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More than spatial coordination – How Dutch agricultural collectives foster social capital for effective governance of agri-environmental measures

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ABSTRACT

Collective approaches for agri-environmental measures are known for aiming at spatial coordination of measures to enhance ecological effectiveness. In the Netherlands, governance networks for agri-environmental measures are centered around agricultural collectives that function as intermediaries between individual farmers and governmental as well as non-governmental actors. Against the background that some agricultural collectives are bottom-up and other top-down initiated, we analyzed in how far they can build up social capital through formal and informal relations. We used the Net-Map method to collect qualitative and quantitative data for a Social Network Analysis to uncover the network characteristics that contribute to a certain level of social capital. The results revealed that the umbrella organization links the collectives to the national governmental level and to other collectives. This is especially important for top-down initiated collectives. The facilitation of internal meetings within the collectives is important for social learning. Furthermore, a formalization of the exchange between collectives and stakeholders of nature conservation could strengthen cooperation where traditionally conflicts dominate. By analyzing interaction in detail, the social reasoning to promote collective agri-environmental measures was highlighted. They enable collaboration of different stakeholders at multiple levels to the end that knowledge and resources are bundled.

1. Introduction

Agri-environmental and climate measures (AECM) offer governmental contracts for farmers to voluntarily implement more environmentally friendly farming practices as an additional component to legal requirements. In the European Union (EU), effects of AECM on promoting biodiversity and ecosystem services have been criticized as insufficient due to a lack of local targeting of measures and their spatial coordination at landscape scale (Kleijn et al., 2006; Pe'er et al., 2019). Different approaches of incentives are designed to address coordination at landscape scale (Nguyen et al., 2022). One approach can be defined as collective AECM. It is organized around farmer-based organizations which facilitate the coordination of measures. Most importantly, this approach emphasizes social reasons for cooperation at a landscape level (de Vries et al., 2019): involvement of stakeholders for allocation of resources and knowledge (Dik et al., 2021); farmers' ability as a group to participate in decision-making beyond farm-scale for creating ownership (Mills et al., 2011; Emery and Franks, 2012); and social learning, e.

g. in farmer meetings, for creating commitment of farmers for agri-environmental management (Mills et al., 2011; Dooley, 2020; Westerink et al., 2021). While similar regional initiatives to involve farmer organizations in collective AECM occur also in other countries such as Belgium or United Kingdom (e.g. Westerink et al., 2017), the Netherlands is the only EU Member State so far that introduced collective AECM as a national program in 2016. Dutch farmers no longer have direct contracts with the government, but with farmer organizations, the agricultural collectives, of which they need to be a member, if they want to apply for AECM.

The agricultural collectives in the Netherlands are legal entities who receive governmental AECM payments to coordinate implementation in their defined territories to fulfill area-specific environmental targets. They are associations in which farmers and other private individuals who own land become members if they choose to enroll land in AECM. Each of the 40 collectives in the Netherlands has a contract with the government that stipulates regional environmental priorities and target corridors. The collectives redistribute the AECM payments by

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administering private contracts with their members whereby they coordinate the contractual provisions to achieve spatial connectivity of habitats at landscape scale and fulfill the terms of the joint contract (Terwan et al., 2016). Due to the history of the Dutch collective program, the collectives are structurally different. Since the 1990s, local farmer organizations for joint landscape management evolved bottom-up to gain more autonomy in agri-environmental management decisions. The Dutch government reacted to the success of these organizations by the transition to a nationwide collective program. Many of the small former organizations merged into the newly established collectives, which were foreseen by the government as professional organizations that cover the whole area of the country (Runhaar et al., 2016; Westerink et al., 2020).

The new Dutch program is characterized by increased collaboration between farmers, governmental and non-governmental organizations. Knowledge about the specific natural environment and farmers in their region position the collectives not only as efficient entities for AECM implementation and pilots for future agricultural policies, but also as interesting project partners for stakeholders who focus on sustainability goals in the agricultural sector such as water authorities or nature conservation groups (Barghusen et al., 2021). All collectives operate in networks of different actors and organizations from local to national level, based on formal and informal relations. For example, some collectives have informal agreements with volunteers to monitor species while others contract professionals to do so. Researchers who were involved in the development process of the new program have claimed that its success depends on the quality of collaboration among all stakeholders for which social capital is needed (Nieuwenhuizen et al., 2014). Social capital is often understood as attributes and relationships that facilitate cooperation such as trust; reciprocity and exchanges; common rules, norms, and sanctions; and connectedness in networks and groups (Pretty, 2003; see also Coleman, 1988; Putnam et al., 1994; Ahn and Ostrom, 2002). Social capital facilitates collective activities because it furthers the willingness of actors to invest in social relationships as other actors signal back to them that they will reciprocate and also contribute (Pretty, 2003).¹ Nieuwenhuizen et al. (2014) elaborate on how social capital, e.g., in the form of mutual trust and commitment, was mobilized in the old bottom-up farmer organizations.

While some of the Dutch collectives fully build on a former bottom-up organization, others were only founded with the launch of the new program. In this study, we refer to them as bottom-up and top-down initiated collectives. Naturally, a clear distinction is not always realistic, e.g., many collectives build on multiple, formerly separated organizations and are therefore both bottom-up and top-down initiated. However, we find these differences relevant, because the Dutch collective program receives great attention as a role model for policy makers to implement collective AECM in other EU Member States. Thereby it is unclear, whether new collective structures in the farmer community can be successful or whether they should better build on existing structures, such as machinery rings or regional landscape foundations. Some authors studying collective action for agricultural landscape management suggest starting from existing networks, because social capital is already present (e.g. Prager, 2015; Mills et al., 2011; Boulton et al., 2013). This would lower barriers to farmers engagement with collective AECM as stated by Riley et al. (2018), e.g., the challenge of reliance to other farmers or a general lack of inter-farm communication around conservation activities. On the other side, existing networks may not be flexible enough to adapt to new tasks and roles. Strong internal relationships of a group can lead to homogenization of knowledge or an “us-against-them” attitude (Bodin and Crona, 2009; Bodin, 2017). Hence, existing

¹ This approach of social capital as a collective property that facilitates cooperation was introduced by Putnam. By contrast, Bourdieu conceptualized social capital rather as a property of the individual who can mobilize resources due to a certain social position (Bourdieu, 1986).

networks in the farmer community could also challenge collaboration with other stakeholders. Against this background, research on social capital in the Dutch context with its mixture of bottom-up and top-down initiated collectives could contribute to this debate.

Although studies have recognized that those Dutch collectives with long experience in working together may profit from grown trust in their network (de Vries et al., 2019), as well as from their members’ desire for social approval within the collective where reciprocity and commitment to “nature” developed to a norm (Barghusen et al., 2021; Westerink et al., 2021), research has yet to investigate how bottom-up initiated collectives mobilize social capital in their networks, compared to top-down initiated collectives. There are indications that both can be successful but may also face challenges in this regard. De Vries et al. (2019) analyzed that through increased collaboration, induced by the shift of former governmental responsibilities to the collectives, institutional as well as interpersonal trust is reinforced. This holds for all collectives since they operate under the same national frame design. All collectives have opportunities to invest in networking, e.g., for strategic policymaking, which is recommended for organizational professionalization (Dik et al., 2021). Westerink et al. (2020) emphasize the importance that collectives balance their investment into social capital for their internal and external relations in such a way that their identity as a farmer organization is maintained and farmer drop-out can be avoided. This suggests being a challenge especially for bottom-up initiated collectives which have a historical identity as a self-governing farmer organization and need to fulfill expectations of their members in this regard.

In this study, we adopt a network perspective on social capital to detect pathways how the collectives invest in network capability and policymaking while at the same time maintain connectedness with their members. Thereby, we aim to gain knowledge on differences between bottom-up and top-down initiated collectives and their typical challenges and strategies. More precisely, we pose the following research questions:

How are different functions of social capital (bonding, bridging, linking) mobilized in the actor networks around Dutch agricultural collectives?

- What are differences between bottom-up and top-down initiated collectives in this regard?
- To which extent do informal relations play a role, compared to formalized relations?

2. Conceptual framework

When analyzing social capital in networks it is often distinguished between different functions of social capital: *bonding* social capital occurs within a social group and is tied to strong connectedness; *bridging* social capital links different social groups; and *linking* social capital refers to vertical linkages between social groups and policy actors at higher level (Woolcock, 2001; Putnam, 2000; Granovetter, 1973). According to Szreter (2002), the dynamic balance between bonding, bridging and linking social capital facilitates democratic governance, which was confirmed for the context of the Dutch collectives (Westerink et al., 2020). Showing how and how well these functions are mobilized, is the common thread of our analysis.

For our study, we consider social capital being “produced” in formal and informal relations between the actors of the networks around the agricultural collectives. For informal relations, trust can be based on interpersonal experiences, reputational experiences shared by others, or by common norms. In many interactions in societies, formal institutions function as external sources of control supporting trust and cooperative behavior through the provision of rules and normative expectations (Spadaro et al., 2020). This implies a certain level of institutional trust; that individuals perceive institutions as competent and reliable (ibid.).

Against this background, we consider *formal* relations as those

defined in a) contracts, regarding transactions of information and services; or defined via b) authority and monitoring systems; or that occur in c) working groups and forums with a mandate for certain steering tasks; or as those defined via d) membership in an organization.

We consider *informal* relations as coalitions or interpersonal cooperation to support routine transactions, e.g. reflecting on (day-to-day) decisions or sharing information (see [Primmer, 2011](#)).

Formal and informal relations often coexist. [Primmer \(2011\)](#) points out that the coincidence of formal and informal ties can improve learning, as the challenging reframing of issues within fixed institutional boundaries can be bypassed.

In this study, we assess social capital in formal and informal relations around two Dutch collectives by employing Social Network Analysis (SNA). It offers the frame to study the level and distribution of social capital among stakeholders, using graph theory and sociograms, and it is a common approach to identify challenges and opportunities for action to overcome resource management problems ([Barnes-Mauthe et al., 2015](#); [Bodin, 2017](#); [Wasserman and Faust, 1994](#)). In the network graphs, nodes represent actors (individuals, groups, or organizations) that are connected through ties that represent their relationships ([Borgatti et al., 2018](#)). Social capital is often detected in the presence or absence of actors and ties, but also the number and strength of ties, or the position of certain actors in the network that enable them to act as a broker, e.g. ([Burt, 2002](#); [Bodin and Crona 2009](#)). In SNA, sociometric measures like centrality are calculated to describe the position of individual nodes ([Borgatti et al., 2018](#)).

For our SNA, we link network features to analyze social capital to literature by indicating the relevance for successful governance of collective AECM (see [Table 2](#) in method section). We focus on relations between organizations or groups of individuals comparing the networks around a bottom-up and a top-down initiated collective. Thereby, bonding, bridging and linking social capital can all be based on formal as well as informal ties (see also [Pichler and Wallace, 2007](#)). We assume that the two collectives differ in how social capital is mobilized in their networks based on their history, among other. Following the argument of [Prager \(2015\)](#) and other authors, we hypothesize social capital to be better developed in the network of our bottom-up initiated case. In detail, we hypothesize:

- the level of bonding social capital to be higher for the bottom-up initiated collective since it has a strong identity as a self-governing farmer organization from the time before the nationwide collective AECM started.
- the level of bridging and linking social capital to be higher for the bottom-up initiated collective since it may build on well-rehearsed internal processes and therefore has more capacities to invest in external relationships, compared to the top-down initiated collective.

Consequently, we expect the network around the bottom-up initiated collective to be larger due to additional actors, but also to be more interconnected than the network around the top-down initiated collective. However, as explained in the introduction, the program offers opportunities and challenges for networking and policymaking for both collectives.

It is important to add that our design of the SNA only partly accounts for bonding social capital since we consider members of the collective as one actor. Relations among the members can therefore not be represented in the network graph. Nevertheless, interaction among members is important for bonding social capital ([Nieuwenhuizen et al., 2014](#)) and is considered in the qualitative analysis of the interview data. In general, our interview data complements the network data, since it covers topics such as trust, conflict, and motivation, which helps to analyze the quality of relations between actors of the network.

3. Methods

3.1. Description of the Dutch agricultural collectives

The agricultural collectives in the Netherlands implement AECM according to national standards. The contracting has a so-called front-door-back-door approach. All collectives are contracted by their respective province (front-door) to reach negotiated targets for a certain amount of measures. These need to be carried out within focus areas for specific habitats that are determined by the province. According to this frame contract, the collectives contract interested members (back-door), if they have lands in the focus areas ([Terwan et al., 2016](#)). Members, as well as board members, are usually farmers and landowners. The collectives have an executive unit with employees for administration, consultation, and coordination. The employees negotiate with farmers on the choice and exact location of the measure, based on information from constant monitoring often carried out by volunteers or self-employed actors. The collectives may partly determine their own enforcement rules and they also adapt measures that were proposed on a national scale to their own circumstances. Most of the collectives' costs is financed by keeping 15%–20% of the AECM payment. From this amount, the collectives provide up to 2% to their umbrella organization, BoerenNatuur (EU H2020 Project Contracts2.0, personal communication).

3.2. Selection of analyzed cases

The two collectives we focus on were purposely selected as contrasting cases: one bottom-up and the other one top-down initiated (purposive sampling, [Bryman, 2016](#)). However, they also differ in other aspects that are listed in [Table 1](#), such as size and the landscapes

Table 1

Characteristics of the case studies ANOG and NaLi ([Barghusen et al., 2021](#); additional websites: cbs.nl, clo.nl, agrimatie.nl, provinciegroening.nl, anog.nl, natuurrjiklimburg.nl).

	ANOG	NaLi
Initiation	bottom-up	top-down
Established in	2003	2015
Province	Groningen	Limburg
Land area (km ²) of the province	2,324	2,147
Percentage of land under agricultural use	ca. 78%	ca. 60%
Landscape types in the province	coastal zone, peat area, peat colony, sea clay area	hilly area, river area, sandy area
Size of the collective: area within the province	one of three collectives in the province	covers the whole area of the province
Size of the collective: land area (ha) of collective	120,000	217,400
Size of the collective: number of members	350	1500
Size of the collective: participants in AECM in 2020	133	1313
Farm types	mainly arable farms	dairy farms, arable farms, and horticulture
Management focus	provision of habitat for farmland birds and protection of water streams	biodiversity: maintenance of landscape elements, provision of habitat for target species (farmland birds and hamster)
Number of board members	6	5
Number of employees in the office of the collective	5	5

Table 2
Analytical framework to detect social capital in the actor networks around the collectives.

	1st-level analysis: presence of ties (in network graphs)	Relevance for successful governance of Dutch collective AECM (and <i>other contexts</i>)	2nd-level analysis: strength of ties (in network graphs)	Relevance for successful governance of Dutch collective AECM (and <i>other contexts</i>)	3rd-level analysis: position of nodes (in network graphs and according to SNA metrics compared to perceived level of influence by interviewees)	Relevance for successful governance of Dutch collective AECM (and <i>other contexts</i>)
Bonding social capital	Ties between collective and farmers	Communication with individual farmers and knowledge transfer (Westerink et al., 2020; Nieuwenhuizen et al., 2014)	Is one function of social capital dominating in terms of strong ties or is it rather balanced for the collective?	The functions of social capital should be balanced (Westerink et al., 2020; Bodin and Crona 2009)	Position of the collective among the core actors, perceived influence of the collective	Feeling of farmers to be represented by the collective (Westerink et al., 2020; Nieuwenhuizen et al., 2014)
	Ties between collective and other collectives	Cooperation with other farmer collectives for knowledge exchange (Dik et al., 2021)				
Bridging social capital	Ties between collective and other regional stakeholders (who not belong to the farming sector)	Relation with province for evaluation and additional support (Dik et al., 2021); regular meetings with province and water boards (Nieuwenhuizen et al., 2014); Regional network for additional projects (Nieuwenhuizen et al., 2014); Nature and landscape organizations for knowledge transfer (Dik et al., 2021); Collectives as bridging actors between farmers and society: foster communication and joint projects (Prager 2015)			Representation and perceived influence of different actor types	<i>Representation of peripheral actors with a stake (Bodin and Crona 2009)</i>
Linking social capital	Ties between collective and (governmental) organizations at national steering level	<i>Vertical connections to representatives from formal institutions of the state (Agger and Jensen 2015)</i>			Role of indirect vertical connectedness through position of facilitators	Umbrella organization represents collectives in meetings with governmental organizations, is involved in national debate on future development (De Vries et al., 2019; Dik et al., 2021)

characteristics. We focused on those two as interesting examples to study how social capital is mobilized in bottom-up and top-down initiated collectives. The umbrella organization considered both collectives as successful in terms of professional management which is one reason why they involved them in a European research project and in pilot projects for the new CAP (EU H2020 Project Contracts2.0, personal communication).

3.3. Description of two selected cases

The collective “Agrarisch Natuurvereniging Oost-Groningen” (ANOG) evolved bottom-up and was founded in 2003. The territory of ANOG is in the province Groningen, one of the northern Dutch provinces, and is characterized by arable land in peat colonies (see Table 1). Unlike the other collectives in that province, “Collectief Midden Groningen” (CMG) and “Collectief Groningen West” (CGW), ANOG is not a merger of multiple old farmer organizations. It is nearly the same organization as it was before the start of the new program (EU H2020 Project Contracts2.0). ANOG, CMG and CGW formally coordinate common procedures and rules concerning sanctioning and mutual on-field controls. The collectives’ board members and employees regularly meet to identify bottlenecks that need to be communicated to the province or umbrella organization (interviews P1, P7, P8). For communication and learning, ANOG established three thematic working groups, chaired by a board member and an employee who invite members to exchange knowledge, identify problems and develop new

ideas before they are discussed within the whole collective. Another type of group meeting is organized for clusters of neighboring farmers working on field margins in distinct focus areas. Furthermore, the regional water board funds study groups for those farmers who work on buffer strips (interviews P1, P2, P4, P5).

By comparison, the collective “Coöperatie Natuurrijk Limburg” (NaLi) is rather top-down initiated because it was founded in 2015 during the transition to the collective program. NaLi manages almost twice as much land as ANOG but has more than four times more members (see Table 1). The first reason is that the area of NaLi covers the whole province of Limburg. The second reason is that next to farmers, members of NaLi include a considerable share of private landowners who are involved in management of landscape elements (EU H2020 Project Contracts2.0). Limburg is in the South of the Netherlands and is characterized by many landscape elements and hilly areas, but also by open areas at river sites. Nearly 87% of the members of NaLi partake in AECM, compared to only 38% for ANOG. This can be explained by a large amount of supporters’ memberships in ANOG, while the focus on landscape elements in Limburg offers many non-farmers to participate in AECM (EU H2020 Project Contracts2.0, personal communication). Due to its size, NaLi established a nested structure: it has four sub-areas that are managed by organizations with an own board. In addition to the board of the large collective, there is a council of board members from the sub-organizations. However, the collective is responsible for the coordination of the contracts. Despite the large number of members, due to its nested governance structure, NaLi manages with the same number

of employees in the main office. In addition, NaLi employs field workers who maintain the contact with members on-site and provide consultation and advice on the effectiveness of measures. Compared to ANOG, group meetings are less established (interviews Q1, Q2, Q3, Q5).

3.4. Data collection

The Net-Map tool is a participatory interview technique to collect network data (Schiffer and Hauck, 2010; Hauck et al., 2015). Through in-depth interviews, Net-Map enables to collect qualitative, explanatory data in addition to the quantitative data that is needed to calculate SNA metrics (Schiffer and Hauck, 2010). During the interview, stakeholders are involved by the interviewer to mutually visualize the network which helps to directly understand and reflect strengths and weaknesses of the current network and discuss options to improve it (Schröter et al., 2018). The procedure of Net-Map, as proposed by Schiffer and Hauck (2010), is adaptable to the context of the study.

For our study, the following steps marked the process of each interview: (1) identifying the actors; (2) detecting their formal and informal interactions and reflecting on trust; (3) quantifying their influences; and (4) reflecting on challenges. Depending on the interviewee, the order of steps and time spent to discuss them varied to some extent. During our data collection, we realized that it is not helpful to ask explicitly about formal and informal relations, since our interviewees defined these differently and time pressure for us as interviewers prevented us from explaining the more complex definition given in section 2. Therefore, we decided to ask about interactions in general and distinguish between formal and informal relations in our analysis based on the definition given in Section 2.

Due to the COVID-19 pandemic, we conducted our interviews online using an online visualization tool. It limited the participatory character of the network visualization because it was more difficult to engage interviewees in it. Nevertheless, we were able to collect sufficient qualitative data which improved our analysis of the quantitative part significantly. The interviews were held in English, German and Dutch and lasted between 60 and 90 min. For the selection of interviewees, we applied snowball-sampling (Bryman, 2016) until we interviewed at least one representative for each actor that was named more than three times and balanced views from regional and national level, from governmental and non-governmental parties, and from agriculture and nature conservation. This was important to obtain a representative, less subjective overview on the networks from the summary of individual perceptions. Before each interview, we informed about confidential data usage and purpose of the interview in an information and consent form. We conducted 18 interviews in total, whereby eight interviews were only used to analyze the network of ANOG, and five interviews were only used for the network of NaLi. The remaining five interviews covered actors from national level and contributed to the analysis of both networks (see Appendix A for a detailed list of interviewees). A pre-test was conducted in October 2020 with an employee of a collective. Since no major changes were required in the interview guideline (see Appendix B), we included the data into our sample. After finishing the interviews in July 2021, we had a total of 380 transcript pages.

3.5. Data preparation

We used the software MAXQDA 2018 (Kuckartz and Rädiker, 2019) to code segments of the interview transcripts according to themes from the steps of our interview guideline and to retrieve quotes to back-up our argumentation. We then transferred qualitative information from the transcripts together with quantitative information from the Net-Map sheets into Excel spreadsheets for the SNA. We considered the interviewees' personal view on whom is connected to whom. Thereby, we already grouped ties into either formal or informal relations according to our definition. For ANOG, we aggregated individual matrices with information from each interview to two matrices, one for formal and one

for informal relations. We repeated this step for NaLi. Then we transferred the aggregated matrices to the software package UCINET 6/NetDraw (Borgatti et al., 2002) which is commonly used to calculate SNA metrics and draw network graphs (Borgatti et al., 2018).

We drew four networks, one formal and one informal network each for ANOG and NaLi. For more details, we also added the attribute data (see Appendix C and D) for the nodes to visualize the level they are operating at, their position in the formal network and the average level of influence as perceived by our interviewees. The position of the nodes in the formal network was calculated with the “coreness” metric in UCINET. We chose this metric to measure centrality of the nodes because we assumed that a core-periphery structure will characterize the formal networks' shapes best. Such a structure implies that there are core nodes which are connected to other core nodes as well as to others in the periphery, and periphery nodes, which are only connected to core nodes, but not to each other. However, a discrete classification of nodes is less realistic. Therefore, “coreness” is measured as a continuous property of nodes, assigning scores to each node (Borgatti et al., 2018). For further improvement of the network visualization, we displayed the strength of ties (= often mentioned relations) to be able to check whether they occur between actors with similar attribute data (bonding social capital), between actors from different social groups (bridging social capital), or between actors from different levels (linking social capital).

3.6. Data analysis

With the network graphs, we were able to detect social capital in three analytical steps. Table 2 shows how we linked these steps and the network features we focus on to literature findings to indicate how certain network features are relevant for successful governance of collective AECM. Thereby we drew from literature in the Dutch context, completed by other related literature (marked in italics). Our *first level of analysis* is the presence of ties between different actor types indicating presence of bonding, bridging, and linking social capital. Our *second level of analysis* considers the number and strength of ties related to bonding, bridging, and linking social capital and whether one function is dominating. Our *third level of analysis* considers positions of actors in the network that foster or hinder bonding, bridging, and linking social capital. The analysis of the network graphs was cross-checked with the interview transcripts. We also used the transcripts for information on the inner structure of the collectives. An additional source were their websites and quality handbooks which outline internal rules.

4. Results

Our data show that the networks around the collectives consist of many more actors and relations than the mere contracting between provinces, collectives, and members. We identified 22 actors that were mentioned by at least three interviewees for ANOG, and 20 actors for NaLi (for a description of all actors included in the SNA see Appendix C). In the following, we explain how the most important formal and informal relations support bonding, bridging, and linking social capital for ANOG and NaLi.

4.1. Social capital through formal relations

4.1.1. ANOG

Fig. 1 shows the formal network around ANOG. Central relations were those for the front-door-back-door contracting between the province (ProvG), ANOG and its members (Memb). In addition, there was a strong connection between ANOG, the province and the paying agency (RVO), because this national agency administers all payments to the collectives on behalf of the provinces. All in all, bonding, bridging, and linking social capital appeared to be balanced according to the number and strength of ties associated with these.

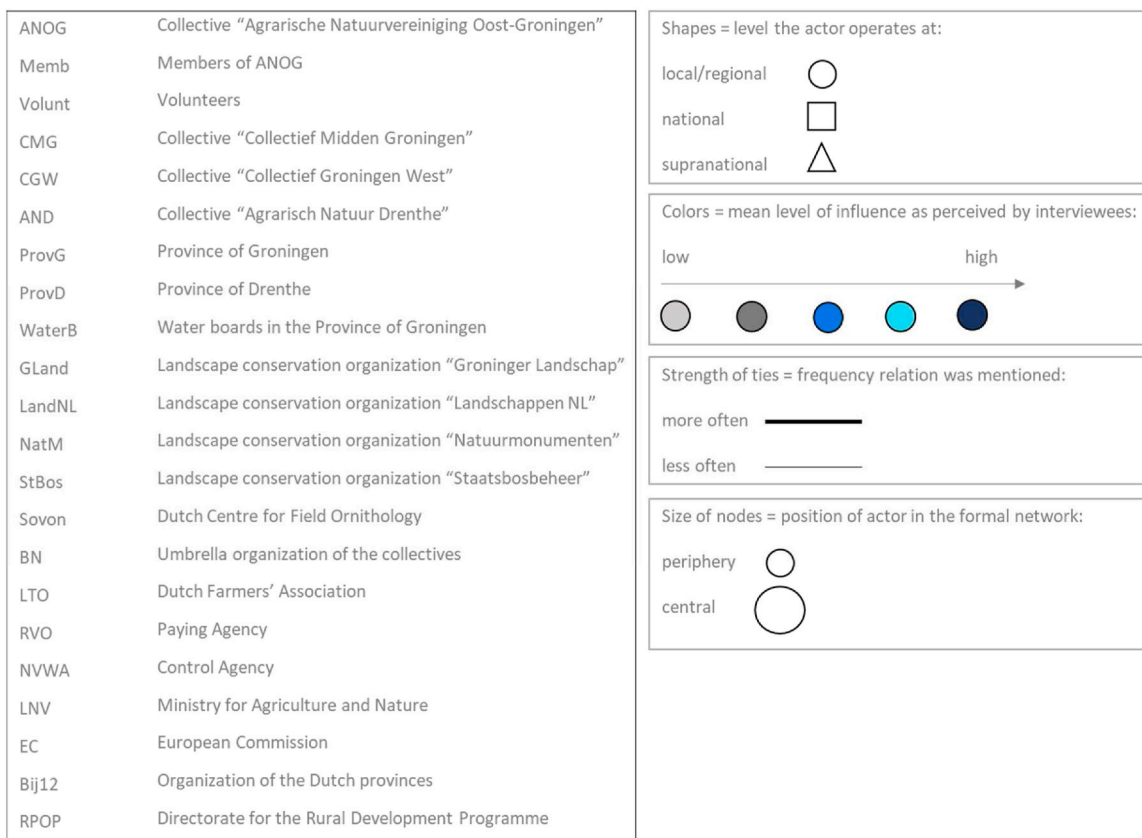
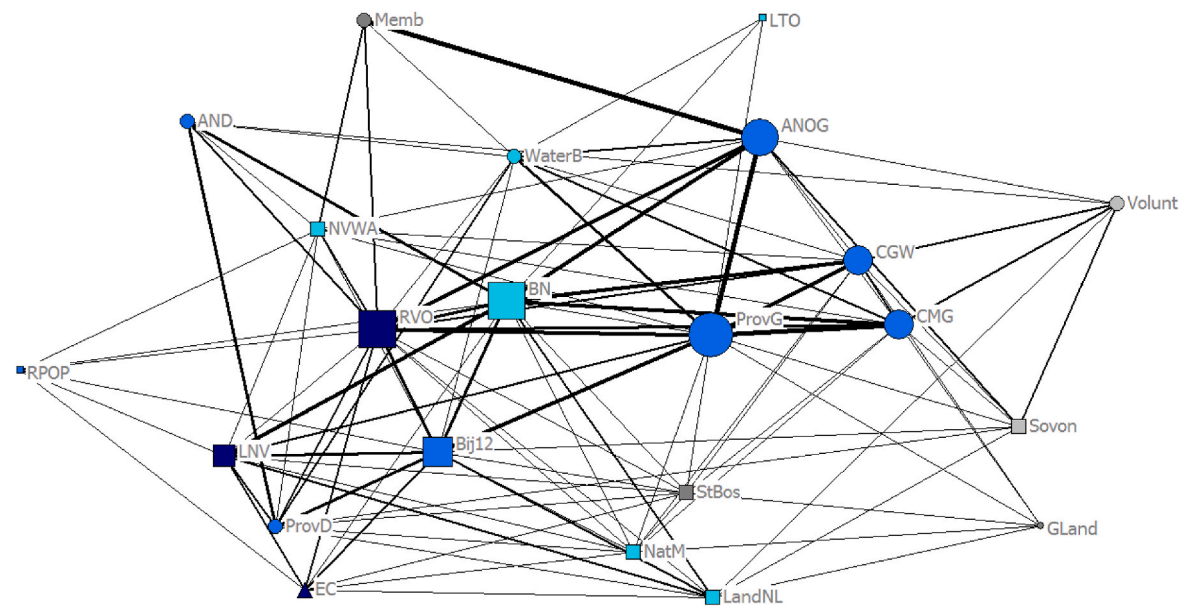


Fig. 1. Formal network around ANOG (created in NetDraw).

Bonding social capital occurred in the strong relation between ANOG and its members which rather stems from the membership than from the contractual relationship. It was mobilized through the self-governing identity of the collective: “between ANOG and the farmers there is a very strong trust [...] there are a lot of farmers working in the [organization], so it’s a club that belongs to the farmers ...” (interview P5). Fig. 1 shows that the influence of ANOG was perceived to be equal with the province although in the ranking of “coreness” scores the province was the most

central actor whereas ANOG was on the fourth position (see Appendix D). This supports the perception of ANOG as a self-governing organization. However, one interviewee mentioned conflict potential along with the self-controlling component of the program: “sometimes [...] it is not like it is supposed to be and then [farmers] don’t agree and say “well I see birds, and I do that, and you are getting too bureaucratic” [...], “you look like the government”, all those things [...] that [the organization] should be more on their side” (interview P1). In addition to the internal relations,

bonding social capital occurred in the partnership of ANOG with its neighboring collectives (CGW and CMG) (Fig. 1), which helps to raise transparency of controls and prevents from a sense of competition between the collectives.

Bridging social capital was mobilized, in addition to the contractual relationships with province and paying agency, through formal integration of the regional water boards (WaterB) in the contracting process. Fig. 1 shows that the water boards interact with the three collectives in Groningen and the province. The water boards co-fund water-related measures and support the province with decisions on focus areas and approval of the collective contract. ANOG had one additional

cooperation with the Dutch Centre for Field Ornithology (Sovon) on professional monitoring of farmland birds. Both these co-operations enhance trust in the collective as an organization with high ambitions to improve biodiversity and ecosystem services. Trust is also maintained through the partnership with other collectives on mutual controls, which increases credibility. On the downside, there were no direct formal ties between ANOG and nature conservation organizations (GLand, StBos, NatM).

Linking social capital was maintained for ANOG through representation of their umbrella organization (BN) in several regular steering meetings on national level. Fig. 1 shows strong connectedness of

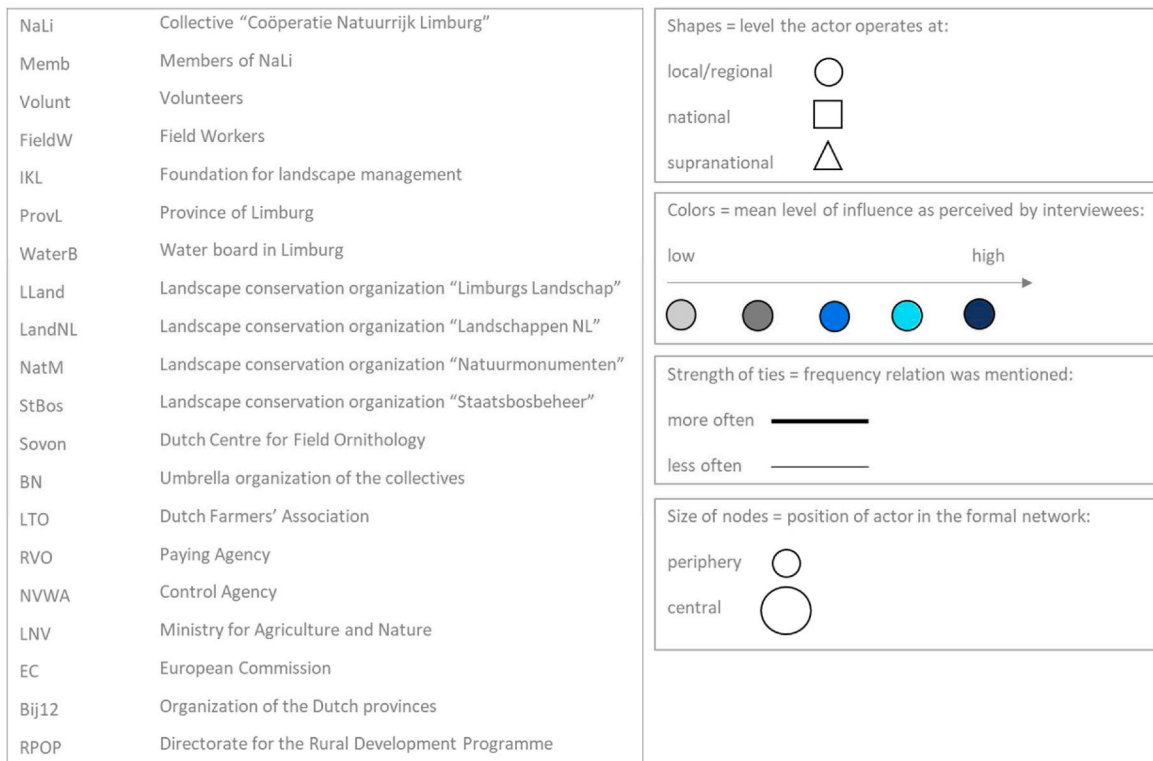
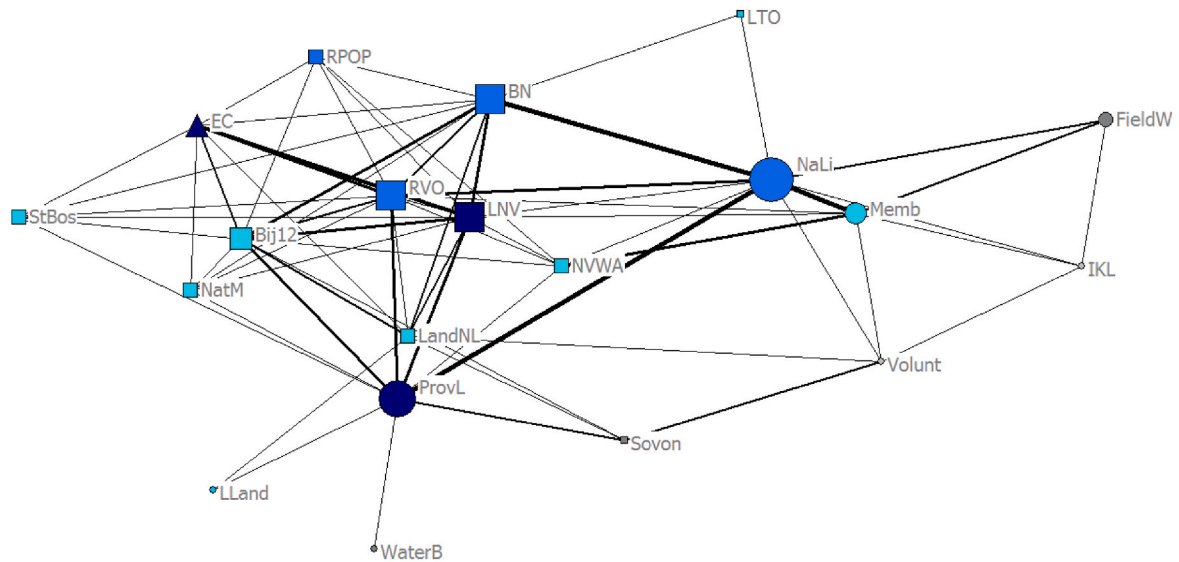


Fig. 2. Formal network around NaLi (created in NetDraw).

BoerenNatuur with the Ministry of Agriculture (LNV), the paying agency and the execution unit for nature related issues from the joint organization of the 12 provinces (Bij12). Although the program follows a decentralized approach, there are national steering meetings to align broad goals and processes between the provinces and the Ministry of Agriculture. The organizations of the national steering committees are also important to channel the information exchange with the European Commission (EC). Hence, BoerenNatuur was positioned as one of the most central actors in the network, with a higher “coreness” score than the ministry and the organization of the 12 provinces. Interestingly, the influence of BoerenNatuur was perceived not that high by interviewees of ANOG. Also, in terms of linking social capital, the partnership of ANOG with neighboring collectives helps in enabling identification of general problems and solutions, which can be communicated via the umbrella organization or in direct dialogue with governmental actors: “I think that ANOG is better capable in projecting [problems] towards all the collectives, the whole scheme” (interview R2).

4.1.2. NaLi

Fig. 2 shows the formal network around NaLi, with the front-door-back-door contracting between the province (ProvL), NaLi and its members (Memb) and a strong connection between NaLi, the province and the paying agency (RVO), in analogy to ANOG. Bonding, bridging, and linking social capital appeared to be balanced according to the number and strength of ties associated with these.

Bonding social capital occurred in the strong relation between NaLi and its members: “The base is that we trust, we have a high level of trust between the sub-groups and the collective” (interview Q3). Although interviewees confirmed that the nested structure and on-farm advice by the field workers (FieldW) helps to create connectedness of members to the organization, the self-governing identity and social learning is still to be improved. Fig. 2 shows that the interviewees ascribed higher influence to the province and the ministry than to NaLi although NaLi has the highest “coreness” score in the formal network (see Appendix D). Interestingly, the members’ influence was perceived to be higher as in ANOG. However, professional development of the collectives’ organizations backed by engaged members was more often mentioned as a challenge by interviewees of NaLi. To improve social learning, NaLi started with regular group meetings, which are not that formalized yet, in comparison to ANOG. One interviewee reflected that “The bottom-up approach, thinking together, learning from each other, could be higher in Limburg [...] and they’re working on it. Yeah, and I think ANOG is past that. [...] The farmers are used to working together.” (interview R2).

Bridging social capital in the form of co-operations in addition to the contractual relationships with province and paying agency, appeared not to play a large role yet. There is no formal cooperation with the regional water board (WaterB) in place yet, nor did the interviewees highlight other formal co-operations, except from an organization for maintenance of trees and hedges (IKL) (Fig. 2). However, it is important to keep in mind that our case study regions are not characterized by the same natural environment and therefore have different priorities in agri-environmental management and related strategic partnerships. Like ANOG, there were no direct formal ties between NaLi and nature conservation organizations (LLand, StBos, NatM).

Linking social capital was maintained for NaLi, in analogy to ANOG, through representation of their umbrella organization (BN) in several regular steering meetings on national level. Fig. 2 shows strong connectedness of BoerenNatuur with the Ministry of Agriculture (LNV), the paying agency and the execution unit for nature related issues from the joint organization of the 12 provinces (Bij12). BoerenNatuur was positioned as one of the most central actors in the network, with a higher “coreness” score than the ministry and the organization of the 12 provinces, but unlike ANOG, the influence of BoerenNatuur was accordingly perceived high by interviewees of NaLi.

4.2. Social capital through informal relations

4.2.1. ANOG

Fig. 3 shows the informal network around ANOG. Strong ties exist for each bonding, bridging, and linking social capital. Compared to the formal network, the number of bridging ties was higher.

Bonding social capital was supported through exchange between collectives, beyond meetings organized by BoerenNatuur. Next to the partnership with collectives from the same province, ANOG consults with the collective from the neighboring province (AND). The reason is that they both have large areas of arable farming on peat soil and cooperate with the same water board while the two partner collectives have mainly grassland areas and partly cooperate with other water boards. Joining forces to solve similar problems supports the identity of self-governance. In analogy to exchange between those two collectives, there is also exchange between their two provinces which may be important for recognition of alignment proposals made by the collectives (Fig. 3).

Bridging social capital was supported through regular exchange between collectives and their provinces, beyond the prescribed procedure of contracting. There are meetings between the province (ProvG) together with a representation (one board member and employee) from the three collectives (ANOG, CMG, CGW). These meetings turned out to be an efficient way for early communication of problems so that they also invited the water boards to join. Compared to the formal network, Fig. 3 shows more bridging ties because coordination and consultation of ANOG with nature conservation organizations (StBos, NatM, GLand) on location and quality of measures takes place in a rather informal way. Interviewees mentioned room for improvement here.

Linking social capital was supported through the collectives’ umbrella organization being part of a more informal network of exchange among the ministry of agriculture (LNV), the paying agency (RVO) and the execution unit for the 12 provinces (Bij12). They consult on the preparation of the formal committees or on ad-hoc solutions such as exceptionally shifting a deadline when there where IT problems: “How do you think of it? So, that’s kind of how it works. And that’s very informal. But the result will go in those formal meetings [...] when the pressure is high and when the solutions are not very simple [...] there are only four or five people in the whole context, who connect to each other [...] BoerenNatuur, the ministry, provinces and RVO” (interview R2). Fig. 3 shows this broker position of the umbrella organization linking ANOG to the national level, beyond the formal steering committees. However, this position might be less transparent for stakeholders from the regional level which would explain that the umbrella organization was not perceived as one of the most influential actors by the interviewees from ANOG.

4.2.2. NaLi

Fig. 4 shows the informal network around NaLi. Compared to the formal network, the number and strength of bridging ties was much higher so that bridging social capital was rather dominating over bonding and linking social capital.

Bonding social capital was fostered by the field workers who not only consult with the members during formal controls of measures but are in constant contact for day-to-day exchange: “I don’t think you can do this work when you don’t have a bit of motivation that comes from the heart [...] when a farmer calls on Saturday that he has a question, then [they] answer ...” (interview Q5). Unlike ANOG, further exchange between collectives, beyond meetings organized by BoerenNatuur, was not mentioned for NaLi.

Bridging social capital was supported through regular exchange between collectives and their provinces. However, several interviewees described the relation with the province as less supportive in the amount of co-funding but also in discussing bottlenecks or consulting about additional projects. Compared to the formal network, Fig. 4 indicates exchange between NaLi, the water board (WaterB) and nature conservation organizations (StBos, NatM, LLand). Like ANOG, interviewees

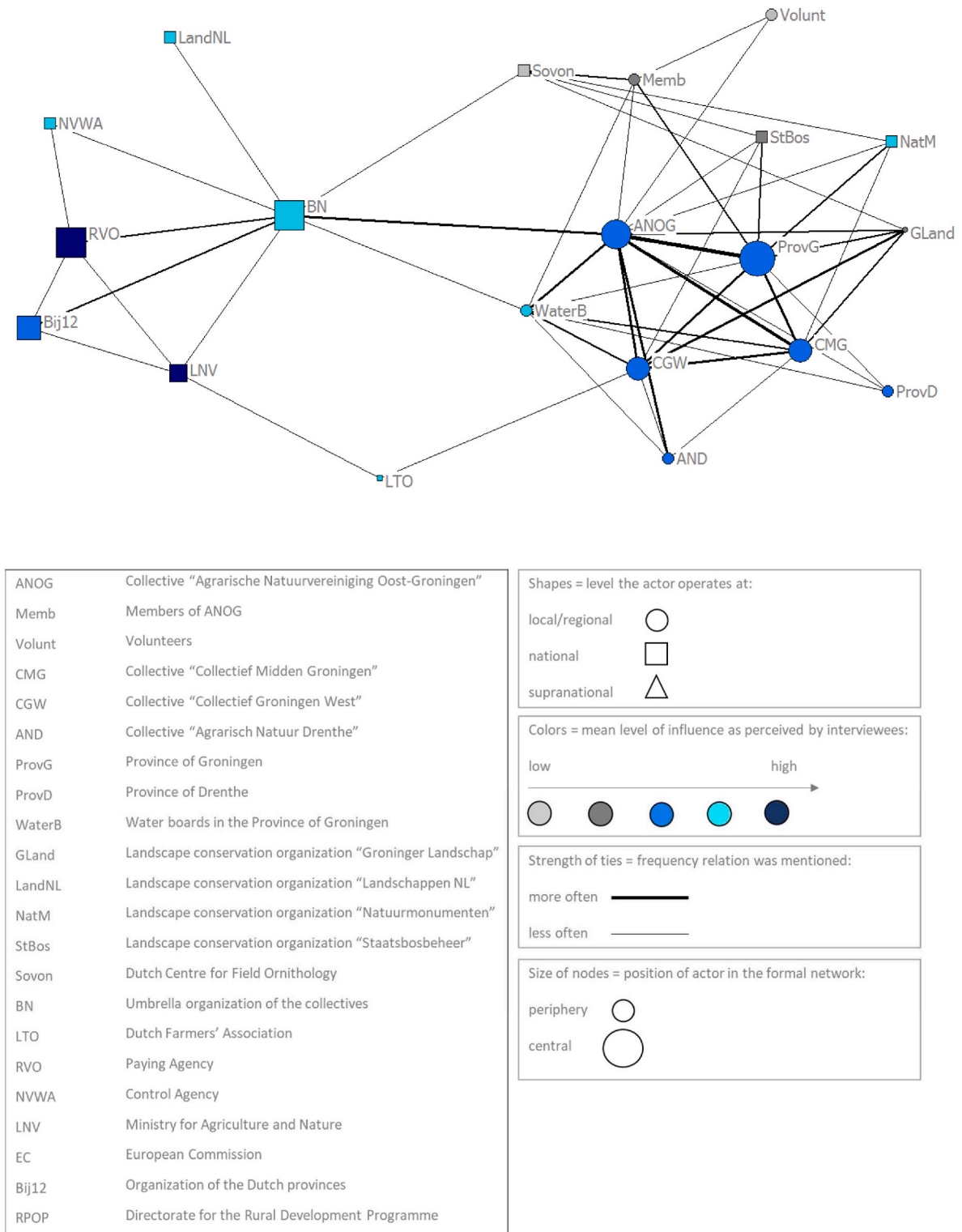


Fig. 3. Informal network around ANOG (created in NetDraw).

mentioned room for improvement. Interestingly, this exchange occurs also via the field workers, who integrate information they obtain from the nature conservation organizations directly in their discussions with farmers. Therefore, the field workers represented a much more central actor in the informal network compared to the formal one. To scale up exchange and enable formal cooperation, the collective recognized that they first need to increase their familiarity and trust as an important partner. They “invited [participants], the nature organizations, [...] the

local community, people from province, just to show what we are doing and what the importance of our work is in the landscape. [...] And that’s something that needs to be scaled up.” (interview Q5).

Linking social capital was supported through the collectives’ umbrella organization as part of a more informal network of exchange among the four most important players at national level. The broker position of BoerenNatuur linking NaLi to the national level, beyond the formal steering committees, occurred in analogy to ANOG (Fig. 4).

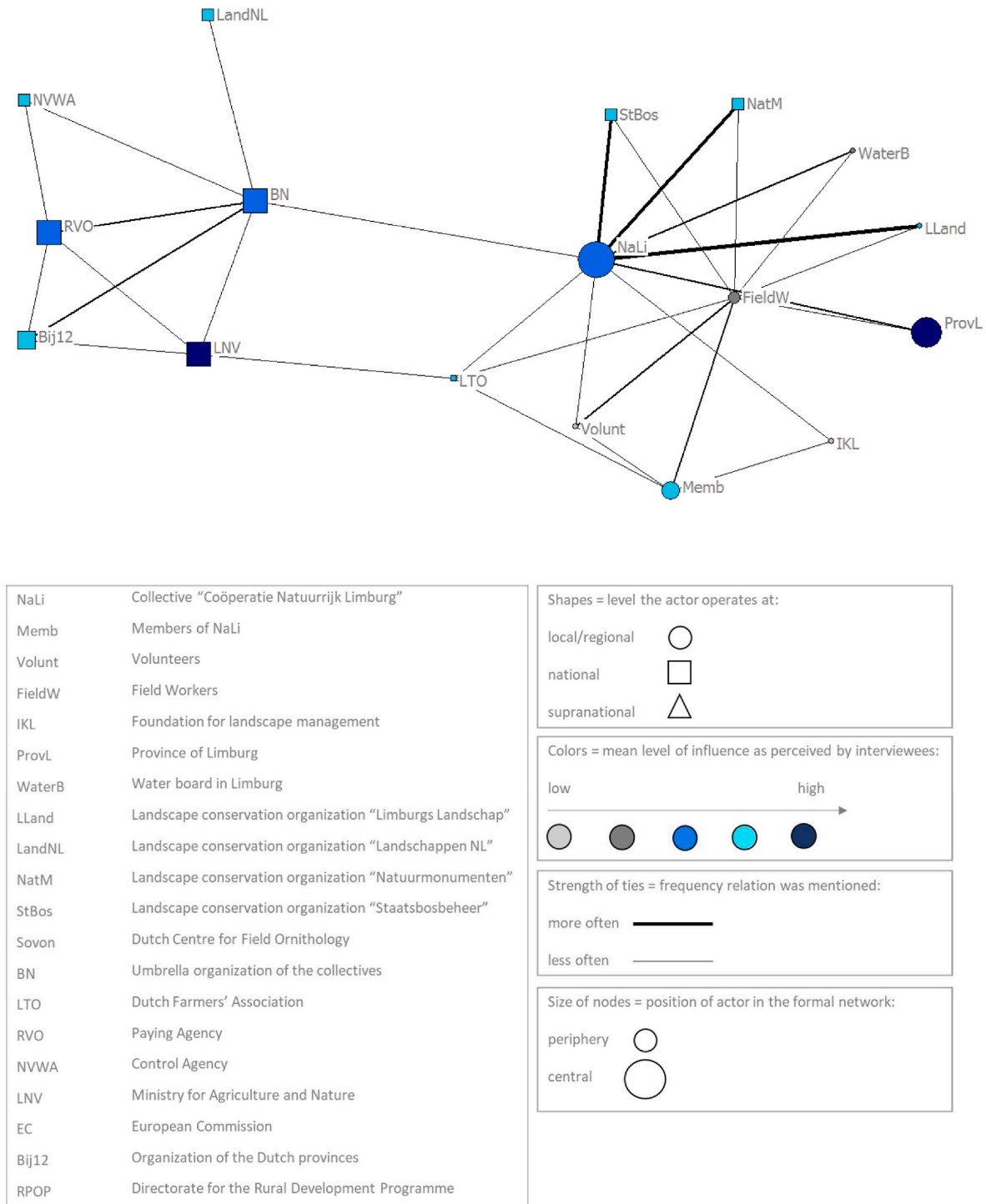


Fig. 4. Informal network around NaLi (created in NetDraw).

5. Discussion

5.1. Social capital in bottom-up vs. top-down initiated collectives

Regarding our hypothesis that social capital is better developed in the bottom-up initiated collective, we found some supporting evidence. The bottom-up collective build on well-functioning internal structures, connectedness with and among members and with other collectives, whereas the top-down initiated collective is still improving bonding social capital in that sense. Overall, the networks around the bottom-up initiated collective appear to be denser, although only few more actors

are involved. The bottom-up collective has capacities to invest also in bridging social capital and operate trans-regionally, which are stated as success factors for collectives by Dik et al. (2021). This may be a reason why interviewees ascribed less influence to the umbrella organization than to the collective.

In comparison, the top-down collective seems to be at a stage where it still deals with internal bottlenecks, although the formal nested structure and informal communication via the field workers already contribute to social capital in this large collective. In fact, our data points more to the importance of development stages of the organizations. It may be more important that the bottom-up initiated collective

exist for more than 10 years longer than the fact that they are bottom-up initiated. Moreover, one has to bear in mind that bottom-up and top-down initiation is a concept to explain the more complex reality, where often elements of both play a role (see [Prager, 2015](#)).

A supporting argument for the importance of time rather than bottom-up or top-down initiation stems from the existing awareness and strategies of the top-down initiated collective to invest in bridging and linking social capital, while still improving inner connectedness. Since this collective can learn from front-runners, there is the chance to reach the same stage as the bottom-up collective within some years. Being embedded in the network of collectives under the umbrella of BoerenNatuur is particularly important for the top-down initiated collective.

Even though our two cases differ in several structural elements, our findings point at some features how both collectives can foster social capital. For bonding social capital, it is important to have meetings for knowledge exchange among members and between members and staff of the collective. For bridging social capital, good communication between collective and province is crucial. Additional co-operations can improve ecological effects for certain types or location of measures. For the latter, communication with nature conservation organizations is important to create buffer zones around protected nature areas. For linking social capital, the umbrella organization of the collectives is an important actor. It is helpful, if efforts made by the collectives and umbrella organization to advocate for their members at national level, are communicated back to the members, which again supports bonding social capital. These findings support the recommendations for collectives and governmental organizations made by [Nieuwenhuizen et al. \(2014\)](#) from before the start of the Dutch collective program, e.g. strengthen the inner connectedness within the collectives, build up trust between collectives and government, or invest in stakeholder partnerships.

Our focus on two Dutch collectives limits the generalizability of our results. Future research may use our conceptual framework for a wider study, possibly including a larger number of interviewees to explore the range of existing perceptions within one actor group, such as farmers, in dependency on social indicators like education, age, or environmental attitudes. However, similarities in single structural elements exist for other collectives, as well as for other collective agri-environmental initiatives in other countries. Hence, a reflection on other situations, based on the experiences from our two cases, is possible to some extent, despite of contextual dependence of successful collaboration and the unique development of collective AECM in the Netherlands. Our observation, that it is possible to form new farmer organizations when starting collective AECM, if awareness and engagement into the development of social capital is present, could be of general interest.

Another supporting argument for the importance of time rather than bottom-up or top-down initiation is that we found challenges in balancing bonding and bridging social capital for both collectives. While the top-down collective still needs to build up bonding social capital, the bottom-up collective needs to maintain it. Some evidence for the difficulty of collectives to preserve their identity as self-governing organizations as stated by [Westerink et al. \(2020\)](#) was found. In fact, interviewees from all levels mentioned a lack of flexibility to adapt measures, double controls, and incomprehensible decisions on sanctioning as challenges that can be summarized to a limited room for self-governance of the collectives due to governmental, especially EU requirements (see [Westerink et al., 2015](#); [Boonstra et al., 2021](#)). However, it seems to be an issue especially for bottom-up initiated collectives, where members might have had higher expectations concerning the room for self-governance within the new program, compared to farmers who had no experience with self-governing initiatives from before 2016. The fact that the influence level of members was perceived lower by interviewees from the bottom-up than by those from the top-down initiated collective supports this argument. Regarding bridging social capital, both the top-down and the bottom-up initiated collective could still improve cooperation with nature conservation

organizations.

5.2. More formalization needed?

A question that arises is whether there is a need for more formalization of some relations. Could formalized integration of nature conservation organizations in the planning of focus areas, but also in evaluation of the management, help the collectives to build bridges between the agricultural sector and nature conservation? A recent interim evaluation stated a lack of a formal role of nature conservation organizations and water boards in the Dutch AECM program ([Boonstra et al., 2021](#)).

From an organizational economics perspective, [Poppo and Zenger \(2002\)](#) argue that formal arrangements can set the stage for the development of trust and commitment within long-term interactions, especially in early, more vulnerable stages of exchange. Following this argumentation, the relation of the collectives with nature conservation organizations could benefit from formalization. This may hold for all collectives since trust between the agricultural sector and nature conservation is still at a vulnerable stage and formalization would ensure equal access to exchange of all relevant stakeholders. Moreover, formalization could ensure continuity and long-term cooperation by reducing the dependency on single key individuals which is especially a challenge within the collectives ([Dik et al., 2021](#); [Termeer et al., 2013](#)). Formal cooperation with nature conservation organizations could also increase trust from the governmental authorities. However, to maintain the self-governing identity, the collectives should initiate and organize it.

Further research could investigate the importance of formalized relations of the collectives or similar farmer organizations with stakeholders from nature conservation in building bridges between “agriculture” and “nature”. This could contribute to better define the role of nature conservation actors in the Dutch as well as other existing and planned collective AECM.

6. Conclusion

In this study, we aimed to gain knowledge on how social capital is mobilized in the actor networks around bottom-up vs. top-down initiated agricultural collectives to pave the way for collaboration of stakeholders for the success of collective AECM in the Netherlands. Our special interest covered the question if and how newly, rather top-down initiated collectives are equally able to build up social capital through formal and informal relations, beyond the mere contracting.

Our results indicate different development stages of social capital in the two collectives we analyzed. The bottom-up initiated collective currently has a higher level of social capital, most likely because it exists for a longer time than the top-down initiated collective. This younger organization strategically builds up social capital, based on experiences of frontrunners, while the bottom-up initiated collective has to maintain it. The facilitation of exchange between collectives by the umbrella organization is particularly important for younger collectives. Our results show that fostering social capital over time is more important than bottom-up or top-down initiation. From a practical perspective, this allows to conclude that it is possible to start collective AECM with top-down initiated farmer organizations, if people involved are aware of the importance of social capital and actively engage to foster it. This may be an interesting finding for initiatives to implement collective AECM in other countries who are confronted with the question whether to integrate existing structures in the farming community or form new ones.

Although pathways on how to improve or maintain social capital in collective AECM are context dependent, some general principles can be derived from our case studies. First, umbrella organizations of farmer organizations maintain linking social capital if they are formally represented in steering committees at national level. A precondition to the success of this communication channel is an active involvement of the

farmer organizations in discussions beyond their territory. Communication about actions of advocacy back to the members is crucial. Second, formalization of exchange between the farmer organizations and nature conservation organizations improves bridging social capital when mutual trust is vulnerable. Third, the self-governing identity of farmer organizations that supports bonding social capital is essential and can be enhanced through social learning in group meetings.

Finally, this study confirms the social reasons for collective AECM. The details of social interaction show that more than spatial coordination of measures is needed for an effective landscape approach of AECM. Engaging stakeholders more actively in the governance of AECM so that they share responsibilities, and strengthen mutual trust, enables multi-level collaboration which is needed for the conservation of biodiversity and ecosystems. In our study, we started with the assumption that social capital is a crucial criterion for effective collective AECM. An interesting research approach would be to investigate the influence of social capital on actual environmental impact. This could be done through interdisciplinary research accompanying the collectives.

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Ethics declaration

In accordance with ethical guidelines and good scientific practice, we obtained consent from each of our interviewee in the following way: We informed about confidential data usage and purpose of the interview in an information and consent form before the interview which was signed by all interviewees. Right before the interview started, we again asked for consent to record the interview. All collected data was anonymized to ensure privacy. The original data is stored on a secured server by Leibniz Centre for Agricultural Landscape Research (ZALF) until it will be deleted according to its’ data policy regulations.

Author statement

Rena Barghusen: Conceptualization; Methodology; Formal analysis; Investigation; Writing; Writing – Review & Editing; Visualization; Project administration. **Claudia Sattler:** Conceptualization; Methodology; Writing – Review & Editing; Visualization; Supervision; Funding acquisition. **Richard Berner:** Validation; Investigation; Writing – Review & Editing. **Bettina Matzdorf:** Conceptualization; Methodology; Writing – Review & Editing; Visualization; Supervision; Funding acquisition.

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.

Data availability

The data that has been used is confidential.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jrurstud.2022.10.023>.

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