by a strong agricultural development, with a great area within the region popularly known as Europe's "Huerta", Spanish for "vegetable and fruit garden" with predominant greenhouse horticulture and extensive irrigated agriculture (Castro et al., 2019; Sánchez-Picón et al., 2011). The regions' exports of fresh vegetable products account for almost 80 % of their production (Jiménez-Aceituno et al., in prep). The rapid development of this region has resulted in significant social and economic benefits, while also bringing negative impacts on biodiversity and natural resources as well as creating social challenges such as the generation of inequalities towards marginalised groups like migrant workers (Castro et al., 2018; 2019; Jiménez-Aceituno et al., in prep).

#### 4. Methodological approach and data collection

##### 4.1. Net-Map: A tool for qualitative analysis

Net-Map is a newly developed qualitative network mapping tool, which can be used both for groups or individual mapping, aiming at revealing networks of actors and their perceived influence. We used it in participatory group workshops to map the networks argued as relevant for the governance of the agricultural production systems in the selected cases. The workshops produced qualitative network data that through the participants' narratives reveal individual and collective perceptions of actor networks, including what actors are embedded in the networks, their perceived levels of influence and their connections to each other (Schiffer & Hauch, 2012; Schröter et al., 2018). In using collaboratively gathered data we emphasise the sensitivity of our respective cases and analysis to context, and how context is located in the socio-historical landscapes in which our data have been gathered (Vromen, 2010).

The mapping method of Net-Maps "integrates the collection of social network data with an independent assessment of actor influence (...) and the collection of qualitative network narratives" (Schiffer & Hauch, 2012, p. 231). This is particularly valuable when collecting data on complex networks composed by a broad variety of actors. The data reveals several networks that represent the participants' assessment of how actors in the network interact with each other, showing us the manifold ways in which power is understood and exercised. In addition, using Net-Map as a tool to collect empirical data allows us to go beyond the quantitative approach of SNA and rather opt for participatory co-production of knowledge by focusing on the participants' perceptions of actors' influence and goals (Schiffer & Hauck, 2010). This is especially valuable when aiming to broaden the perspective to how power can be studied in network settings. We focus on what parameters might explain *why* traditionally neglected and marginalised actor groups are perceived as highly influential in our material.

##### 4.2. Data collection

Our empirical material is composed of 22 Net-Maps (which is what we call the networks generated through Net-Map), conducted in three local sites in the respective case countries Brazil, Senegal and Spain. The Net-Map workshops were conducted on site in two of our case countries (Brazil, Senegal) and virtually in one (Spain) between 2021 and 2022. The data collected for this paper is part of a larger project called XPaths, short for "Science in Action – Intersecting Pathways to the SDGs across Scales in the Drylands". The project focuses on understanding the implementation of the SDGs at the regional and local levels in the three countries. The sample in our Net-Map workshops consisted of practitioners and knowledge users at local scales from different sectors, providing us a broad set of perspectives in regards to actors and their levels of influence in the networks.

In our Spain case, one Net-Map workshop was conducted per local site and the discussions surrounded the agricultural production system. In Brazil and Senegal, we conducted more than one Net-Map per local

site with groups of participants from different sectors separately. For the Brazilian case, the agricultural expansion in the São Francisco River basin has a history of competing uses of water, affecting food and energy production. Therefore, a nexus approach including food, water and energy production, was used to understand the network of actors involved in each site. In the Senegal case, the selected local sites were chosen due to the stark contrast of their respective social-ecological sub-systems and the predominant activities thereof, leading the Net-Map discussions to focus on different production systems. For the latter two case countries, the Net-Maps included in this paper underwent a selection process. For the Brazil case, we neglected Net-Maps that did not provide explicit descriptions of relations and collaborations between actors, leading us to include a total of 10 Net-Maps for the analysis. For the Senegal case we based the selection of Net-Maps on systems related to agriculture and food production, including a total of nine Net-Maps. Additionally, the Net-Maps included in the analysis from Brazil and Senegal represent different participant groups, providing a more diverse perception of the actor constellations and power structures embedded in the networks.

During each Net-Map workshop, participants were asked to visualise relevant actors in the systems discussed. Participants selected for the Net-Map workshops represented a variety of sectors, e.g., academia, governmental institutions, agricultural practitioners and civil society actors, to provide a broad range of perspectives in regards to the systems of focus during the discussions. The following comparable information was gathered in the Net-Map workshops: 1) identifying relevant actors embedded in the system(s); 2) their ties to each other (both collaborative and conflictive), and 3) their degrees of perceived influence, ranging from very low to very high levels of influence. The information revealing how actors relate to each other, e.g., whether they collaborate to achieve a shared goal or whether they have negative or conflictive ties to each other, were revealed through participants narratives in the transcribed workshop data. For this paper, we focus on the interplay of conflict and collaboration and how conflict is described by participants in the workshop data.

##### 4.3. Data analysis

Although the Net-Maps show a variety of actors, our analysis focuses on actor groups that traditionally are perceived as less influential in collaborative governance and decision-making that nevertheless are perceived as particularly influential in our data. Specifically, we aim to understand these actors' sources of power and whether adopting active roles in a conflict can be interpreted as a source of power. During the Net-Map workshops, participants mapped the different actor types and their degrees of influence according to their own perceptions, as well as ties between actors. We use participants' assessments of actors' influence to identify the most influential actors, using influential capacity as a proxy for reputational power (Fischer & Sciarini, 2015).

The actors identified within our definition of traditionally neglected actors that were considered highly influential by participants were depicted in network representations made in the UCINET software (Borgatti, Everett, & Freeman, 2002). We analyse the ties and connections of these actors as depicted in the UCINET networks in tandem with the explicit explanations of actor relations as provided by participants during the Net-Map workshops. A deductive approach was applied to detect patterns in the description of actors' relations and collaborations, e.g., in some cases actors' ties to each other were described by participants as "conflictual" or "negative". Through investigating the social relations embedded in the networks of actors we aim to decipher what factors might explain why traditionally neglected actors are perceived as highly influential and whether they also were embedded in conflictive tensions (Freeman, 2011). Throughout this process, we relied on Nasiritousi et al. (2014)'s typology of five power sources complemented with four additional types of power (*recognition, resistance, representation and opposing conflict power* (Fig. 2), and used it to understand actors'

relations in the networks.

In the Spanish case study, we relied on complementary workshop transcriptions describing the ties and connections between actors when those were not explicitly represented in the Net-Map data. For reasons of time these were not explicitly drawn during the drawing of the network in the workshop, but were detailed in the recorded discussions during the workshop. These sources allowed us to overcome the lack of explanation of actor's ties in the Net-Maps representations and to better comprehend participants' different perceptions of actors' influence. For Brazil and Senegal, the types of relations and ties between actors were explicitly described by participants in the analysed data.

The selected cases, although sharing similar characteristics and sustainability challenges due to their location in dryland regions, have very divergent contextual particularities, not only between case countries but also within. Due to these contextual disparities, cross case analysis is particularly difficult to tackle. Our analysis aims at bringing to the fore the richness of situated networks through an innovative participative and collaborative method. By drawing on multiple networks that share similarities and have disparities amongst them, we get a rich picture of complex governance situations as well as formal and informal links between different actors and actor groups with a particular focus on traditionally neglected actors and their sources of power.

## 5. Results and analysis

We observed that actors perceived as highly influential, according to workshop participants, represent a variety of sectors. Amongst these we identified the public and private sector as highly influential, which confirms previous literature on these sectors containing the most influential actors in collaborative governance settings. Our results show that actors theoretically perceived as less powerful, such as certain social movements and community level stakeholders, are in our case perceived as influential by other actors in their networks, steering our focus to showcasing these actor groups' high levels of influence. Yet, the presence and level of influence of traditionally neglected actors varied across cases. We present our results per case country.

### 5.1. Case study – Brazil

In our Brazil case, and following our RQ 1, we identified civil society organisations and social movements (CSO) as highly influential in some of our participants' assessments across local sites. This was also true for community level stakeholders (CLS), e.g. traditional communities that historically have been, and still are, marginalised in the political domains as well as in society (Yashar, 2005).

What was evidenced in our Brazil case is that not all Net-Map participants were in agreement in relation to these actor groups' perceived levels of influence. On the contrary, we saw great disparities depending on the participants represented in the Net-Map workshops. In Brazil, we separated participants in groups in accordance with their sectoral affiliations – participants representing e.g., social movements were in workshops together whereas participants representing e.g., governmental institutions were together. In order to create a safe space for participants, in which they could safely and freely discuss actor collaborations and potential conflicts, this turned out to be the most feasible structure for our workshops. Our local sites in Brazil are embedded in conflictual tensions across sectors and actor groups, and in the aim to avoid more conflict and tensions our research groups decided to opt for this workshop structure. In separating participants in accordance with their sectoral affiliations, our data showed us that representatives from academia, the private sector and governance institutions perceived traditionally neglected actors as the least influential, whereas representatives from social movements and civil society perceived both CSO actors and CLS as having high or very high levels of influence. This shows that in the Brazilian case, workshop participants perceived actors sharing similar characteristics to their own as more influential.

The highly influential CSO actors in our Brazil Net-Maps tend to collaborate, i.e. work with others similar to themselves. We believe that these collaborations are based on 1) knowledge exchange; 2) gathering supporters for a similar cause or goal; 3) as a mode of empowering the agenda and 4) as a resistance strategy. Additionally, we saw that these actors often showed relations of collaboration with CLS, the second actor category within our definition of traditionally neglected actors. These collaborations are, according to workshop participants narratives, to a large extent based on CSO actors defending the local populations interests in relation to socio-environmental conflicts with extractivist industries – a predominant stirrer of conflict in our case study sites in Brazil.

The second actor group within our definition of traditionally neglected actors is the CLS. This actor group includes Indigenous and traditional community representatives and networks, local inhabitants and informal community networks. The perceptions of these actors' influential capacity is contested in our Brazil case, ranging from very high to very low depending on the Net-Map session, i.e., on the sectoral affiliation of the group of participants. Also, in relation to these actors, mainly representatives from the CSO cluster, including individual CLS representatives, perceived this actor group as particularly influential. These actors display strong collaborative ties with CSO.

In relation to our second RQ, we identified conflictive ties exclusively in Net-Maps conducted with CSO and CLS representatives, i.e., what we consider traditionally neglected actors. Conflictive ties or tensions were explicitly described through participants narratives in the analysed data. These were identified explicitly in our Brazil case, and were often connected to large scale extractivist industries and large associations related to those industries that act as a lobbying actor. Amongst these industries we identified large scale actors within the agricultural sector and renewable energy companies (see Appendix A for all UCINet network representations).

### 5.2. Case study – Senegal

In our Senegal case, the analysed Net-Maps were all conducted with agricultural practitioners, e.g., farmers and gardeners, who are stakeholders in the systems discussed. We identified NGOs as highly influential, however these were presented in broader terms encompassing financially resourceful national and international NGOs. We have not included these actors for further analysis due to them not following our definition of traditionally neglected actors. Rather, the NGOs referred to here are instead interpreted as being influential non-state actors, deferring from our focus of analysis (Nasitourisi et al., 2014).

We identified CLS, including farmers and breeders, as highly influential in parts of the Senegal data, which stands in contrast to our other two cases where we rarely identified agricultural practitioners as highly influential. Additionally, we identified highly influential community networks ranging from groups for the advancement of women to community borehole associations. These networks are of rather informal structures, following our definition of traditionally neglected actors.

We identified traditionally neglected actors as highly influential across local sites, although not in relation to all different production systems discussed. In relation to access to water, no traditionally neglected actors were identified as highly influential in two of the sites. In the third site, we identified community networks as highly influential together with agricultural practitioners. These actors did not display any collaborative ties with each other, which stands in contrast to our other two local Senegal sites, where traditionally neglected actors to a high extent collaborate with each other. Rather, in this case, they collaborated with influential actors from the public sector. What is also interesting is that conflictive ties are identified between traditionally neglected actors, which stands in contrast to our Brazil case where these actor groups collaborate to high extents.

In relation to agricultural production systems, we identified traditionally neglected actors as highly influential across local sites. These

included practitioners and community networks such as community producer organisations. We identified many collaborative ties between these actors, a tie we interpret as being based on them sharing similar goals. Additionally, in Net-Maps where only one traditionally neglected actor was identified as highly influential, we saw network centrality, i. e., that the actor is central in the network through having many collaborations or links across the networks (Mancilla Garcia & Bodin, 2018b), as an explanatory factor to why they were perceived as particularly influential.

### 5.3. Case study – Spain

For our Spain Net-Map workshops, we conducted one workshop per local site (three in total) in a virtual format. The participants ranged from representatives of social movements, to agricultural practitioners and academics.

In the Spanish case we identified grassroot environmental and civil society organisations as actors within the CSO-cluster falling within our definition of traditionally neglected actors, as well as farmers and agricultural practitioners within the CLS-cluster. Although actors within our definition of traditionally neglected actors were identified in all local sites, they were considered as influential in only one. In this site, we identified civil society and grassroot environmental organisations as highly influential. We did not identify any CLS as highly influential in our Spain case. Instead, these actors were perceived as having the lowest influential capacities across our Spain data. However, this result must be taken with caution. Indeed, the category of people working in agriculture represents a very diverse group which includes land owners, their workers, small-scale farmers, etc. Moreover, in the Spanish South-East (where our case is situated) many agricultural cooperatives exist and also present a high degree of variability, from big cooperatives whose members only join to benefit from competitive prices to small ones where all-decisions are made collectively. That said, the agricultural sector and agricultural cooperatives are often conflated and perceived as a highly influential actor group, obscuring the difference between powerful and powerless agricultural actors. When considering the large agricultural cooperatives, due to their high financial assets and market logic, this type of actor is not within our definition of traditionally neglected actors.

The influential traditionally neglected actors identified in our data, i. e., grassroot environmental and civil society organisations, did display collaborations among themselves as well as with other actors, ranging from governmental institutions to research institutes and universities, agricultural practitioners and agrarian organisations. Yet, not all workshop participants were in agreement in regards to these actors' influential capacities. When aiming to detect why some workshop participants perceived them as influential and others not, their narratives revealed that these actors' high capacity to mobilise civil society for the defence of a culturally significant area facing environmental degradation, successfully drawing the attention of the media, as partially explaining their high influence when perceived as such. These accounts were noticed particularly amongst participants that did not represent any CSO. Additionally, CSO representatives during the workshops highlighted that, despite their social influence, they had limited influence on the political agenda and in decision-making actions, making them perceive actors as themselves as less influential in the networks. This stands in contrast to our Brazil case, where representatives from CSO's often perceived other actors similar to themselves as highly influential, whereas in our Spain case representatives from this cluster rarely saw themselves and others like them as highly influential.

## 6. Discussion

In this paper, we have taken a qualitative approach to social network analysis, relying on collaboratively produced data gathered through the Net-Maps method. Through bridging three case studies, we aimed to

better comprehend the underlying factors that could explain the perceived high influence of actors that traditionally are not considered the most influential in collaborative governance. By bridging the literature on power in collaborative governance and multi-actor networks, we are able to explore factors that help explain the sources of power of these traditionally neglected actors.

Our first research question aimed to explore whether there were any actors that usually are neglected in decision making, e.g., civil society actors or local stakeholders, that were perceived as particularly influential, and what could potentially explain their high influence. In our Brazil case, we identified various different CSO and CLS as particularly influential actor groups in our data across local sites. Amongst these actors we identified social movements and grassroots organizations as well as Indigenous movements and local communities. In our Senegal case, we did not identify any actors within the CSO category as particularly influential. However, we identified various CLS as particularly influential in our Senegal data, from community borehole organizations to groups for the advancement of women as well as farmers and breeders. Only in Senegal did we identify agricultural practitioners as particularly influential, although to a varying extent and not unanimously in all Net-Maps included for analysis. In our Spain data, we identified grassroots social movements and environmental organisations within our definition of traditionally neglected actors that were perceived as highly influential.

In regards to the factors that might explain why these actors were considered as particularly influential, several conclusions can be drawn. In our Brazil case, influential CSO actors generally displayed ties to actors in the public sector, e.g. municipal administrations and state government institutions perceived as highly influential. Being connected to other highly influential actors, through e.g., collaborative ties, might foster their access to decision-making processes, what Nasiritousi et al. (2014) refer to as *leverage power*, and serves as a potential explanation to why these actors are perceived as highly influential.

In our Senegal case, we saw collaborative ties between CLS and different financial actors that fund development projects and programs. This can be explained by CLS actors being closely linked to development programmes and projects that are financed by the state or private NGO's. Through CLS actors having network ties with financial actors, we see *material power* as a measure that might explain these actors' high levels of influence. However, these ties were not recurrent in the other two cases.

Many of the CSO actors displayed collaborative ties to CLS, e.g. traditional communities and local populations, particularly so in the Brazil case. These ties may be interpreted as the more organised CSO actors defending the interests of marginalised voices against e.g., large scale industries in relation to access to land, a great stirrer of conflict in some of our local sites, showing *representation* as a source of power (Chowdhury, 2021; Nasiritousi et al., 2014). This was encountered also in one of our local sites in our Spain case, which is characterized by a culturally significant area that currently is facing environmental degradation. Influential CSO were in this site considered as influential due to their high capacities to mobilise civil society for the defence of this area and successfully drawing the attention of the media. Similarly, and in parts of our material, it was explicitly described that certain CSO provide legal advice and other support to local inhabitants suggesting *cognitive power*, i.e., providing information and expertise, as a measure of power (Avelino, 2017; Nasiritousi et al., 2014).

In agreement with previous SNA studies, actors are prone to mutual interactions, or reciprocation, creating bonding structures between them as a strategy to increase trust and commitment (Mancilla Garcia & Bodin, 2018b). In our data, we identified high evidence of collaborations between civil society and social movements actors, a collaboration that we interpret as them sharing similar goals and characteristics. This may imply that that the capacity to mobilise and organise networks is perceived as a measure of power, what we refer to as *resistance* as power (Lilja et al., 2017). We argue that the collaborative ties between

traditionally neglected actors are to a high extent based on sharing mutual goals that go against the already powerful actors' goals. Moreover, this suggests that these actors work collaboratively rather than following one leader, generating more collaborative efforts. This is a link we argue as explanatory to why these actors are perceived as highly influential.

These actors' roles as a *resistance* power and as *representing* marginalised voices is another key factor explaining their high levels of influence, showcasing *resistance* and *representation* as sources of power of these actors. This is in line with our hypothesis – firstly, that *recognition* as a source of power, i.e., being recognised as having the ability to shape what is perceived as “normal”, is more recurrent between actors that share similar goals and agendas. This, we argue, is particularly true when these actors' visions and goals significantly differ from the dominant perspectives. Secondly, we hypothesised that acts of *resistance* from traditionally neglected actors have the potential to change social processes and structures, leading to them being perceived as particularly influential.

One particularly interesting aspect revealed in our data is that not all workshop participants were in agreement in regards to these actors' influential capacities. We saw great disparities depending on the Net-Map sessions since these were organised differently in each of our cases. In our Brazil case, we saw that participants representing social movements and civil society to a high extent identify traditionally neglected actors, including themselves, as highly influential, whereas representatives from other sectors did not. Instead, other representative groups rather perceived these actors as having the lowest influential capacities. In our Spain case, civil society representatives across local did not perceive themselves or others like them as highly influential but rather as having the lowest influential capacity. This stands in contrast to our Brazil case, in which civil society representatives often perceived themselves and other actors alike them as highly influential. Senegal case we saw that the same actor groups were perceived as highly influential in certain agricultural production systems and not in others. These insights reveal that influence is interpreted differently by participants, showcasing the broad spectra on which power is understood and exercised.

Our second RQ aimed to explore whether the traditionally neglected actors were embedded in conflictive relations that could potentially explain their perceived levels of high influence. We aimed to explore whether there was a link between our definition of traditionally neglected actors and conflictive tensions in the networks, and whether these could potentially explain these actors' high levels of influence. We identified negative ties in two of our case countries – Brazil and Senegal, and these were almost exclusively amongst our definition of traditionally neglected actors. In the Spain case, we did not identify explicit conflictive ties between actors. This can partially be explained by the workshop conditions where actors from different sectors were gathered together, potentially creating an atmosphere where highlighting conflict might be perceived as discomforting for participants. Particularly so in instances where power imbalances are present. However, we are aware that conflicts do exist in our Spain case.

The Brazil case displayed the most conflictive tensions, whereas we identified a few in the Senegal case. The high number of conflictive ties identified in the Brazil case can be explained by a variety of factors. In all our local sites socio-environmental conflicts are predominant, and particularly so, land related conflicts. The main drivers of these conflicts are due to agricultural and wind energy expansion causing competition over land as well as water resources (Cerdas Vega & Teixeira Pitta, 2017; de Paula Sousa Júnior et al., 2022; Grecchi et al., 2014; Coca et al., 2023). Land speculation and land grabbing are occurring as a result of this trend, and social conflicts involving local communities are a rising phenomenon explaining the high extent to which we identified conflictive tensions in our Brazil networks (Olofsson, 2023; Turkovska et al., 2021; Traldi, 2021).

For the case of Senegal, we identified conflicts in our local site where

mining operations are present (Prause & Billon, 2021). The conflictive ties identified were between traditionally neglected actors and private actors in relation to conflicts of interest over natural resources, particularly evident are conflict over water use and land rights. Conflicts related to territoriality and right to land are encountered in our local sites, and the actors embedded in conflictive ties were mining companies, explained as causing land related conflicts and insecure land tenure rights for local communities.

We argue that the recurrent conflictive tensions encountered amongst our definition of traditionally neglected actors is in line with our aim connected to research question two – that the ability to oppose dominant perspectives through acts of resistance including *opposing conflict* as being interpreted as a measure of power. Lastly, part of our material shows that representatives of civil society and social movements were the most common representative group to express negative tensions in one of our cases (Brazil). Due to the strong collaborative ties between our traditionally neglected actors, as shown in our networks, we believe that representatives of these collaborations to a higher extent are affected, directly or indirectly, by these tensions thus potentially having a stronger incentive to expose them.

## 7. Conclusion

Our paper sought to identify the sources of power of traditionally neglected actor groups, contributing to filling a gap in existing research. We have used SNA to map the diverse types of relations and interactions between actors embedded in agricultural production systems and the food-water-energy nexus as described by participants in three case countries. The qualitative network approach applied in this paper through the use of Net-Maps have helped us understand the formal and informal structures and sources of power embedded in multi-actor networks.

Although the Net-Map workshop preconditions varied across sites as well as within case countries, and despite the contextual particularities across sites, several patterns emerged. These include, firstly, that overshadowing traditionally neglected actor groups gives a false understanding of the myriad ways in which power is understood and exercised. Understanding how these actor groups are perceived in relation to influential capacity is essential when envisioning a sustainable, inclusive and just future. The power of *recognition*, together with *resistance* are essential to better comprehend these actors' sources of power, together with their capacities as *representing marginalised perspectives*, and should be further investigated in future research. Additionally, we saw that actors within our definition of traditionally neglected actors displayed conflictive tensions with other influential actors due to competing interests, showcasing *opposing conflict* as an explanatory factor of these actors' high levels of influence. These points highlight the need for more research on actor networks in informal settings to broaden the perspective as to how power is defined and exercised, particularly so in relation to neglected actors of society.

Due to our data collection not being entirely harmonized across cases, e.g., they did not follow the exact same protocol, cross-case comparisons were particularly difficult. However, this limitation of our study highlights the flexibility of adaptation that the Net-Map tools entails – local context is essential to bring forward through applying this method. The narratives reveal in our Net-Map data, and the collaborative process of Net-Maps, gave us rich details and nuances as to how people interpret and understand conflict and influence in actor networks, a contribution that has been brought forward in this work.

This paper exemplifies the use of Net-Map on distinct countries of the world that share many characteristics due to them being located in dryland regions, whilst having highly diverse contextual particularities, socio-historical attributes, governance structures and income levels. Acknowledging that the scalar issue is relevant for establishing collaborative interventions in nested environmental governance systems, further research could examine power dimensions in collaborative

practice from a cross-case perspective.

### CRedit authorship contribution statement

**Veronica Olofsson:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Maria Mancilla Garcia:** Writing – review & editing, Conceptualization. **Antonio J. Castro:** Writing – review & editing, Data curation. **Sofía Cortés Calderón:** Writing – review & editing. **Amadou Hamath Diallo:** Writing – review & editing, Data curation. **Amanda Jiménez Aceituno:** Writing – review & editing, Data curation, Conceptualization. **María D. López-Rodríguez:** Writing – review & editing, Data curation. **Tais Sonetti Gonzalez:** Writing – review & editing, Data curation, Conceptualization. **Amanda Sousa Silvino:** Writing – review & editing, Data curation. **Ana Paula Aguiar:** Supervision, Project administration, Data curation.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix

**A.1.1.1.** UCINET network representation local site 1, Brazil. Network displays collaborations and conflictual ties of the traditionally excluded actors considered as highly influential. The network is an aggregation of all Net-Maps analyzed in local site 1.

UCINET network representation of local site 1, Brazil. This local site is greatly affected by socio-environmental conflicts and with the presence of many traditional communities. The CSO and CLS, perceived as highly influential, are represented as circles, and the triangles indicate conflictive tensions (*opposing conflict*). These tensions are believed to be due to lack of proper representation of traditional communities and perspectives in governance. However, they also display collaborative relations with governmental actors as well as different knowledge institutes and farmer associations, showcasing *leverage* and *cognitive power*.

**1.2. Ucinet network representation Location 2, Brazil. Network displays collaborations and conflictive ties of the traditionally excluded actors considered as highly influential**

**A.1.2.** UCINET network representation local site 2, Brazil. Network displays collaborations and conflictive ties of the traditionally excluded actors considered as highly influential. The network is an aggregation of all Net-Maps analyzed in local site 2.

In this network, we see only one CLS actor as highly influential (represented as a red circle), together various CSO actors (represented as yellow circles). The CLS actor displays various collaborations and ties, amongst these collaborations with local governance actors (LG\_1), knowledge institutions (KI) and private actors (PO). They also display conflictive ties, represented as upside-down triangles, with large-scale enterprises (LSE), renewable energy companies (REC) and financial institutions (FI). We interpret the conflictive ties as showcasing an example of *opposing conflict* as a source of power, following our theoretical framework. They also display collaborative ties with the influential CSO actors – collaborations that to high extent are based on these actors' sharing similar goals (*recognition as power*).

**A.1.3.** UCINET network representation local site 3, Brazil. Network displays collaborations and conflictive ties of the traditionally excluded actors considered as highly influential. The network is an aggregation of all Net-Maps analyzed in local site 2.

In this local site, we see four CLS actors as highly influential – all of them except one (CLS\_1), only display collaborative ties to each other. Yet, CLS\_1 show network centrality (i.e., the actor is central in the

network through having many ties to other actors). Amongst these ties the actors display collaboration with a financial institution (*material power*) and state governance actors (*leverage power*) as well as conflictive ties (*opposing conflict as power*) to renewable energy companies and mining companies amongst other actors.

**A.2.1.1** UCINET network representation local site 1, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Permanent access to water.

In this network we see the presence of traditionally excluded actors represented as smaller red circles. The smaller circles represent actors that are not considered as highly influential.

**A.2.1.2** UCINET network representation local site 2, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Water in agriculture.

In this network we see the presence of traditionally excluded actors represented as smaller red squares. The smaller squares represent actors that are not considered as highly influential.

**A.2.1.3** UCINET network representation local site 3, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Access to water.

In the network, we identified CLS as highly influential. This was the only local site where such actors were considered as influential in relation to access to water. The influential CLS has great network connectivity, and connections to key actors in decision making (*leverage power*). They also display collaborative ties to other CLS not considered as influential, showing that similar mind-setted actors tend to collaborate no matter influential capacities, showcasing *representation as power*, as an applicable typology for understanding these actors' high level of influence.

**A.2.2.1** UCINET network representation local site 1, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Production systems adapted to CC.

In this network we see the presence of two highly influential CLS actors. They are both rather central in the network, i.e., they display many collaborative ties with other actors in the network. Amongst these they display collaborative ties to public institutions and local governance actors (*leverage power*), to financial institutions (*material power*) and ties to each other (*recognition as power*; *representation as power*).

**A.2.2.2** UCINET network representation local site 2, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Securing land.

The network shows three CLS actors as highly influential. They display collaborative ties amongst each other (*recognition as power*; *representation as power*), but also to public institutions and local governance actors (*leverage power*) as well as conflictive ties to profit driven institutions (*opposing conflict as power*).

**A.2.2.3** UCINET network representation Location 3, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Access to land.

This network shows a total of six CLS actors, of which three display conflictual ties and three collaborative ties to different actors in the network. The negative ties are with local governance actors or public institutions, but also between two CLS actor – a tie we did not encounter in any of the other local sites in Senegal nor in the other two case countries.

**A.2.3.1** UCINET network representation local site 1, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Market gardening.

In this network we see three CLS actors as highly influential. They display various different collaborative ties, amongst these with public institution as well as with local and national governance actors (*leverage power*), financial institutions, small-scale enterprises (*material power/access*) and financial donors (*material power and social power*).

**A.2.3.2** UCINET network representation local site 2, Senegal. Network displays collaborations amongst all actors in the NetMap. System: Establishment of integrated farms.

On this network, onle CLS actor is considered as highly influential. As the network displays, this actor is very central in the network (i.e., the actor has many collaborative ties to other actors in the network), which might explain their high level of influence (*social power*).

**A.2.3.3 UCINET network representation local site 3, Senegal.** Network displays collaborations amongst all actors in the NetMap. System: Establishment of market farms.

This network shows three CLS actors as highly influential. The structure of the network is rather linear, i.e., there are few collaborative ties across actor groups. The CLS actors display collaborations with public institutions, local and departmental governance actors (*leverage power*), financial institutions (*material power*) and to one another (*recognition as power; representation as power*).

**A.3.1 UCINET network representation local site 1, Spain.** Network displays collaborations amongst all actors in the NetMap.

The network shows all actor relations in Local site 1, the only local site where we identified CSO as highly influential (represented as yellow circles). CLS, although central in the network, were not considered as highly influential, displaying that network centrality does not necessarily imply an ability to influence outcomes.

**A.3.2 UCINET network representation Location 2, Spain.** Network displays collaborations amongst all actors in the NetMap. Note that no CLS-actors were considered highly influential by Net-Map participants, and that no CSO were discussed in the workshop discussions explaining the lack of representation from this actor group.

### 3.3. Ucinet network representation Location 3, Spain. Network displays collaborations amongst all actors in the NetMap

**A.3.3 UCINET network representation Location 3, Spain.** Network displays collaborations amongst all actors in the NetMap. Note that no CLS-actors were considered highly influential by Net-Map participants, and that no CSO were discussed in the workshop discussions explaining the lack of representation from this actor group.

#### Data availability

Data will be made available on request.

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