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**The Role of Social Capital in Agricultural Collective Action:
A Social Network Analysis of the Agricultural Nature and Landscape
Management Scheme in the Dutch Province of Limburg**

Master Thesis

for the acquisition of the academic degree Master of Science

submitted by

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Abstract

Since 2016, the Netherlands has been pursuing a habitat-based collective approach for agri-environment climate schemes which is carried out by agricultural collectives. The collectives are self-governing groups, that take over tasks from authorities and mediate between them and land managers. This research concerns the Agricultural Nature and Landscape Management Scheme (ANLb) in the Province of Limburg, located in the south of the Netherlands. At its core is the collective Natuurrijk Limburg. Eight interviews with different stakeholders are conducted with the Net-Map Method as a means of Social Network Analysis. The aim of the research is first to investigate the governance structure of the ANLb. For this purpose, central actors are named and described, formal and informal relationships and motivations are shown. Since it is a young collective structure, it is of interest to study the presence of bonding, bridging, and linking social capital, as well as how they affect the functioning of the network. The case shows that the ANLb is a complex collaborative governance structure involving both public and private actors. The collective has built linking social capital with the authorities while preserving bonding within, which fosters exchange and collaborative learning. However, to maintain bonding, bottom-up structures within the collective must be preserved.

Keywords: Agricultural Collective, Social Capital, Collaborative Governance, Collective Action, Netherlands

List of abbreviations

AECM	Agri-Environment Climate Measure
AECS	Agri-Environment Climate Scheme
AES	Agri-Environment Scheme
ANLb	Agrarisch Natuur- en Landschapsbeheer, Agricultural Nature and Landscape Management
CAP	Common Agriculture Policy
COVID-19	Coronavirus Disease 2019
CPR	Common Pool Resource
EU	European Union
IPO	Interprovinciaal Overleg, Interprovincial Consultation
LEC	Local Environmental Cooperatives
LLTB	Limburgse Land- en Tuinbouwbond, Limburg Agricultural and Horticultural Association
LNV	Ministerie van Landbouw, Natuur en Voedselkwaliteit, Ministry for Agriculture, Nature and Food Quality
NL	Natuurrijk Limburg
NMM	Net-Map Method
NVWA	Nederlandse Voedsel- en Warenautoriteit, Dutch Food and Consumer Product Safety Authority
POP	Plattenlands Ontwikkelings Programm, Rural Development Program
RDP	Rural Development Program
RVO	Rijksdienst voor Ondernemend, Netherlands Enterprise Agency
SC	Social Capital
SNA	Social Network Analysis
SNL	Subsidiestelsel Natuur en Landschap, Subsidy System for Nature and Landscape
ZALF	Leibniz Centre for Agricultural Landscape Research

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1. Introduction

1.1. Background

Human impact on Earth's ecosystems is reducing biological diversity within many habitats worldwide and is accelerating extinction in increasing rates (Tilman et al. 2017). Biodiversity, the variety of genes, species and functional traits in an ecosystem has severe impacts on the ability of ecosystems to provide ecosystem services and fulfil ecosystem functions (Cardinale et al. 2012). According to Cardinale et al. (2012) remarkable progress was made in the last 20 years in improving our understanding on how the loss of biodiversity affects the functioning of ecosystems and thus the society. Multiple reasons are known for the loss of biodiversity, but intensive agriculture is undoubtedly one of the main drivers for that phenomenon (Kleijn et al. 2009). Dudley and Alexander (2017) even name it the worldwide largest contributor to biodiversity loss, with increasing impacts due to growing population and changing consumption patterns.

The issue is likewise of increasing relevance to the European Union's environmental and agricultural policies. For historical reasons, agricultural practices in the EU differ greatly by region. In an assessment of agricultural biodiversity in the EU25 Reidsma et al. (2006) find the lowest ecosystem quality in intensively used agriculture areas in lowlands like the Netherlands and northern France. Two out of six priorities of the EU Rural Development Program (RDP) under the Common Agricultural Policy (CAP) explicitly encompass the conservation and expansion of environmental quality. Namely priority four, which is about "*restoring, preserving and enhancing ecosystems*" and priority five, which fosters a "*resource-efficient, climate-resilient economy*" (La Notte et al. 2014, p. 91; European Network for Rural Development 2017). One of numerous policy tools to address the problem of declining biodiversity and a crucial element in the Rural Development Framework are so-called Agri-Environment Climate Schemes (AECS).

In these AECS, farmers and other beneficiaries commit themselves to provide environmental benefits or positive externalities. The payment is then based on the estimated income losses or additional costs arising from the new practices (La Notte et al. 2014). It is granted to those farmers who voluntarily go beyond mandatory environmental standards and take action for e.g. climate protection, water quality improvement or biodiversity conservation. The AECS are mandatory for member states

to offer but voluntary for farmers to join. Each national state has certain leeway in how to implement the AECS, but they are required to commit at least 30% of their rural development budget to support environmental and climate action in that way (European Commission 2019).

This research focuses on one of the national designs of the AECS in the Netherlands. Within the 2014 - 2020 CAP period, the EU Rural Development Regulation introduced the possibility of group applications for AECS in 2014 (Dupraz and Guyomard 2019). In the Netherlands since 2016 it is no longer possible to benefit from the payments through a contract as a single individual. Instead, this is only possible through a collective contract. The country is so far the only state that has implemented this group option. The approach, meaning the national design of the AECS funding program, carries the name Agrarisch Natuur en Landschapsbeheer (ANLb - Agricultural Nature and Landscape Management).

The way the collective model works is that the government defines national targets and offers a catalogue of possible conservation activities. It then signs a contract with a regional farmers and landowners collective, whereat the farmers of each collective coordinate their activities on the common agricultural land (Terwan et al. 2016). The mechanism has been referred to as a “*front door - back door*” approach, where relations between the public agencies and collectives are represented through the front door, while the interactions between the collective and the members (mostly farmers) are represented through the back door (ibid, p. 4). The collective administers the contracts with the individual farmer, takes care of the monitoring, the payment and the possible sanctioning (Westerink et al. 2020). Hence, the forty existing agri-environmental collectives function as an intermediary between farmers and the government. The collectives self-organise biodiversity conservation activities such as for instance the protection of meadow birds or the maintenance of landscape elements on farmland (Westerink et al. 2020).

The government of the Netherlands declared that especially when it comes to farmland birds and ecological corridors which are important conservation targets, the decline in farmland biodiversity can only be reversed through a cross farm approach (Terwan et al. 2016). The new approach is, among other things, supposed to increase the environmental output, allow for more flexibility for the farmers and lower error rates and implementation costs. It supposedly also matches well with a long tradition of agri-environmental cooperation in the Netherlands (ibid). Generally, it can be said that although research shows some positive environmental impacts through AECMs, many

authors emphasise that there is need for further improvements (Jongeneel and Pollman 2014; Batáry et al. 2015; Westerink et al. 2017). Bogaart et al. (2020) state that the Living Planet Index, which measures the abundance of selected species groups, in the Netherlands in the data period from 1990-2016 improved only in wetlands while the situation worsened in almost all other ecosystem types (agricultural, heathland, urban).

1.2. Research focus and relevance

The Netherlands, as mentioned above, is the only country so far that has opted for this form of collective contracts as the design of the AECS. This makes the ANLb an interesting object of research. Can the approach also be suitable for other member states? The Netherlands has a long tradition of agricultural collectives (Renting and van der Ploeg 2001), which is not necessarily the case in other European states. The collaborative experience could have built up social capital, which is understood as “*soft qualities of networks and relationships that enable groups to accomplish things together, including trust, access to knowledge and support, shared values and the capacity to learn and innovate as a group*” (Westerink et al. 2020, p. 391).

The concept is often used to explain the success or failure of collective action. It is of interest in this research how social capital is needed for the functioning of the Dutch AECS. While many different forms of social capital are described in the literature, three forms are of particular interest here. At first, bonding social capital which is “*associated with closed, often dense networks in which members have strong mutual connections and similar socioeconomic status*” (King et al. 2019, p. 126). Furthermore, bridging social capital, which is found between more heterogenous groups of people, with a similar level of power. And finally, linking social capital, that describes the relations of groups of people on a vertical axis, with different levels of power (Westerink et al. 2020). Through trying to understand the role of social capital, this master thesis contributes to a better understanding of the governance structure and the functioning of the “*new-style Dutch AECS*” (Runhaar et al. 2017, p. 278) and the agricultural collectives within them. Using the term “*governance structure*”, I refer to the institutional setup, the process of decision making in collective action and the formal and informal patterns of rule (Robichau 2011).

Presently there are 40 certified collectives in the Netherlands that execute the AECS within certain geographical boundaries. Out of these one of the Dutch provinces, Limburg (also known as Nederlands-Limburg), will be examined in detail as a case study.

The corresponding collective, Natuurrijk Limburg, covers the area of the whole province located in the far south of the Netherlands. It was established in 2015 for the implementation of the national AECS and has now over 1300 members with the largest area of land under its care of all the Dutch collectives (Contracts 2.0 2020). It makes an interesting case for the analysis because of its short history and large number of members, built up social capital is assumed to play an important role for the effective collaboration within the network.

The research will be guided by the following two research questions: *1. How does the governance structure of the ANLb within and around the agricultural collective Natuurrijk Limburg work?* I will answer that question by addressing the following sub-questions: Who are central actors? Who shares formal and informal relations? Which actors are influential? What are motivations to engage? *2. In which way does the presence of social capital influence the functionality of the network?* This question is addressed through the sub-questions: What bonding social capital exists between homogeneous actors? And what bridging/linking social capital exists between heterogeneous actors?

Several recent research publications have so far studied different aspects of the new collective AECS in the Netherlands. Westerink et al. (2020) investigates how the since 2016 emerged collectives in the Netherlands navigate their identity in interactions with public authorities and how they manage potential trade-offs between different forms of social capital. While they needed to foster bonding social capital within their member groups, they also needed to develop bridging social capital with other stakeholders and linking social capital with public authorities. The collectives adopted characteristics of public agencies in order to meet the demands of the Dutch government and the EU legislation. Further research, the scholars argue, should look into the development since 2016: did the collectives maintain their bonding social capital as well as developed linking and bridging social capital with public authorities and other parties? This research thus tries to address the shown research gap. Using Natuurrijk Limburg as case study it is examined to what extent bonding social capital exists between homogeneous actors as well as bridging and linking social capital between heterogeneous actors in the network. Thereby the role of trust is also touched upon because it is regarded as a crucial element of social capital (Call and Jagger 2017). De Vries et al. (2019) already studied interpersonal and institutional trust in a Dutch collective in the province of Drenthe. The authors see great potential in the collective models because of the increasing need to connect biodiversity and landscape values at the landscape level (ibid). They conclude

that it would be of interest to study other similar geographical or institutional set-ups to examine how interactions across social networks contribute to trust.

My study links to this research and will further explore the role of social capital, as knowing more about the role of social capital between different stakeholders in the network can be valuable knowledge for other young collectives. In general, it can be said that the better understanding of the *modus operandi* of the “*new-style AECS*” is relevant for the continuous improvement of the collective approach, which could also serve as a potential model for other countries.

For my research I will draw from theories of collective action, collaborative governance, and social capital. Social capital theory can provide an explanation how actors in a network use their relationships with each other for their own or the collective good (Adger 2003). Various forms of social capital, in this research particularly bonding, bridging and linking social capital have influence on the functioning of collective action as well as on systems of collaborative governance (Oh and Bush 2016).

For my investigation, I will use status-quo Net-Map interviews as a tool of Social Network Analysis (SNA) identifying relevant interviewees through referral sampling. SNA is recognised as a valuable method to empirically assess and measure social capital in networks (Giurca and Metz 2018). The Net-Map Method (NMM) is a participatory low-cost, low-tech tool. Its strengths lie within the possibility of visualising and making explicit a number of phenomena (Schiffer and Hauck 2010). While semi-structured interviews are conducted the interviewer visualises, together with the interviewee, certain network structures, relations, and processes on a sheet of paper. Through the method, qualitative and quantitative data of network relations can be obtained (Schiffer and Hauck 2010). It is normally a pen and paper-based technique but is executable as well through online communication and visualisation tools, which necessarily have to be used instead due to the current COVID-19 measures in Germany and the Netherlands.

1.3. Structure of the thesis

The remainder of this master thesis is structured as follows. The following theory section in chapter two draws on theories of collective action and collaborative governance. Further, the theory of social capital and its sub-forms such as bonding, bridging and linking social capital are discussed and a connection to collective action is made. It is shown on the basis of existing literature that Social Network Analysis is a suitable tool to

identify social capital in networks and to analyse its effects. At the end of the theory chapter, I explain why the introduced theories are relevant and applicable to the selected case study.

The following section starts with providing insight about the genesis and significance of the agricultural collectives within the frame of the ANLb in the Netherlands in more detail. The selection of the case study region is justified, and the chosen case described in detail. In the subsequent method section in chapter four, the Net-Map Method for Social Network Analysis is introduced and its application to the selected case is described in detail. Additionally, the selection of the interview partners is outlined and the process of conducting the interviews through NMM is explained. Afterwards, the methods and tools, used to analyse the acquired qualitative and quantitative data will be discussed.

Hereafter, in the results part in chapter five, the quantitative and qualitative results are presented split up according to the two research questions. Through answering the sub-research questions, i.e. by identifying central actors, formal and informal relations, this thesis tries to answer the two main research questions that guide the inquiry. Afterwards the results, their meaning in the context of existing literature, their validity together with potential shortcomings and limits of the methods and data are reviewed in a discussion chapter. The paper ends with a conclusion in which the most important steps, findings and outcomes of the research are summarised.

2. Theoretical framework and application to selected case study

The aim of this chapter is to present the theoretical framework of the research. For this purpose, theories of collective action and collaborative environmental governance are briefly introduced, and connections are shown. In a next step, the theory of social capital is discussed. Different types of social capital relevant for this research will be presented and their importance in collective action will be shown. Finally, the content of the theories will be linked to the case study and the resulting research questions.

2.1. Collective action and collaborative governance

In her influential book “*Governing the Commons*” Ostrom (1990) laid the foundation for a new understanding of collective action. The research focused mainly on the regional management of common pool resources (CPRs). Ostrom describes how local groups succeed in using common resources sustainably through joint, coordinated action without having to privatize them or place them under government control. By the term “*common pool resource*” Ostrom (1990, p. 130) understood “*natural or manmade resource systems that [are] sufficiently large as to make it costly (but no impossible) to exclude potential beneficiaries from obtaining benefits from its use*”. Since then, a large and growing body of research has emerged that studies collective action in the context of the management of CPRs. Frequently used examples for studied resource systems are fishing grounds, grazing areas, lakes or streams and others more (ibid).

Collective action can be defined as “*the action taken by a group (directly or through an organisation) in pursuit of members perceived shared interests*” (Marshall 1998, p. 196). Later definitions have added different elements, but they all share common features like: the involvement of a group of people, shared interests and common and voluntary actions to pursue those shared interests (Meinzen-Dick et al. 2004). The empirical literature on collective action is by far not limited on the management on CPRs. In fact it by now includes studies on widely different types of collective action occurring at multiple levels, from problems in local neighbourhoods to international cooperation, including studies on voting or protest and civil war, just to name a few (Ostrom 2009; Boix and Stokes 2009). Collective action can be carried out by formal organisations, but also informal collective action exists, where local groups or local networks of people self-organise and coordinate local deeds (Vanni 2014).

In agricultural research Davies et al. (2004) distinguish between two types of collective action: (1) cooperation, namely farmer-to-farmer and bottom-up collective action and (2) coordination, namely top-down agency led collective action (Vanni 2014, p. 22). The distinction implies, that some collective actions do not receive any support by the government, while others are promoted and supported through governmental policies (Vanni 2014).

Agricultural collective action in the ANLb is induced by the policy approach of the AECS in the Netherlands. Considering it from an ecological point of view, collective action between farmers, in terms of spatial coordination within a landscape, is very plausible. Many goals such as the protection of different habitats and species, water quality or the protection of traditionally cultural landscapes can be achieved much more effectively on a connected landscape level than on a single farm level. The latter are simply too small in terms of area (Westerink et al. 2017). Furthermore, measures to be implemented, such as ecological corridors, often need to be adapted to existing environmental features to be effective instead of being arbitrary implemented on a single farm (ibid).

From a social standpoint, it can be likewise beneficial for farmers to engage in the schemes. Often the regional landscape is considered as part of the identity of rural communities. Collective action between local groups can be understood as a possibility to jointly preserve this identity. The collaboration can make the exchange of ideas and knowledge possible and social capital can be build up (Westerink et al. 2017), which will be discussed later in detail. Furthermore, collective action might reduce transaction costs, when farmers get assistance in application procedures, can share advisory service as a group, or get fast advice by their neighbours (Westerink et al. 2017).

However, collective action that needs to be spatially coordinated and adjusted to existing environmental features needs knowledge, documentation, and coordination. Westerink et al. (2017) uses the term collaborative management, to refer to the collaboration of land managers who are actually carrying out the management activities on the ground. This in turn is embedded into a system of collaborative governance. Emerson et al. (2012, p. 2) define this concept broadly as *“the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished”* Westerink et al. (2017, p. 177) see it, applied to the AECS, as

“involvement of governmental and non-governmental actors in the processes and structures of decision making and management at the scheme level”. Following Oh and Bush (2016), collaborative governance has received growing attention from scholars and practitioners, mainly because the collaboration among private, public and non-profit organisations results in the achieving of policy goals through collective management and decision making. The growing awareness for the complexity of environmental problems now has formed relationships and processes, that sometimes involve new roles for non-state actors in defining and shaping environmental governance (Ali-Khan and Mulvihill 2008). Multi-actor collaborative approaches to deal with agri-environmental problems have become a commonplace around the world. By whom they are initiated and how they are designed depends heavily on the context and local conditions (Ansell and Gash 2007).

Fish et al. (2010) argue that since the 1980s the relationship between the state and the civil society has changed, concerning the question of responsibility for the provision of public goods and in particular environmental quality. The state and its bureaucracies have historically had a central role in activities of regulation, planning, policy implementation, monitoring and evaluation. In the ascent of more liberalised economic regimes, this has been reconfigured. According to Fish et al. (2010, p. 5624), in the new *“area of governance”* decision making increasingly involves a diverse range of self-organising actor networks, multi-party arrangements or public-private partnerships. To function, more ‘sociocratic’ forms of knowledge and capacity development are needed. Following Tropp et al. (2017), the emphasis has to be put on the management of people and processes, knowledge sharing and organisational diversity. However, whether governments and authorities are willing to share power and decision-making capacity with non-state actors remains an object of political contestation.

2.2. Theory of social capital

2.2.1. Social capital in the context of collective action and collaborative governance

A concept that is of high relevance for collective action research and used particularly to explain the success or failure of joint action is social capital (SC). The following subsection is intended to provide firstly a brief introduction into the concept of SC and secondly to outline its relevance to collective action as well as to collaborative governance.

Multiple disciplines over the last few decades have given considerable attention to social capital (Liu et al. 2014). Hence there is some debate over the definition and operationalisation of the term (Dasgupta and Serageldin 1999). It is generally considered as a “*multidimensional concept, that incorporates diverse social phenomena such as trust, reciprocity and exchange, norms and networks of interpersonal relationships*” Barnes-Mauthe et al. (2015, p. 393). The foundation of it was established by Bourdieu (2002), who argued that society is divided into classes that differ in their endowment of different forms of capital. He distinguished between economic, cultural and social capital. The concept was then widely popularized by Putnam (1995a). Putnam et al. (1993, p. 167) define it as “*features of social organisation, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated action*”. Today, as will be elucidated later, the literature distinguishes between many different forms of social capital, only some of which will be important for this research.

Social capital is of high relevance for collective action because the latter requires flows of information and networks between actors to enable them to take decisions. Social capital theory provides an explanation for how individuals, groups, and also formalized organisations use their relationships with and within each other as an asset for their own and the collective good (Adger 2003). Social capital is often regarded as an asset in collective action and several benefits are described in the literature. Ostrom and Ahn (2009, p. 17) even make it inseparable by viewing SC “*as an attribute of individuals and of their relationships that enhance[s] their ability to solve collective-action problems.*” However, social capital not only affects and can exist between individuals but also between formal organisations that have ties of information sharing, trust, and shared interests (Borg et al. 2015). This is particularly relevant for this study as it examines a network of organisations.

Trust is thereby often mentioned as an important aspect of social capital. Some authors regard trust as a definitional part of it (Westerink et al. 2020), while others see it more as a consequence of other forms of SC, mainly trustworthiness of people, networks, and institutions (Ostrom 1990). De Vries et al. (2019) show how trust between actors (interpersonal trust) within a certain organisation, but as well trusting in an institutional design can foster collective action for agri-environmental management. According to Wade (1987) chances of successful collective action increase when people are concerned about their social reputation, an asset that is also strongly linked to trust. Mutual trust

moreover reduces transaction costs (TC) in collective action because it reduces the need to monitor others and thus saves money and time (Vanni 2014).

Social Capital encourages exchange and reciprocity, and also enables norms, rules and sanctions (Barnes-Mauthe et al. 2015; Putnam 1995b). Reciprocity contributes to the development of long-term obligations and again increases trust between people and organisations. Successful collective action heavily depends on rules and sanctions, that ensure that the groups interests are in line with those of the individuals. For this, the condition must be given that the rules are recognized by as much people as possible and are able to change the behaviour of the individuals effectively (Vanni 2014). This can give people the confidence to invest in collective goods.

Since collaborative governance also requires the cooperation of various actors, it is not surprising that social capital is described as an important asset in the literature as well, much like in collective action research. Collaborative processes are inherently subject to some difficulties. Uncertainty may prevent partners in collaborative governance from engagement due to high transaction costs. Conflicts over power and resource related problems may lead to failed collaboration. Networks, trust and norms however can reduce barriers and therefore improve the effectiveness of collaborative governance (Oh and Bush 2016).

The flow of resources is an important component for collaboration, that will influence the results and outcomes. Examples (de Vries et al. 2019) of these resources can be financial and human resources, materials, knowledge, or innovative ideas. Barriers can develop, when participants have trouble to identify which actors possess the needed resources and if the partners are credible in exchanging those, meaning that the actors might doubt another actor's credibility (Oh and Bush 2016). Social capital in form of trustworthiness, reciprocity, and reputation can expand the flow of resources in a collaborative process. Building trust and experiencing that sharing resources and knowledge will produce benefits in the long term gradually increases the flow of resources, knowledge and information shared. Reaching a consensus of goals, missions and values among participants and organisations will improve the condition to achieve the aims of the collaboration (ibid).

Social capital plays a vital role for the success of collective action, as well as collaborative governance (Borg et al. 2015). Without it, it is difficult to pursue collaborative efforts that lead to successful collective decision making and desired outcomes. However, social capital remains a complex concept and should not be reduced

to a single metric (Call and Jagger 2017), as there exist different types that have variable positive as well as potentially negative impacts.

2.2.2. Bonding, bridging, and linking social capital

This thesis will focus on three important types that are well established and have already been applied in many case-studies: Bonding, bridging and linking social capital. Putnam (2000) was the first author, who formally distinguished between bonding and bridging SC.

Bonding SC is associated with inward-looking networks, bringing together similar kinds of people (Fisher 2013). It evolves within groups that are rather homogenous, thus those networks are often dense, and the members have strong mutual connections. They are similar in their socio-economic status, attitudes, status of information and resources and might form similar views over time (King et al. 2019). Bonding can be associated with a feeling of ‘people like us’ or ‘in it together’. Taking a company as an example it would exist between employees who share identity and a sense of belonging. Within the company, the relations are inward-looking, most people know each other. Even if this does not hold true, there still could be strong bonding within units and teams of that organisation (Claridge 2018).

Bridging however exists in outward-looking networks and connections among different groups of people (Putnam 2000; Baylis et al. 2018). These actors are different in their social identity but might share common interest or goals, which enables them to exchange novel resources (King et al. 2019; High et al. 2005). For Westerink et al. (2020) it evolves across different groups with similar positions of power. Sticking to the example of a company, bridging could describe a relationship to another organisation or firm. Those networks could provide actors with access to new resources otherwise not available. Granovetter (1973) established a concept of so-called weak ties, which is not synonymous with bridging SC but similar. He described how dissimilar actors “*gain access to resources, such as employment, outside their immediate social connections*” (cited after King et al. 2019, p. 126)

While bridging concerns e.g. demographically different groups in a horizontal way, linking SC is about vertical connections, between actors with different levels of power and influence. It can mean connections to actors who are politically or financially more dominant or could occur between institutions on a different hierarchical level

(Woolcock and Sweetser 2002; Dahal and Adhikari 2008). For Westerink et. al (2020) it describes the quality of relationship between groups in uneven power positions, which could be for instance farmers and public officials. Some authors have conceptualised linking as a subset of bridging in order to capture the power dynamics of vertical associations (Clardige 2018).

In early research, SC was considered a “*more is better*” resource. However more recent literature shows that different forms of SC have their advantages as well as certain downsides (Birendra et al. 2018, p. 318). Bonding fulfils useful social functions, it can help people to ‘get by’, by providing resources among a group. Furthermore, it provides the norms and trust that facilitate collaborative action (Claridge 2018). Bridging can increase the ability to gather information, to recognize opportunities, gain access to power through a better position in a network. It traverses social boundaries and therefore helps to exchange information, innovation and to build consensus among diverse groups. It works as a social lubricant or leverage (Clardige 2018).

Disadvantages are named in various studies. While this is hardly ever the case for bridging, it is often the case for bonding SC (Sijun et al. 2011). Because bridging SC is outward looking, it fosters diversity and heterogenous connections. Bonding however, might lead to negative consequences, the stronger it gets. Birendra et al. (2018) in adaption from Agnitsch et al. (2006) and Portes (1998) name three important potential negative consequences: the exclusion of outsiders; that benefits are only shared with a limited group of members; and that individual freedom might be restricted because of group conformity and downwards levelling norms, that allow members with similar opinion to stick to the groups while opposing opinions are forced to leave the group. Hence bonding might form homogenous groups, who share similar views and become isolated from wider social exchange (King et al. 2019). This can lead to a “*us-versus-them*” mentality, where the trust among members of a group is high, while there is the tendency to avoid and distrust other groups (Coffé and Geys 2007, p. 124). While it can lead to lock-in effects and path dependencies that depress the sharing of knowledge or other resources it nevertheless might also provide an environment where people feel save to explore new ideas together (King et al. 2019). Thus, it must be noted that the effects depend heavily on the concrete social and institutional environment.

2.2.3. Social Network Analysis as a suitable method to study social capital

This subsection briefly discusses the role social capital plays in the context of Social Network Analysis. For this purpose, SNA is introduced, but a more detailed discussion will take place in the methods-chapter. In a second step, the connection between the two concepts is highlighted.

Social Network Analysis, according to Borgatti et al. (2018), is a way of thinking about social systems that focuses on the relationship among the entities that make up that system. A social network consists of independent actors (individuals, groups, or organisations) that interact with each other to establish a flow of information or resources (Abid et al. 2017). SNA is a body of research methods, that try to analyse underlying structures of such networks. These are constructions based on certain criteria by the researcher, who for example must define the boundaries of the network. SNA tries, on the basis of gathered empirical data, to identify structural ties between social actors, giving on one hand information about the relations between social entities (Tabassum et al. 2018). On the other hand, there is also data gathered at node-level about specific actors, for instance how central they are in the network or what function they fulfil, whether they act as brokers, for example. The goal, achieved by using different kinds of data along with graphic imagery and computational models (Prell 2012), is to understand the contents and patterns of relationships in social networks in order to understand these relations and hence their implications (Tabassum et al. 2018). It consequently helps to understand processes and outcomes of the network (Giurca and Metz 2018).

SNA has proven to be useful in a number of studies related to social capital (e.g. Clark 2010; Díez-Vial and Montoro-Sánchez 2014, Birendra et al. 2018). SC refers to *“the value found within social networks as well as the value one gains access to through social networks”* (Prell 2012, p. 62). It thus tends to have an intrinsic and an instrumental notion of the value of social networks (ibid). There is a body of research measuring and studying social capital from a social network’s perspective. It focusses on how certain structural features like bonding or bridging ties, dense structures or weak ties correspond to a variety of different outcome variables (Prell 2012). Barnes-Mauthe et al. (2015) for instance identify a number of important network measures of social capital and test them using a dataset from Hawaii’s longline fishery. The identified network measures, like betweenness, tie strength, degree centrality, eigenvector centrality, and various others are of high value to determine SC in its different forms in social-ecological systems. Baylis

et al. (2018) measure, using a social network approach, bonding and bridging social capital in networks that manage common pool resources. They use firewood collection on communal lands in the Yunnan Province in China as a case study and look for the presence as well as effects of both bonding and bridging SC on the efficient community governance of the common pool resource (Baylis et al. 2018). Borg et al. (2015) use network surveys as a tool of SNA and examine for elements that constitute social capital like information sharing, trust and shared interests. They test and demonstrate how these ties relate to each other and which ones are crucial for efficient collective action in a collaborative network for forest biodiversity in Finland (Borg et al. 2015).

In SNA different metrics have been developed that can be used as measures to indicate certain patterns in the network. Apart from quantitative measurements, qualitative data can be obtained with the help of the methodology of Social Network Analysis, which allows statements to be made about actors and their relationships with regard to bonding, bridging and linking.

2.3. Application of the theories for agri-environmental collectives in the Netherlands

The collective Natuurrijk Limburg has a large number of members (1300) and only exists for a relatively short period of time. Farmers and landowners are active in the cooperative, collaborate with each other and, in coordination with the administration of the collective, carry out management activities on the ground. They collaborate to achieve a shared interest, the protection of certain species or generally speaking maintaining and increasing the biodiversity in the region. Westerink et al. (2017) refers to this process as ‘collaborative management’, which is a form of collective action. Based on the theory described above, (bonding) social capital plays a crucial role in the effective functioning of it (Ostrom and Ahn 2009).

At the same time, the collectives within ANLb are part of an actors’ network of various private and public actors. The subsidy scheme is embedded in a system of collaborative governance (Westerink et al. 2017). According to Westerink et al. (2020) the farmers collectives try to combine the identity of a rather bottom-up self-governing group with that of a boundary organisation that serves to enable collaboration between the farmers and the government. The collectives had to develop linking social capital and characteristics of a public agency. However, this came at risk of losing bonding social capital within the collective, which is a very important resource for self-governing groups

(Westerink et. al 2020). Against the backdrop that social capital has been identified as an important resource for collaborative governance in the literature, I assume that especially bridging and linking between the collective and various actors plays a major role in the effective functioning of the whole network structure. Figure 1 shows a simplified structure of the actors and the forms of social capital that are assumed to be relevant in the distinct relations.

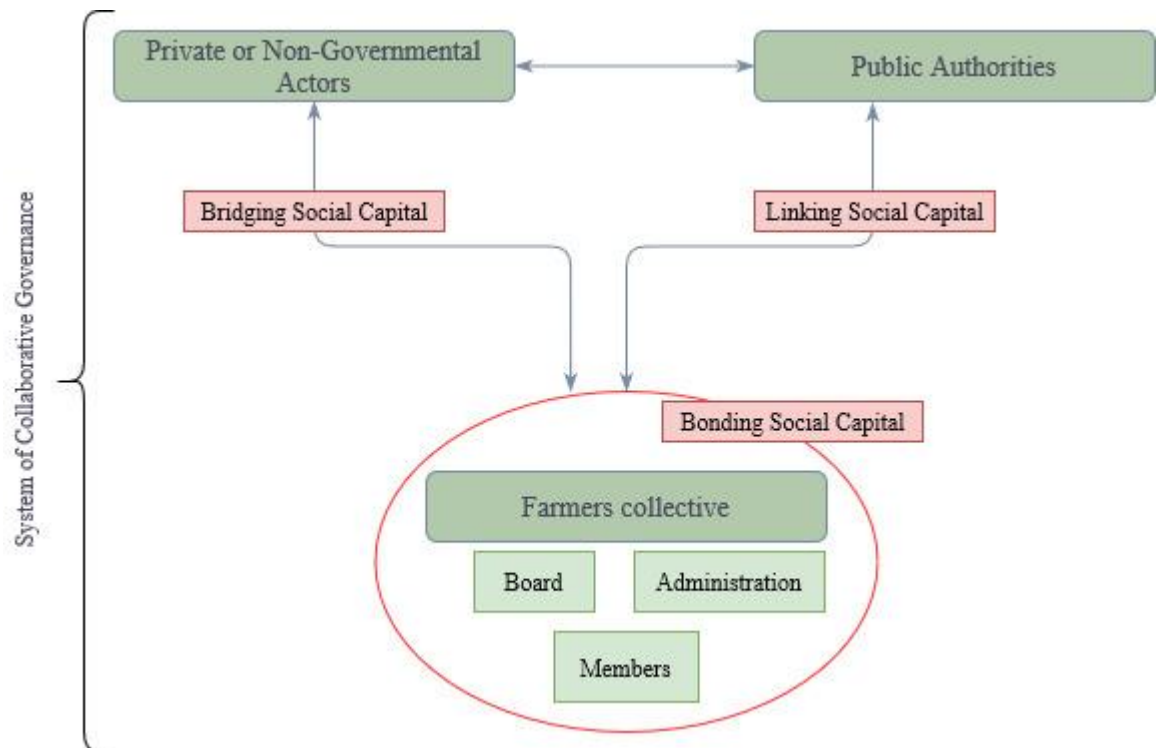


Fig. 1 Representation between which actors which form of social capital is assumed to be relevant. For the sake of clarity, this diagram omits the fact that important bridging relationships may also exist between other actors in the network.

A first important goal of this research is to understand what structures and mechanisms actually underlie the ANLb network including and around the studied collective. It is of interest how it operates, who is part of it and how decisions are made. From this derives the first research question: *How does the governance structure of the ANLb within and around the agricultural collective Natuurrijk Limburg work?* To answer that question several sub-research questions must be answered to gain a cohesive picture: Who are central actors in the network, which are their tasks? Which actors share formalized relations, e.g. through contractual relations? Between which actors do informal relations exist, thus flows of knowledge or other resources, like relations of trust? Who has how

much influence on the decision-making and who benefits from it? What motivations have actors to engage?

As described above, the presence or absence of social capital in networks is often used to explain the success or failure of collective action. Social capital is generally regarded as an important asset for the functioning of networks between people (Clark 2010). The second main question guiding the research is: *In which way does the presence of social capital influence the functionality of the network?* This question is answered with the help of the following sub-questions: What bonding social capital exists between homogeneous actors? And what bridging/linking social capital exists between heterogeneous actors? Using the Net-Map-Method, different actors are asked about their roles, connections to others, motives, influences, or benefits in the network. Homogenous and heterogeneous actors are thereby identified, and their relations studied. Using quantitative indicators for measurement as described by Barnes-Mauthe et al. (2015) and qualitative statements, levels, and impact of bonding, bridging and linking SC between different actors can be estimated. This allows conclusions to be drawn about how this affects the modus operandi of the network.

3. Case study

The aim of this chapter is to first briefly present the history and development of the Dutch AECS and to explain why it exists in its current form. Afterwards I will justify the case selection and present the chosen case. To this end, the study region is presented first, followed by the selected collective and how it implements the ANLb.

3.1. Background on the Dutch AECS

In 1994 under the Common Agriculture Policy in the European Union it became mandatory for all member states to include Agri-environmental schemes (AES) in their Rural Development Plans (Westerink et al. 2017). AES were renamed Agri-Environment and Climate Schemes (AECS) from 2015 on (Dupraz and Guyomard 2019). These schemes are a policy tool that enables member states through financial support to design and implement AECS. Each measure has specific objectives, which can be the protection of soil, water, landscape, climate, biodiversity, or other environmental public goods.

Hence, there is a variety of possible actions like reducing the inputs of fertiliser, enhancing habitats for wildlife, introducing buffer strips, integrated production and numerous others (European Commission 2017). AECS take place under the roof of each member state's Rural Development Programme and are mandatory for the latter to offer, but voluntary for individuals (mostly farmers) to participate in. These can in turn, when they choose to go beyond basic environmental requirements, claim payments through implementing AECM (ibid). The payments are seen as a form of compensation for additional costs arising from the new practices, creating environmental benefits or positive externalities.

However, van Strien et al. (2016) show that despite increasing political efforts, the state of biodiversity from 1990 to 2014 of populations in farmland and open semi-natural habitats in the Netherlands has continuously declined. Although individual successes are discernible, the political attempts and actual measures to protect biodiversity hence seem fundamentally insufficient.

The Netherlands have quite a long history of agricultural cooperation which does not need to be set out in detail here. Already in the 1980s Local Environmental Cooperatives (LEC) were founded, many more in the 1990s. In 2014, the EU Rural Development Regulation for the first time introduced the possibility to apply for AECS as a group, instead solely as an individual. Two years later, this became legally the only option for landowners. The subsidy program in the Netherlands carries the already mentioned name Agrarisch Natuur- en Landschapsbeheer. Professional farmer collectives are the only financial beneficiaries (Dik et al. 2021).

The Dutch government lists four main reasons for the change, naming the long tradition of agri-environmental cooperatives as one of them. Social structures were already present, they only had to be professionalized and extended to the entire countryside. As a second reason they see the need for greater flexibility for the content of the conservation activities. Furthermore, they claim to facilitate the administrative process and reduce implementation costs (Terwan et al. 2016). The last and maybe most important argument however is to improve the environmental performance. As Westerink et al. (2020, p. 393) emphasize: “[T]he lack of effectiveness in ecological terms [was a] very strong argument for reforming the Dutch AES”. It became evident that only a cross-farm approach could reverse the decline in farmland biodiversity. The government so focuses on creating good habitat conditions for rare species, more than making commitments on individual farm level (Jongeneel and Pollman 2014).

In 2021, forty agri-environmental collectives that are legal entities execute the national AECS. They cover the whole area of the Netherlands. Over 9000 farmers are actively involved and manage an area of about 100.000ha of farmland (BoerenNatuur 2021b). The government closes no contract with an individual farmer anymore but with each collective based on their specific management plan. The collectives close individual contracts with the farmers, coordinate the measures, they monitor the compliance of the farmers' action with the agreement, can apply sanctioning and process the payments.

3.2. Case selection

This thesis is written within the framework of the project *Contracts 2.0: Co-Design of Novel Contract Models for Innovative Agri-Environmental-Climate Measures and Valorisation of Environmental Public Goods* under the auspices of the European Commission. The main goal of the project is to develop new contract-based approaches that incentivise farmers for the increased provision of environmental public goods alongside private goods (European Commission 2020). One of the four types that are investigated are the “*collective approaches*” that are based on group contracts. One of the work packages is occupied with the ex-post analysis of existing contracts. The action partner hereby is BoerenNatuur, the national umbrella organisation of the 40 private farmer collectives in the Netherlands (ibid). For the research of the contract governance, it is on one hand of interest to understand the collective action among contract parties (a group of farmers that signed up to a collective contract) as well as the collaboration between contract parties (e.g. government agencies and farmers) (Prager et al. 2020).

In consultation with the ZALF research institute and BoerenNatuur, the farmers collective Natuurrijk Limburg was selected as a possible case study. It has only existed in this form since 2016 and is also the largest Dutch collective, which makes it interesting to examine the social capital that has been built up. The collective and various governmental and non-governmental actors surrounding it in Limburg and on the national Dutch level constitute the relevant network for the execution of the ANLb in the province. This structure is investigated in the present study.

3.3. Case description

Natuurrijk Limburg is one of the 40 above mentioned collectives, located in the province of Limburg. The Dutch province is located in the very south-east of the Netherlands (Fig. 2) and covers about 2200 km². With a population of 1,1 million people and over 500 inhabitants per km² it is quite densely populated (Remme 2016). In Dutch provinces, provincial parliaments are elected every four years ('provinciale staate'). They then elect a provincial government ('gedeputeerde staten'). However, the Netherlands does not have a pronounced federal structure, and the provincial parliaments have little legislative power. They are not headed by a prime minister elected by parliament but by a commissioner of the king appointed by the minister of the interior. Accordingly, provinces in the Netherlands are entrusted with administrative tasks and implementation of national policy rather than enjoying much autonomy themselves (Lepszy 2003).



Fig. 2 Location of the Province of Limburg within the Netherlands, Source: Dreamstime (2021)

The inhabitants of the province of Limburg partly perceive themselves as culturally distinct from the rest of the Netherlands, in fact the province differs culturally significantly from other Dutch provinces. This is evident in the dominance of the Roman Catholic religion, the influence of German and French culture, as well as the use of the Limburg dialect (sometimes referred to as the Limburg language).

The landscape of the province is characterized by the Geest, a landform formed during the Ice Age. Therefore, the soils are often sandy, and the vegetation is characterized by heath landscapes. While in the north peat and sand soil dominates, the south has fertile loessic soils. Jongman (2002) describes that centuries of intensive land

management have converted most of the natural ecosystems in the area and those that remain are highly fragmented. While about 50% of the province's land is used agriculturally, around 20% is developed, 15% is forest and a rest of 15% accounts for semi-natural vegetation and water. The competition for land between agriculture, nature and urban land covers is considered high (Remme 2016). The region provides habitat for a number of species that are, according to Statistics Netherlands (2008) of national or international importance, such as for instance a number of bird species that depend on the habitat of the traditional open heathlands.

Agriculture and agriculture-related industries are an important component of the Limburg economy. The sector contributes to 8% of the GDP and likewise 8% of employment of the region, with more than 46,000 jobs, 16,000 of which in the primary sector (Provincie Limburg 2020). The area under cultivation is around 94,500 ha, which corresponds to 5% of the total area under cultivation in the Netherlands. A large part of 34,000 ha is used for arable farming. With 26 ha, the average Limburg agricultural enterprise is smaller than the average in the Netherlands (34ha). The dominant crops are sugar beet, wheat, vegetables, and potatoes. With 1% (1,296 ha) of the total area in Limburg and 2% of the total organic area in the Netherlands, the area under organic cultivation is limited. With a share of almost 60%, grass, used as pasture, is the most frequently cultivated organically produced crop (van der Meulen 2020).

The collective under study Natuurrijk Limburg, is the only collective in the Dutch province of Limburg and therefore covers the whole area of the province. The collective has been a cooperative under Dutch law since 2015 under the name "*Coöperatie Natuurrijk Limburg U.A.*", before that it existed for several years in the different legal form of a foundation. Every agricultural collective must be certified to be eligible for the provincial Nature and Landscape Subsidy System (SNL). The certification is done by the SNL Stichting Certificering (Certification Foundation), an independent body who controls certain quality requirements for management, organisation, and administration of the collectives (BIJ12 2021a). The quality criteria are reviewed again at certain intervals.

As the only collective in the whole province, NL covers the biggest area of land of all Dutch collectives. The members are land owners, who are mostly farmers but also private landowners who do not farm professionally (Natuurrijk Limburg 2021c). As provided for in the statutes of a cooperative, there is a general meeting of members, which elects a board of directors. There is a small number of employees who take on the

administrative tasks. The collective is allowed to use up to 15% of the founding, that is paid approximately 50% by the funds of the EU subsidies and 50% by the province, for hiring ecological trained staff and paying people who master the administrative burden (Contracts 2.0 2020).

The core task of the collective is the execution of the ANLb, part of the aforementioned SNL. The provinces determine the nature objectives for an area and record them in a so called Beheerplan (management plan). This plan broadly outlines where conservation activities will be applied, but the concrete implementation is the task of the agricultural collectives. The collectives in turn write, in collaboration with other parties like the water boards or landscape organisations, an annual management plan that lays out their activities. Farmers who want to carry out agricultural nature and landscape management approach the collectives and it closes a contract with them. For every period of six years, the collective has to submit a new subsidy application to the province in which it lays out which goals they want to achieve at area level and how they want to realise them (BIJ12 2021b).

The subsidy ANLb follow a habitat approach for animal species, based on an area-oriented collective procedure. Target species are those that fall under the EU Birds Directive and Habitats Directive, the aim is to improve or maintain the conservation status of these animals (Sundseth 2015). They include a number of 68 species of international importance including amphibians, birds, insects, mammals and bats. Little owl (*Athene noctua*), Northern lapwing (*vanellus vanellus*), black-tailed godwit (*limosa limosa*) or the hazel dormouse (*Muscardinus avellanarius*) are just some of the more well-known examples. The subsidy can be granted for four agricultural habitat categories: open grassland, open cropland, wet veins and dry veins plus the category water (BIJ12 2021a).

Every management activity has a function, for example the creation of foraging areas or the optimization of reproduction opportunities. The collective can thereby only make contracts with farmers who work within regions, that the Dutch government has specified as high potential areas. Through the ANLb a variety of projects are carried out, that aim to protect the environment and preserve biodiversity in harmony with agricultural management. The collective thus advises the farmers which measures suit his/her land and which are related to what his/her neighbouring colleagues are exerting. The agreed measures are then recorded in a nationwide GIS-based IT system. Whether the agreed requirements are met is controlled by the collective, which can decide to give a fine or

even end the contract with the farmer. The payment is based on the incurred costs of the farmers and is understood as a compensation (Contracts 2.0 2020).

As described above, most projects are directed at protecting certain indicator species. For illustrative purposes, two ongoing examples of Natuurrijk Limburg are briefly given below. The collective encourages farmers to plant and maintain hedges and shrub areas so that they increase in number, size and width. Hedges provide a necessary habitat for different mammals, reptiles, amphibians and insects. Rare species like the in the Netherlands native species of the dormouse (*Muscardinus avellanarius*), mockingbird (*Mimus polyglottos*), linnet yellowhammer (*Emberiza citronella*) and other birds need hedges for survival (Natuurrijk Limburg 2021b). More than 800 members of the collective jointly manage more than 500km of thicket, cutting and shearing hedges (Natuurrijk Limburg 2021a).

A second project, located in the east of the nature reserve Mariapeel is aimed at bringing back and protecting the crane (*Grus grus*). That is achieved mainly by creating foraging opportunities for the parents with the young birds. By planting herbaceous grass, grain, buckwheat, and protein crops (clover / lucerne) side by side in combination with extensive mowing management an environment is created that is rich of insects and provides feed for the cranes. The fieldworkers advise the farmers in how to create a suitable environment for the bird. The crane can also serve as an indicator species because habitats that suit it also provide good conditions for other species such as the partridge (*Perdix perdix*), lark (*Alauda arvensis*), kestrel (*Falco tinnunculus*) and barn owl (*Tyto alba*) (Natuurrijk Limburg 2021a). The collective offers a number of further projects and measures through the ANLb, which are intended to provide more biodiversity in the landscape, in one case actually not concerning animals but aiming at bringing back rare, native arable flora in central and southern Limburg (Natuurrijk Limburg 2021a)

4. Methods and Materials

This chapter describes how this research proceeds methodologically. First, the applied Net-Map Method is described in the context of Social Network Analysis. Then, the process of how data was obtained throughout the interviews is described. Finally, a subchapter explains how the obtained data was operationalised and analysed to gain knowledge about the case.

The Net-Map Method used allowed for the collection of qualitative and quantitative data, which were used together to generate results. The present research uses a deductive approach. There is already a large body of established literature and solidified knowledge on the role and impact of various forms of social capital in networks and how they influence collective action. Using a case study and the subsequently described methods, this research examines what forms of social capital exist in the specific case and how they operate. This is then collated with existing knowledge about them.

4.1. Net-Map Method for Social Network Analysis

Social networks can be defined as “*a set of social entities, such as people, groups, and organisations with some relationships and interactions between them*” (Tabassum et al. 2018, p. 1256). According to Giurca and Metz (2018) social networks are constructs, that do not independently exist as such. They are rather simplified representations of certain aspects of social phenomena between people, that allow a scientific examination of the subject matter. Borgatti et al. (2018) describe them as a way of thinking about social systems that focus on the relationship among the entities that make up the system. Applying the above mentioned definition to diverse social settings, numerous social networks can be discovered, may it be at the workplace, in a circle of friends or at the university. Although it is standing to reason to assume that social networks consist of human beings, they can as well be composed of collective entities or aggregated units, such as organisations, political parties or other kinds of groups (Knoke and Yang 2014).

Social Network Analysis is a body of research methods that aim to analyse underlying structures of such networks. Understanding these relations through various techniques makes it possible to understand their implications and consequences (Tabassum et al. 2018). Network research uses a certain terminology, while actors are often called ‘nodes’, relationships are referred to as ‘links’ or ‘ties’ (Borgatti et al. 2018).

Relations between actors may either be *directed*, meaning one actor initiates and the other one just receives, or they can be *undirected*, where mutuality occurs (Knoke and Yang 2010).

By using, among also other things, network matrices, diagrams and mathematical measures SNA analyses presence, directions and strength of connections (Skaalsveen et al. 2020). There are different possibilities to collect data in SNA, according to Schiffer and Hauck (2010) the most common approach is to identify the actors using a name generator and consequently asking for each possible pair of nodes. The process is described as potentially long and tiring without learning effects for the interviewee and has led to a search for innovative approaches, that delivers effective results using efficient research frameworks. To address these difficulties, Schiffer and Hauck (2010) based on Douthwaite and Davies (2006) have developed the Net-Map Method (NMM) that will be introduced subsequently.

Initially developed during a partnership between the Challenge Program for Water and Food and the White Volta Basin Board in northern Ghana in between 2006 and 2008, the NMM was thought of as a low-tech and low-cost research tool. The strengths of the method lies within the visualisation of a number of phenomena that structure decision-making areas (Schiffer and Hauck 2010).

In a in a guideline-based interview situation the interviewer and interviewee usually sit opposite each other. Inherently, interviews always reveal the subjective reality of the interviewee and do not provide ‘objective’ data (Helfferich 2011). For the method a large sheet of paper (e.g., DIN A1) is placed between them on which part of the exchange is visualised during the interview process. The first questions aim for central actors of the network, and these are displayed on the paper with the help of coloured stickers. Later, connections such as conflicts or trust, formal and informal relationships are visualised by different coloured arrows between the actors. The interviewees not only provide information about themselves but also about the relationships of the other actors. Variables like influence of an actor can be represented through piling a quantity of coins on its name. It is thus possible to obtain qualitative and quantitative data, network structures, power relations, influences and implicit knowledge can be visualised (Schiffer and Hauck 2010). The interviewees do not need any prior knowledge, they can be introduced to the method on the spot, and through the interactive method it is possible to improve the quality of the obtained network data (Helfferich 2011). As contact restrictions to contain the COVID-19 pandemic made it partly illegal to travel long

distances and conduct face-to-face interviews with a range of stakeholders, the NMM in this case study was conducted online, which will be explained in detail later on.

4.2. Data collection

A first step to get to know the NMM, was a one-day workshop at the Leibniz Centre for Agricultural Landscape Research in Müncheberg. The method was also practiced there on site, at that time it was still assumed that ‘physical’ interviews could potentially take place.

The ZALF, through the *Contracts 2.0* project, had already been in exchange with BoerenNatuur, the national umbrella organisation of the collectives. They arranged a contact person who was active in the administration of Natuurrijk Limburg. The first interview was conducted with this contact person. Then referral sampling was used, in which other relevant actors and possible interviewees were named in the first interview by the contact person and thus additional interview partners could be gained. The contact person suggested four additional contacts, partly in the collective, partly in other organisations. Three additional interviews with stakeholders from other organisations were arranged through inquiries with the relevant organisations after these organisations were mentioned as stakeholders during the previous interviews and seemed relevant. The interviews cover a wide range of the relevant actors but not all of them. Furthermore, there are a number of other less relevant actors, some of which were mentioned only once. The limitation to eight conducted interviews was mainly due to a limited time budget.

All stakeholders were contacted via email and thus informed about the research project. The response rate was, even though often delayed, very high. Except for one request all others were positively received. A set of eight interviews was conducted; due to the resulting delays, the request for additional stakeholders was waived because of time constraints. Out of the total of eight interviews, five were conducted in one-on-one meetings and three together with a colleague.

Interview Partner	Level
RVO	National
BIJ12	National
BoerenNatuur	National
Administrative employee Natuurrijk Limburg	Provincial – Collective
Fieldworker Natuurrijk Limburg	Provincial – Collective
Farmer	Provincial – Collective
Farmer and board member	Provincial – Collective
Public servant Province of Limburg	Provincial

Table 1 List of interview partners.

An internal distinction was made between actors that play a role only at the provincial level and actors and organisations involved with ANLb at the national level. For most organisations except the collective, one person involved in the ANLb was interviewed. This person's statements are representative of his or her organisation. Of course, this also means that only one perspective is gained from an entire organisation, which can limit the generalisability of the information.

The course of the interviews was always very similar. A Zoom link was created in advance and send to the interviewees. When the meeting started, they were given an invitation link to the online visualisation tool Mural¹, so that the visualisation of the network could be participatory as both partners could edit it. The guideline and questions for the interviews were developed together with colleagues, the same guideline was followed for each interview to ensure the consistency of the method.

The interview procedure was the following: First, I briefly introduced myself and thanked them for their participation. Then I explained the goal of the interview, to learn more about the ANLb network and its strengths and weaknesses. With the consent of the interviewees, the interviews were recorded. They lasted between 60 - 100 minutes. To begin with, the interviewees were asked to reflect on their individual task and role and that of their organisation in the ANLb actor network. Some of the most important

¹ www.mural.com

questions are briefly presented below; the complete interview guide can be found in Annex 1.

1. Who are currently the central actors for ANLb in Limburg in general?
2. Which actors are linked through formalized relations, e.g. (monitoring) contracts and other formal agreements?
3. Which actors are linked through informal relations, e.g. information exchange, exchange of resources and knowledge?
4. For which actors do relationships of trust exist?
5. What are motivations of the actors to engage?
6. On a scale from 1 to 10, how motivated are the farmers in the/your collective to participate, including also engagement in collective decision-making, knowledge and capacity building?
7. What is the amount of influence each actor has on the rules and in the decision-making process of ANLb?
8. What is the amount of benefit each actor has from being involved in ANLb?

Reflection part:

9. What works well and what do you consider as successes so far?
10. What works less well and where do you see remaining challenges?
11. Are there farmers who stopped participation, how many and why?
12. Do you want to share anything else important?

While the actors were queried, they were drawn as sticky notes on the mural by the researcher (Fig. 3). Before formal relationships were asked, formal was defined as contractual relationship or cash flow. Informal relationships were about exchanges that occur even without clear legal necessity, for example, to share knowledge and ideas, to consult with each other. Nevertheless, the distinction between formal and informal relationships sometimes led to ambiguities. The relationships were made clear in the mural with the help of different coloured arrows. Difficulties and conflicts between actors that might hinder the process were asked about as well as relationships of trust in the network. When asked about motivations of different actors to participate in the ANLb, the respondents could name what came to their mind, this was illustrated by small symbols in the Net-Map. For instance, banknotes were used to express economic motives,

a tree icon for environmental concern. By the means of small and large bars, the amount of influence and benefits of the various actors was queried. In a final part of the interview, there was always an opportunity for reflection: what do you think works well overall, and what not so well? Anything else important you would like to share on your own? The interviewees saw the mural during the process and had the opportunity to object or make additions. The participation to edit and design the mural themselves was low. At the end of the interview, I thanked the participants and asked for potential further important actors to talk to. This was in the most cases followed by a few minutes of informal, friendly exchange.

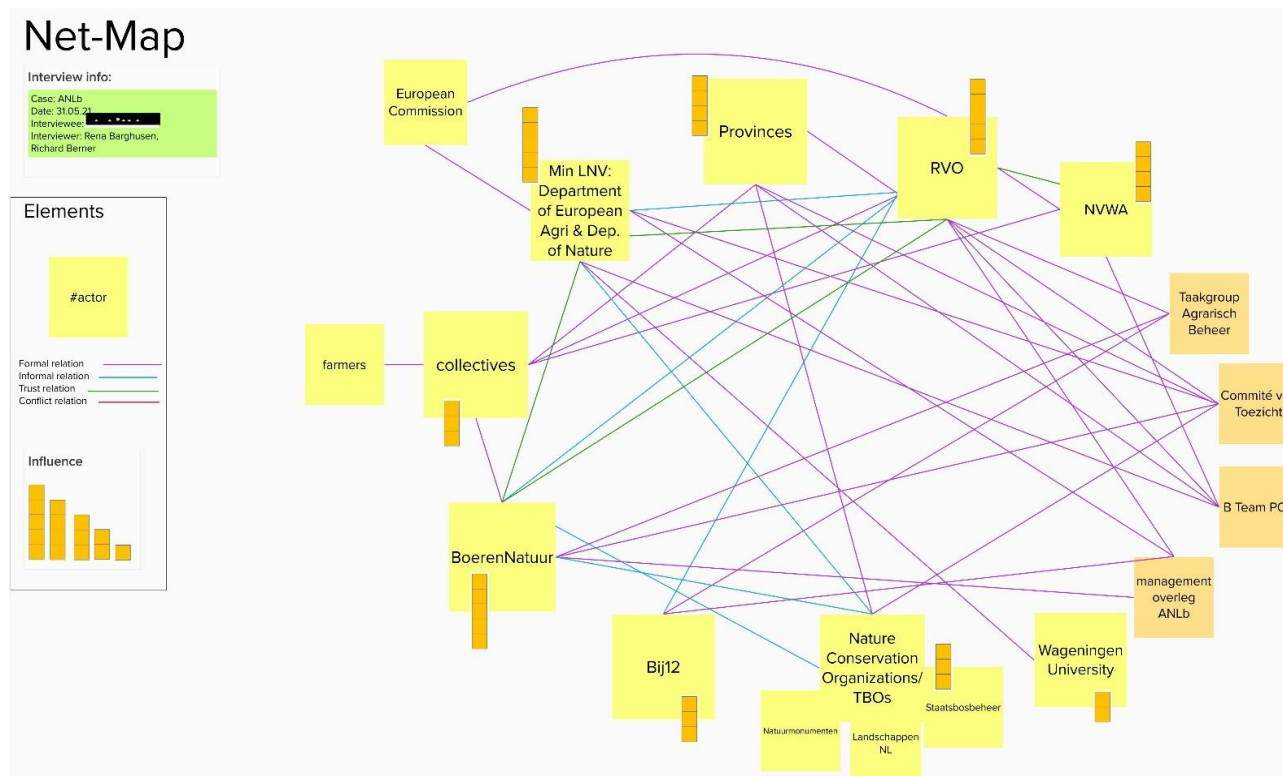


Fig. 3 Example of one of the Net-Maps drawn during one interview

4.3. Data operationalisation

4.3.1. Qualitative analysis of the network data

All eight interviews were recorded with the consent of the interviewees. The software Otter.ai was used to facilitate the transcription, which was done verbatim. Based on Mayring (2015), a qualitative analysis of the data was applied i.e. a coding procedure was used. First, categories for coding were deductively derived. Possible categories arise from

the research interest and are displayed in table 2. The table shows which elements of the questionnaire were specifically relevant to which category.

Category	Reference in the questionnaire
Bonding social capital	<ul style="list-style-type: none"> • Informal relations (exchange of resources, knowledge) • Relations of trust
Bridging social capital	<ul style="list-style-type: none"> • Formal and informal relations • Relations of trust • Influence of the actors
Linking social capital	<ul style="list-style-type: none"> • Formal and informal relations • Relations of trust • Influence of the actors
Trust	<ul style="list-style-type: none"> • Relations of trust
Conflict	<ul style="list-style-type: none"> • Conflictual relations
Motivation	<ul style="list-style-type: none"> • Motivations of actors to engage • How motivated are the farmers to participate / engage

Table 2 Categories for operationalisation

Based on the definitions and understanding of the concepts, rules were established for when statements fit into a certain category. For each established concept such as for instance bonding social capital an interpretative decision was made as to whether the statements in question gave an indication of the character of a relationship and whether that could be interpreted as a sign of bonding.

In a next step, the interview transcripts were searched on a keyword basis, partly manually and partly electronically. The answers to the key questions of each category were considered. The aim was to assign relevant text passages to the corresponding categories in a table (Mayring 2015). In a final step, the results from the categories were summarised. The interviews were assigned a random number, not following the chronology they were conducted, to ensure anonymity (P1 – P8). To make findings from the interviews clear, the results are described and supported with corresponding quotes that were previously assigned to the categories. If views and statements accumulate, it underscores their weight. This can then be recognized by the fact that several interviews (e.g. P3, P4, P5) are cited as evidence.

4.3.2. Quantitative analysis of network data using UCINET

Relevant actors

The range of relevant actors mentioned per interviewee was between seven and sixteen. Most respondents named about ten relevant actors. In the further analysis, only actors who were named at least twice were included. This threshold seemed reasonable in the analysis, as sometimes individuals named an actor that was subsequently not named by any other actor. In order to maintain clarity, I have therefore decided to include only actors in the analysis that appeared to have a decisive relevance but to list all seventeen mentioned actors in Annex II.

Formal and informal connections

Each actor was asked about relationships with and between the other actors. In most cases, actors were best able to provide information about their own organisation's contacts and had difficulties describing all relationships between other actors. There do not exist only one-sided relationships in the network, all relations were described as sort of a mutual exchange. There are therefore visualised by arrows in both directions.

Matrices and coding

The results from the interviews and net maps were formally coded. Thus, a 14x14 matrix was created for both formal and informal contacts. If a contact was indicated and confirmed by at least two actors, this was coded in a binary system with a '1', no contact with a '0' (Borgatti et al. 2018). Additionally, a matrix of formal and informal contacts was aggregated. The Excel matrices thus created were entered into the network analysis program UCINET 6. Based on the matrices entered, which provide information about the quantity of formal and informal contacts, the program is able to calculate a number of network parameters. Based on the resulting numerical values, conclusions can be drawn about who plays which central roles in the network, acts as a broker between others, and between whom bridging and linking ties exist.

Several relevant network parameters and their relevance can be found in table 3. Emphasis lies hereby on sociometric positional measures, that focus on the location of an actor (Lakon et al. 2007). These different measures are used to determine the centrality of actors: degree, betweenness, eigenvector and closeness centrality. These centrality measures were chosen for this analysis because they are standard parameters in the

literature to measure social capital through a network approach (Lakon et al. 2007; Borgatti et al. 1998) and were successfully applied by empirical network studies (e.g. Giurca and Metz 2018; Kustepeli et al. 2020). The measures “*bridging ties*” and “*linking ties*” as proposed by Barnes-Mauthe et. al (2015, p. 395) were included because they give an indication about bridging and linking social capital which is useful for this analysis.

Network Measure	Attribute
Network density	The proportion of direct ties in a network relative to the total number possible (Borgatti et al. 2018). Is the network very fragmented or are most of the actors connected?
Degree centrality	Measures the number of edges (ties) a node (an actor) has in a network. High degree centrality implicates increased opportunities for sharing and receiving information, it is also associated with influence and power over information transmission (Barnes-Mauthe et al. 2015).
Betweenness centrality	Measures the number of times an actor falls in the shortest path length between other nodes, that are not connected (Borgatti et al. 2018). This implicates that the actor is a broker between others. The measure is associated with bridging social capital, that connects disparate groups (Barnes-Mauthe et al. 2015).
Eigenvector centrality	Capturing which node is connected to nodes who themselves are well connected (Borgatti et al. 2018). Measure of <i>global</i> centrality. Actors that reach other actors that themselves reach a lot of stakeholders, have higher information access and influence (Barnes-Mauthe et al. 2015).
Closeness centrality	The sum of geodesic distance from a node to all others. Large numbers indicate that a node is highly peripheral, small numbers that the node is central (Borgatti et al. 2018).
Bridging ties (Barnes-Mauthe et al. 2015)	This measure was not calculated by UCINET but counted manually. It refers to the number of ties an actor has, that link heterogenous types of actors and is associated with bridging social capital.
Linking ties (Barnes-Mauthe et al. 2015)	This measure was also counted manually. It refers to the number of linkages an actor has, that link actors at different hierarchical levels and is associated with linking social capital.

Table 3 Network measures and their significance, following Barnes-Mauthe et al. (2015, p. 395)

Visualisation

NetDraw is a network visualisation program embedded in UCINET 6. Based on the entered data, it can visualise network structures with actors and connections. The matrices were fed into the programme and the visualisation was generated automatically. For better clarity, the structure was adjusted manually and, if necessary, different colours were set for different types of actors. The program allows various settings at node and tie level for instance actors with a higher degree centrality can appear as proportionally larger nodes.

5. Results

5.1. Research question: I: governance structure of the ANLb

The aim of this chapter is to describes the governance structure of the Agricultural Nature and Landscape Management Scheme in Limburg. It strives to answer the first research question: *“How does the governance structure of the ANLb within and around the agricultural collective Natuurrijk Limburg work?”*. At first, it is therefore important to identify key actors and look at what kind of relationships they share with each other. Furthermore, the motivations of actors are briefly discussed, to understand why actors become active in the network in the first place. The subchapter ends with an interim summary of the results of the first research question because they build a foundation for the understanding how the subsidy program is organised and to subsequently study the role of social capital in it.

5.1.1. Roles of central actors

As mentioned above, the range of relevant actors mentioned by single interviewees was between seven and sixteen. A table with all mentioned actors and the number of times they were mentioned can be found in Annex 1. In some cases, actors were named differently, but they turned out to be the same, which was then adjusted accordingly. Four times, farmers were mentioned as actors, for the analysis, they were subsumed as part of the collective. Similarly, volunteers were mentioned twice as actors; they were grouped together for the analysis under the term Nature Conservation Organisations, as they are active under this umbrella. As explained above, only actors who were named at least twice are considered to be most relevant. These eleven actors are described subsequently.

Agricultural Collective Natuurrijk Limburg

The agricultural collective with about 1300 members (farmers and landowners) lies at the core of the ANLb network. Like all the other collectives, it must meet certain quality requirements and is certified every two years by an independent organisation by the name ‘Stichting Certificering’ (P6). Only legally certified collectives can participate within the ANLb. Since the legal form is that of a cooperative under Dutch law (coöperatie), the highest body is the so-called Ledenraad, a member’s council. It has the highest decision-making power (P2) and the elected management board, called Bestuur, must comply with the decision made by it. The management board leads the collective and consists of six people. Furthermore, there is a team of five employees who take care of administrative matters. The interface between the farmers and the collective is formed by six field workers (P3), who advise the farmers on the implementation of agri-environmental measures and form their direct contact partners. They are also responsible for on-site monitoring (P1).

The collective knows only dual memberships. All members of Natuurrijk Limburg are simultaneously members of one of these regional collectives: Innovatief Platteland, Plattelandscoöperatie, Boeren met Natuur and Natuurrijk Limburg Zuid. In the members council there are as well representatives of the four “*implementation collectives*” (P5) (Natuurrijk Limburg 2021c). The latter of the aforementioned collectives accounts for 900 members, or about 70 percent of all members. One respondent (P5) justifies that with the fact that the region is historically and landscape-wise better suited for elements of the ANLb than the north of the province. The implementation collectives can build a stronger regional connection with their members, they also promote projects around the protection of biodiversity, independently from ANLb (P5). However, ANLb contracts are concluded exclusively with the main collective. The already mentioned front-door back-door approach was also described by the respondents (P3, P2, P4). While the collective concludes only one contract with the province, it agrees with each individual farmer on a contract for certain agri-environmental measures. Thereby, it is important that those match the farmers land conditions and consideration will also be given to adjacent areas to create larger habitats (P3). Farmers are financially compensated for their actions through the contract. The collective, thus its members, can decide for which measures it wants to compensate farmers, for which the subsidy money is used. In doing so, however, it must remain within the limits of the possibilities set by the Beheerplan, which is issued

by the province (P2). Financially, the collective is 100% dependent on subsidies to pay the farmers, about 50% of which come from the EU rural development funds and 50% from the province (P6). The collective carries out monitoring through the field workers and, if necessary, terminates contracts after consultation, if the corresponding measures do not show ecological effectiveness or are not carried out appropriately by the farmers. The final decision is formally made by the board, but they follow the assessment of the fieldworkers in cooperation with the other administrative staff (P3).

Provincie Limburg

The Provincie Limburg is the administrative authority of one of the twelve Dutch provinces. It represents the layer between the national government and local municipalities. The province is governed by an elected provincial parliament, the 'provinciale staten', that elects a provincial government, the 'gedeputeerde staten' (P4). The ANLb is one of the subsidies under the frame of the Subsiestelsel Natuur en Landschap (Subsidy System for Nature and Landscape), through which the provinces grant subsidies for the conservation of agricultural nature and landscapes (BIJ12 2021b). The term of these subsidies is always six years. The authorities set relevant nature targets for the ANLb in the Natuurbeheerplan, the nature management plan. It outlines, where agricultural nature management will be applied and which measures are possible, the specific implementation however is decided by the collective (P4, P2). The province has to conclude a single contract with the collective Natuurrijk Limburg, in which payments and requirements are specified.

The province thereby not only sets the relevant nature targets for the ANLb based on an agreement with the national government but it also has budgetary sovereignty. Most respondents expressed that the province has great influence on the ANLb, one respondent commented for instance: *"Highest [in influence], I think, is provinces. Because they provide a lot of money, they set the policy goals, they're sort of the responsible authorities in this whole scheme."* (P5). Another interviewee reported: *"[H]ow much budget you decide to give available- It's all decided by the province. There comes money from the national government to the province, yes. But it's not labelled 1-1 what they give as a budget for ANLb. And the province can decide on itself if it's more or less than what they get from the national government to spend on ANLb. So, I would say that the decision-making power is 90% within the elected body provinciale staten and gedeputeerde staten."* (P4).

Thus, how much subsidy the province pays and how much value is placed on ANLb is a political question, as this depends very much on the political balance of power in the provincial government (P4). Despite the high influence of the province, there is in fact only one civil servant involved in the provincial administration of the ANLb, as various administrative activities are carried out by other agencies which will be introduced in the following.

Rijksdienst voor Ondernemend (RVO)

The RVO is a national agency of the Dutch Ministry of Economic Affairs and Climate Change and the Ministry of Agriculture, Nature and Food Quality. As a national administrative agency it processes all the applications from the collectives (Rijksdienst voor Ondernemend 2021; P(7)). There are about 10 employees at RVO working on the ANLb (P7). The collectives work out a plan how they want to realise species protection. They specify which services they want to perform in the following years in which habitat or water body. The application is addressed to the province, however, RVO is the authority that examines these applications and awards funding contracts for six years at a time (Boonstra and Nieuwenhuizen 2019). They are also entrusted with the payments to the collectives. Furthermore, the agency reviews the results of the monitoring which albeit is carried out by the NVWA. Through a central IT system, this enables them to keep track of the status of measures in the whole Netherlands (P7, P8).

Nederlandse Voedsel- en Warenautoriteit (NVWA)

The Dutch Food and Consumer Product Safety Authority is a national, technical agency based in Utrecht. They are responsible for issues regarding animal health, plant health, food safety and product safety (Nederlandse Voedsel- en Warenautoriteit 2021). Within the ANLb they are responsible for the on-spot monitoring of the implementation of the agri-environmental measures, which they report to the RVO. However, they do this while also being entrusted with other inspections of the farmers, e.g. regarding the health of their livestock or other issues (P7, P2). The double monitoring is a cause of irritation among the farmers involved and in the collective (P7). Field workers report that they sometimes make special arrangements with farmers because they know the place well, for instance to move the timing of the cut a while back. However, the external monitoring by authorities is not aware of this and proceeds according to fixed forms. This then can have a detrimental effect on the farmer, which are sanctioned (P1).

BoerenNatuur

BoerenNatuur is the national umbrella organisation, that represents the 40 agricultural collectives in the Netherlands, in which in total 11.000 farmers are involved with about 100.000 hectares of farmland (BoerenNatuur 2021a). The organisation has about 10 employees. The collectives can use 15% of their budget for organisational purposes and up to 2% is paid for the services of BoerenNatuur (P6). The organisation has mainly two goals: Firstly, they support the members in their work for the Agri-Environmental Schemes, including ANLb. Secondly, they aim to shift agriculture in general to a more nature inclusive farming. For that purpose, different projects exist beside the ANLb, for instance for sustainable dairy farming (BoerenNatuur 2021a). As main service for the collectives, BoerenNatuur runs an IT-system that takes up the biggest part of the budget. By the means of it, the collective can indicate at plot level, which measures an individual farmer wants to implement. The organisation is in general an important intermediary for knowledge exchange between the collectives as well as with other stakeholders like the authorities and private nature conservation organisations (P6, P4, P7).

Bij12

Bij12 ('bij' can mean 'by', 'at', or 'for') is a public organisation that supports the Dutch provinces concerning nature and environmental conservation. They are responsible for compensation payments when it comes to damage done by protected species, nitrogen pollution and various other issues (P8). As an organisation, they are part of the so-called Interprovinciaal Overleg (IPO), an association of the twelve provinces, that advocates for their interests (P6). For the ANLb, Bij12 plays a role mainly as a knowledge platform, facilitator, and organiser of a series of meetings, that concern the implementation and future of the ANLb (P4). It hence brings various actors, including the authorities on one table. In the federal state, it helps to link the provinces with each other and with the national authorities (P8).

Nature Conservation Organisations

Nature Conservation Organisations where frequently named as actors of the ANLb (P3, P1, P4, P6, P7, P8). It was predominantly used as an umbrella term for different actors, such as for instance Natuurvereniging Limburgs Landschap, Staatsbosbeheer or Natuurmonumenten. These are associations that conduct various activities around environmental protection. They play a role in the ANLb because they coordinate a large

number of volunteers who check the state of nature in the fields, meadows and natural areas whereby other actors can gain knowledge of the state of the ecosystems or certain species (P6). They are also in contact with the farmers on site and participate in the policy dialog about the ANLb with the collectives and authorities (P8).

European Commission

The European Commission plays an important role as a policymaker in the agricultural sector. The Regulation No. 1305/2013 Article 28 in the EU Rural Development Framework in 2014 introduced the possibility for joint applications for AECM (Terwan et al. 2016). The Dutch government then decided only to allow these joint applications. As already mentioned above, the ANLb is financed 50% by EU agricultural subsidies from the second pillar of the CAP. However, they are not involved in the execution of the ANLb.

Ministerie van Landbouw, Natuur en Voedselkwaliteit (LNV)

The Dutch Ministry of Agriculture, Nature and Food Quality is the administrative layer between the European Commission and the provinces. As the national policy level, they have pushed the move to the collective system in the Netherlands. As ministry, they are the superior authority to the agencies of RVO and NVWA. They do not play a decisive role in the daily execution of the ANLb, but they have important responsibility and influence on the systematic design and the possible further development of the ANLb (P7).

Waterschap Limburg

Water boards are regional public water authorities, that are in charge of water ways, water quality, waste water treatment and other issues concerning water (Unie van Waterschappen 2021). The Waterschap was named three times as a relevant actor in the ANLb network (P3, P1, P4). Agriculture can have a negative effect on water quality for instance when it comes to nitrogen, phosphate pollution or pesticides. A declared goal of the ANLb is to enhance the ecological value of water systems and to improve the water quality, hence it is standing to reason to collaborate with the water boards on several of these issues. One respondent explained that the waterboards do not play a decisive role up to this point in Limburg, but that could develop in the future (P3).

Limburgse Land- en Tuinbouwbond (LLTB)

The LLTB is a lobby association for farmers in Limburg. According to own information, the organisation “*supports members in good entrepreneurship and indicates the social importance of agriculture and horticulture in Limburg.*” (Limburgse Land- en Tuinbouwbond 2021). The LLTB has the right to appoint one of the max. 7 directors from the board, who at the same time assumes the role of the Chairman of the Board (Cremers 2015; P6) Three respondents named the LLTB as a relevant actor because they have influence on the members of the collective (P2), and there is knowledge sharing about AECM between the collective and the association (P6, P3).

5.1.2. Formal and informal relations between actors

In this section, formal and informal relationships between actors will be highlighted, providing insights into how they relate to each other in the network. Most of the actors mentioned above have contact in some way; in some cases, it is difficult to distinguish between formal and informal relationships. Partly, no contracts exist, but recurring, institutionalized meetings between the actors do. Therefore, in the following, formal relationships are only those that include contractual relationships or that are somehow legally anchored for instance to ensure the monitoring. All others are considered informal relationships, however an attempt will be made to name the most important platforms, where institutionalised meetings between actors take place.

Fig. 4 illustrates formal relationships between actors. Blue actors are state- or supranational actors such as the EU Commission, green actors are non-state actors. Firstly, the execution collectives are formally only connected to the main collective. Whoever wants to join the scheme joins an execution collective in his region, to which he/she pays a contribution (P1). He/She thereby automatically becomes a member of Natuurrijk Limburg as well, which functions as interface with the province. The collective maintains 1300 individual contracts with farmers and landowners, which are here conceptualised as part within the collective. The collective is organised in the umbrella organisation BoerenNatuur and pays part of its administrative costs for their work. They in turn take over certain tasks for the collectives and represent them on a national level. Therefore, they are in strong exchange with many other actors, but formally the main relationship is with the individual collectives in the regions.

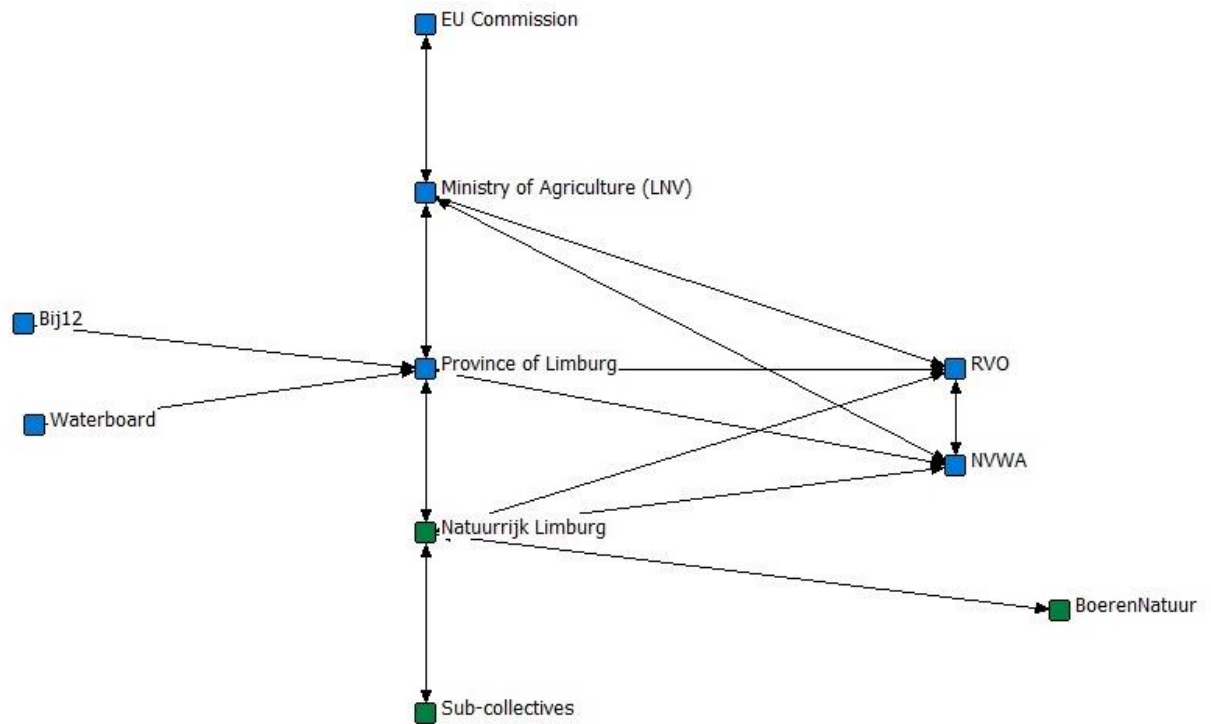


Fig. 4 Network representation of formal relations

The province of Limburg, as well as the other provinces, mandates and pays RVO to review applications and contracts, to perform various administrative tasks and also to conduct the payments. Likewise, money flows to NVWA because they are responsible for the on-site monitoring, whose results are reported to RVO. The contract with RVO and NVWA is thereby negotiated in one piece (P4). RVO and NVWA are national government agencies (agentschap) that are subordinate to the Ministry of Agriculture (Rijksoverheid 2021). Even though the provincial government has decision-making power regarding the realisation of the ANLb, the Netherlands is not a federal state. The legislative competence for agricultural policy remains with the central government and the European Commission (Lepszy 2003). There is no direct formal link between the province and the Commission. It is only established through the national Ministry of Agriculture (P4).

The actor Bij12 appears only in formal relation to the province, since it is an organisation intended to strengthen the cooperation of the provinces as part of the Interprovinciaal Overleg. The formal relation with the Waterboard Limburg is unclear, as it is actually a provincial agency that is formally integrated into the ANLb system by co-funding farmers' water conservation projects. However, this did not emerge from the

responses of the interviewees, it was raised that the cooperation between the collective and the water authorities has been rather low so far (P3).

In the network diagram in Figure 5, informal relationships have been added to the formal ones. Looking at the visualisation, it becomes clear that there is now a much larger number of connections as well as actors. In fact, most of the actors in the ANLb network in Limburg are linked in some way. The total number of ties is 65 and the calculated network density 0,492; measuring how many ties between actors exist compared to how many ties between actors are possible.

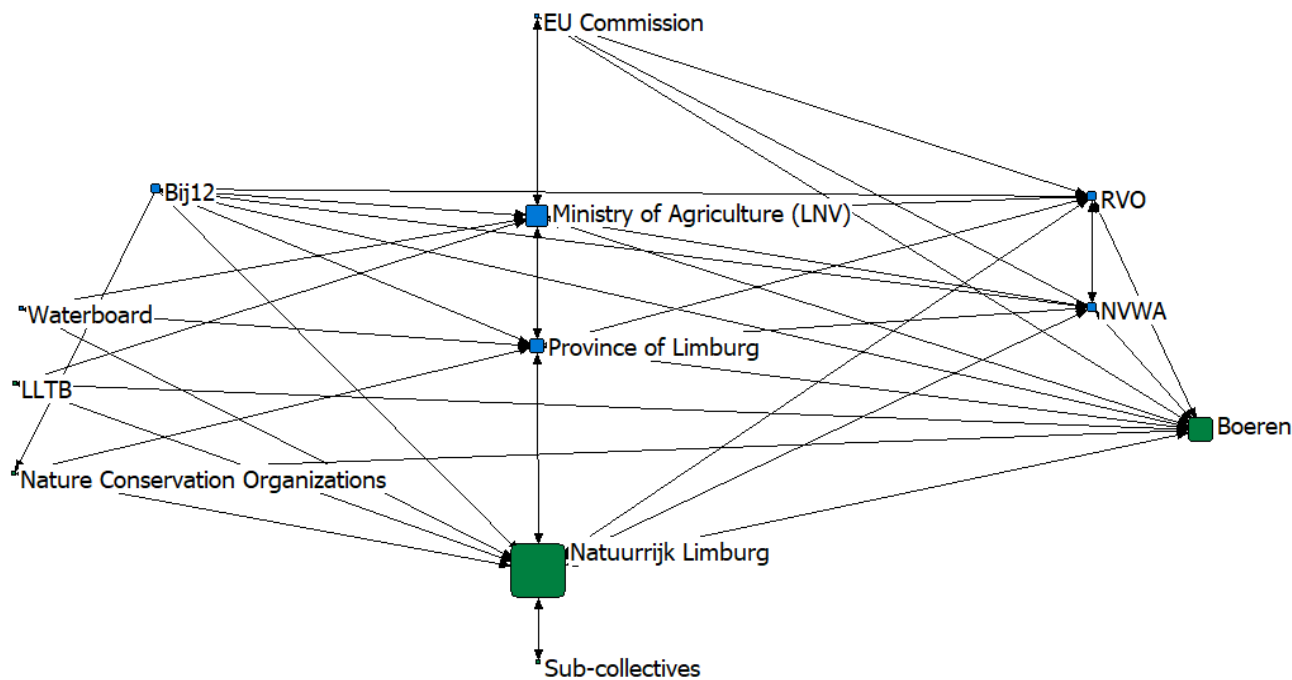


Fig. 5 Network representation showing both formal and informal links. Size of nodes indicates betweenness centrality.

A significant part is the sharing of knowledge and information. Natuurrijk Limburg for instance maintains contact with the farmers lobby organisation, the Limburgse Land- en Tuinbouwbond (LLTB). One respondent commented on that: “[...] it’s also very important to work together with them because they also have a lot of input on members and also have knowledge of the contents of the ANLb and how to improve it.” (P2). Similarly, this accounts for the Waterboard: “We work with Waterschappe, because some measures of the ANLb also help water quality and quantity. And the water board, they want water quality, and the regional government wants nice landscaping, and everybody looks to the farmers and [the collective] has a role to put things together.” (P2). Other

important actors for sharing knowledge are Nature Conservation Organisations like LandschappenNL, that coordinate volunteers and provides lot of data on the status of individual species and ecosystems. These volunteers also provide farmers with advice on landscape management and species protection.

BoerenNatuur as an umbrella organisation precisely has the task to mediate knowledge between the actors and to act as a contact for the national government. They play a connecting role and are in exchange with almost every actor in the network including RVO, NVWA, the provinces, the LNV, and of course the collectives and other stakeholders. A similar role is played by Bij12, which supports the provinces in various agri-environmental matters. They facilitate several institutionalized meetings with stakeholders of the ANLb. A first important one is the so called “*management overleg ANLb*”. According to a respondent, it is a meeting for the steering level (P8). Representatives of the collectives, RVO, BoerenNatuur, the province and the LNV take place in it. “*Things we discuss, for instance, we did an evaluation [...] What are the results? What help is needed to make sure that the researchers get the right information, give access to the right people? But also, what are the results? And how do we interpret those results? What would our advice, in our separate lines of command, what would our advice be to decision makers? [...] Another example is that, of course, we're looking at the new European agricultural policy. And we try to foresee what that means for ANLb and what we need to update to change.*” (P8). When it comes to a more detailed, expert level, there is another cross-stakeholder meeting, called “*Takgroup Agrarisch Beheer*”. The same organisations are present here, but the discussions are more executional as daily issues are of concern. One of the representatives of the collectives is always in task of leading that meeting. Bij12 however is in charge of organising the meetings by making sure there is an agenda, all the information is available and the meeting itself is planned.

A third important platform is the so-called “*Comité van Toezicht*”, “*an obligatory committee every country has to have within the CAP*” (P6) where RVO, BoerenNatuur, the ministry, a proxy of the European Commission, the provinces, but also Nature Conservation Organisations like LandschappenNL, Natuurmonumenten and other stakeholders are involved. The chairman is the Minister of Agriculture and questions around the whole Dutch Regional Development Framework are discussed. Since the ANLb is just one subsidy scheme it is embedded in bigger organisational structure. There is a joint program directorate of the Ministry of Agriculture, Nature and Food Quality with the twelve provinces, called Regiebureau Plattelands Ontwikkelings Programm

(POP, rural development program). They support the LNV and the provinces in their activities around the Rural Development Program, which is the second pillar of the Common Agricultural Policy, and advise the future CAP (Regiebureau Plattenlands Ontwikkelings Programma 2021)

5.1.3. Motivations

Motivation is an important variable to understand the behaviour of an actor (Frey and Osterloh 2013). It was therefore asked in the interviews to understand what induces different actors to collaborate in the ANLb network. A number of different motives were found, often several ones were named at the same time. An important motivation of participating farmers is the economic component. It is about income and risk management. Farmers are contractually guaranteed a payment if certain criteria are met. In times of climate change and drought-related crop failures, this can mean a possibility of safeguarding (P3). Most of the interviewees however emphasise that many farmers also want to do something for biodiversity, for the environment in general, and through the ANLb they get the opportunity to be compensated for this work. Many see this as a way to preserve the traditional Limburg landscape. Employees of the collective, as well as farmers, report that after a few years of operation of the ANLb, ecological results would be partially visible, which has a great impact on the motivation of farmers. When the changes are seen to have an effect, this increases the interest to continue (P1). Of course, the reasons for farmers are very individual, while one is more concerned with financial security, others are intrinsically very interested in nature conservation. Often it is a mixture of both.

Furthermore, participation in the collective also provides the opportunity to expand knowledge on these topics and exchange ideas, which was cited as another source of motivation (P5). Some respondents report that society's expectations of farmers have changed in recent years, which is also reflected in how farmers see themselves. Whereas in the past the main concern was food security, today consumers attach importance to high-quality food, that is cultivated without harming livestock or environment (P2). The population of Limburg, as well as many farmers, valued an attractive, living landscape and farmers could provide that. The ANLb is seen as a good way to combine different existing motivations and put them into practice (P2). One respondent expressed that it is a big change from the previous way of working, where everyone only got individual

contracts through the EU. Through networking within the collective, knowledge sharing and dialogue, the enjoyment of this work increases and so does the motivation. One interviewee commented: *“In the past, you would be a bit of a traitor as a farmer, to do something for nature. That’s not something we do, a farmer is conservative, but that is changing. Farmers see that it is something that society demands of them if they want to remain being a farmer”* (P3). Not only the participating farmers but also the administrative layer of Natuurrijk Limburg seemed very much intrinsically motivated for the issue. This follows from statements such as: *“[I]n my free time I also do some research at certain ANLb elements or parcels. Yes, that’s hobby! I don’t think you can do this work when you don’t have a bit of motivation that comes from the heart. And then a farmer calls you on Saturday, that he has a question and then you answer and things like that.”* (P1).

Actors like BoerenNatuur are also very much intrinsically motivated. The statutes of the organisation include to engage for a more nature inclusive farming. It is more difficult to make a statement regarding the authorities. One respondent expressed the belief that: *“there’s many people who, also from the personal perspective, are really committed to goals, which we try to reach within the agri-environmental schemes. And then each plays his role from their point of view, from the place where they are, in which organisation they are [...] I think many people have a sort of internal motivation to work on this topic.”* (P8) Various respondents expressed that the functioning and further development of the ANLb is very much dependent on a political will and interest of the responsible authorities. It depends to a large extent on the elected parties in the provincial government, since the subsidy scheme requires public spending (P3, P2, P4, P5).

5.1.4. Interim conclusion

Studying the network of the ANLb in Limburg, it becomes clear that it is a system of collaborative governance since there are *“processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished”* (Emerson et al. 2012, p. 2).

At the heart of the network, we find the agricultural collective, that is for one a self-governing group of farmers, but also a boundary organisation that coordinates joint action and mediates to enable collaboration between actors on both sides (landowners and

authorities) (Westerink et al. 2020). Initially, there seems to be formally only the link between the province and the collective, which agrees a contract with the latter, while the collective then concludes the individual contracts with the farmers. In fact, however, much more actors are involved, such as the Rijksdienst voor Ondernemend, which exercises administrative control and manages the payments to the collectives. Furthermore, the national agency NVWA carries out monitoring, although this task is already done by the collective itself. This creates an ineffective dual monitoring process and increases transaction costs of collective action.

Other governmental actors such as the Waterschap Limburg also play a role, as their area of responsibility of good water quality thematically overlaps with the objectives of the ANLb. Numerous respondents (P3, P2, P4, P6, P8, P9) also referred to the importance of volunteers and their private coordinating and nature protection organisations such as LandschappenNL, who for example collect important data on species populations. The umbrella organisation BoerenNatuur takes over administrative tasks of the collectives and provides a link to the national level. The possibility for the ANLb on policy level was created by the EU Commission and introduced by the Dutch Ministry of Agriculture. The execution and realisation are to a large extent entrusted to the subordinate provincial level. The results illustrate that the institutional landscape around ANLb is a complex one, a diverse network where various actors from government authorities, civil society, and the private sector interact to work on a common goal. That is significantly more than formal policy would suggest. Through the network analysis it becomes clear that not only the formal but also the numerous more informal relationships are relevant, for instance for policy feedback.

A series of institutionalised meetings, mainly facilitated by BIJ12, brings together state and non-state actors from different hierarchical levels. The organisation BoerenNatuur has the national overview, as it is in exchange with collectives in all provinces. This allows problems in the general and specific functioning of the system to be addressed. This feedback then can also have an impact on future regulations. The thematic scope of action of the collectives stays limited, 1. because they are in complete financial dependence of the authorities, 2. the objectives to be achieved by the land management activities are predefined and 3. it is not predetermined which measure should be exactly implemented where and how, but there is a catalogue of possible measures that a collective can choose from.

Usually, the goals of the ANLb coincide with the motivations of the participants. Intrinsic motivation to protect and conserve the landscape and biodiversity was expressed by almost all respondents. In addition, there are strong economic incentives for those implementing the ANLb alongside with social motivations to learn from and improve with each other. This section introduced key actors, their motivations, and their relationships with each other. To take this further, I will analyse the network in the next chapter using measures from SNA and qualitative data, thus examining in which way the presence of social capital influences the functionality of the network.

5.2. Research question II: Role of bonding and bridging social capital in the network

The network under consideration is a complex structure of different actors and organisations. Some of these actors or members of them are similar in terms of social characteristics and within the ANLb they are on the same governance level. The interviews furthermore showed that their motives and interests are similar. These are conceptualised here as homogeneous actors.

Between others, there are differences. These actors are divided by the different organisational backgrounds they represent, different interests, and in some cases also through formal power hierarchies when it comes to public authorities and administrative bodies. These are conceptualised as heterogeneous actors. I will present in the following different forms of social capital that were found both between homogeneous actors (bonding) and between heterogeneous actors (bridging and linking) and discuss implications and consequences of these.

5.2.1. Bonding social capital

According to Claridge (2018, p. 2) bonding social capital exists between “*people like us*” who are similar in demographic characteristics, available information, and resources. It is usually a relationship that people with similar backgrounds and interests share. The relations are thus strong and more inward-looking (Claridge 2018). One actor for whom this can be observed is the collective Natuurrijk Limburg itself with its members. The collective is hereby understood as an entity in which at this point no distinction is made between participants and administrative level. This is justified by the fact that the

collective is highly self-governing, and the management level is also partly composed of farmers who are participants in the ANLb.

The collective has only existed in its current form since 2016. One interviewee described the change as follows: *“Farmers more than in the past know what they are getting their money for. They used to have a contract and they would not speak to anybody. So, they would just follow these rules or maybe not, they would receive money, but nobody would actually know what it amounted to. That has changed a lot, farmers are in dialogue with us, they are very happy with the knowledge base that we are giving them explaining why do you have to do it in the way you can do it, but also that they can put in their own knowledge, the contract states this, this is really given a boost to the motivation of farmers, it actually gives them joy. I think, [the landowners] are a little bit more motivated through the social idea to them than the economical.”* (P3) Farmers are more in contact with each other and this happens partly through the joint commitment in a collective. Since it appears in the legal form of a cooperative (coöperatie), the members council is the highest decision-making power. Thus, farmers get activated through participating as members of the coöperatie. On the other hand, the collective is trying actively to bring people together. One participant expressed his view on the that: *“[N]ow we have the collective, and we can bring farms together. We organise support in the fields, with people, participants in a certain area, to look to help them to improve it. And then we bring them in contact, it can be individual, we also do that in groups. Because [that’s how] they also learn from each other. And they can help to improve each other [...] related to biodiversity and landscaping. I think [...] that works very good.”* (P2). Another participant explained that some of the landowners of the ANLb were too old to do the maintenance of for instance hedges by themselves. An ongoing project tried to connect neighbours who have similar landscape elements to work together or to let the maintenance be done by a paid contractor. Instead of being ordered to each land parcel individually, groups of people living nearby could connect to have it done at the same time to save money. He further explained that besides the financial interest in the ANLb people come together because knowledge about maintaining the landscape or good quality soil is a scarce resource and people are keen to acquire that knowledge (P5).

One interviewee commented on the common scope of action: *“We receive subsidy, and there are several lines where we can spend the money. And within that, farmers can have more decision-making influence from bottom up. And that’s I think that’s new because when we started, there were all individual contracts with the government.”*

And they are also not, there was not really a connection between the different contracts and participants. And now because there is a collective, all the participants are together. And now we have also one big goal for the whole province. And really other way of looking to the ANLb.” (P2). Through the collective design, the collaboration, knowledge sharing, and exchange between people has improved. The fact that people with similar motives participate in the same organisation to achieve a common goal build up bonding social capital within the collective. One interviewee expressed regret that there were plans to connect people in persona on the ground further through meetings and workshops, but these plans have been on hold since early 2020 due to the ongoing pandemic (P1).

However, it would not be reasonable to assume that between 1300 individual members of the collective, all would share strong relationships. Similar to other collectives, Natuurrijk Limburg has preserved nested structures, that partly existed before 2016 as Local Environmental Cooperatives (LEC). As already described above, four so-called execution collectives exist: Innovatief Platteland, Plattelandscoöperatie, Boeren met Natuur and Natuurrijk Limburg Zuid. One respondent explains that he thinks that *“a strong central cooperation is needed in Roermond², which has to deal with the province, but has also good lines to the regions”* (P5). P5 emphasized that it would be very important to have a regional collective because people live in the rural areas, maybe close to Maastricht. Even if it is just about 50km distance to Roermond from there, it would be a psychological factor and necessary, if it is desired that the members participate bottom-up: *“They're not going for meeting to Roermond but they're coming for a meeting to Maastricht. [W]hen I want to be an active organisation with active members, then you have to think about how can I get that organised. And that's why they have chosen this decentral approach.”* (P5).

Naturally due to the nested structured, different ideas within the collective can dominate on how things should work. *“The base is that we trust, we have a high level of trust between the collectives and the sub collectives and cooperation in Roermond. But we see a lot of things that can be done better, more efficient, more effective. And we don't know why that's not happening, how we want it, but we are thinking [...] also from bottom up and not from top down. [...] that's what we don't like in this cooperation, but because only also it doesn't work. [W]hen you go top down, it doesn't help you to get the people active, because then we should have left the system from the Minister of Agriculture top*

² City in the very north of the Province of Limburg, headquarter of Natuurrijk Limburg.

down, passive members, they get all their money, and wait until they have an audit. We want to achieve a totally different thing. So, we have to think from bottom up. You have to involve the members.” (P5) It becomes clear that the interviewees are very keen to emphasise that the new collective system brings the participants more together, that they are in greater exchange and can learn from each other, as they work together on a common goal. At the same time, some fear that the collective, like an authority, will only delegate decisions top down, which will have a negative effect on bonding and the members' own initiative. This is also supported by statements such as: *“And now we are in the phase also to improve the coöperatie as itself [...] How can we make it more as a real coöperatie? And that's, that's kind of where we are working up to at the moment.”* (P2). The interviewee thus identifies a problem of participating, which he/she tries to amend.

It was found that administrative staff members take on an important role in making collaboration possible within the collective. Several interviewees commented that the small number of employees means that distances are short and effective (P3, P1): *“[T]he work organisation communicates very, very quickly with each other because we are small. We call each other when we have questions or things that we want to discuss, then that's not a problem.”* (P1). An important link in this process is provided by the field workers, who advice the farmers on site. This is noticeable, for example, in monitoring. The interviewees report that it is not a process in which they act as a control authority, instead, there is communication with the farmers. If it is determined that the measures at the site are not having the right effect, it is decided that the contract must be changed or terminated, but this is almost always done *“in good dialogue”* (P3). By giving advice and helping the farmers to reach their goals, trust relations are built within the collective and the administration is not perceived as a controlling organisation solely.

5.2.2. Bridging and linking social capital

Bridging social capital can be found in social relations of exchange, following Pelling et al. (2005) in associations between people with shared interests or goals but with contrasting social identities. In the structure of the ANLb we find a network with diverse actors, which are on different hierarchical levels: the cooperative, its umbrella organisation, private associations, but also a number of state actors that differ in their competence to set rules and make decisions. Through bridging social capital different groups, that are divided by a (different motives, different organisation) can share and

exchange information and ideas, it can make resources like knowledge accessible (Claridge 2018). Linking Social Capital is conceptualised as a subset of bridging, to capture power dynamics of vertical associations (Claridge 2018). In the following, three selected important bridging and linking relationships will be described: Firstly, the one between the collective and the authorities, in particular the province. Subsequently the roles of BoerenNatuur and Bij12 as bridging and linking actors will be emphasized.

To function, the collectives must interface between the authorities and the landowners. Within the network, the formal linking ties exists between Natuurrijk Limburg and the Province of Limburg. This link exists legally and was also named by all interviewees (P3-8). Further there exist formal linking ties between the collective and the governmental actors RVO and NVWA. Indeed, as shown in Table 4, following the quantitative analysis of the network parameter, the collective has by far the highest betweenness centrality, suggesting that it often falls along the shortest path between two other actors (Borgatti et al. 2018). That can be explained by the fact that the collective probably plays *the* central role in the network and therefore many actors need to interact with it. High betweenness centrality suggests that an actor acts as an intermediary between different groups that are not themselves connected. Therefore, this measure is associated with bridging (Bodin 2017). This is underlined by the fact that the collective also has the highest degree centrality. So, together with BoerenNatuur, the collective has the most connections to other actors.

Number	Name of Organisation	Degree Centrality	Eigenvector Centrality	Betweenness Centrality	Closeness Centrality
1	Natuurrijk Limburg	10	0,332	27,667	16
2	Province of Limburg	8	0,344	3,012	18
3	LNV	9	0,341	8,083	19
4	BoerenNatuur	10	0,392	8,929	16
5	Nature Conservation Organisations	5	0,227	1,25	21
6	LLTB	3	0,151	0,429	23
7	EU Commission	4	0,195	0	24
8	Sub-collectives	1	0,047	0	28
9	BIJ12	8	0,349	3,095	18
10	RVO	7	0,322	1,929	19
11	NVWA	7	0,322	1,929	19
12	Waterboard	3	0,144	0,429	23

Table 4 UCINET output with calculated network parameters. Highest two values are marked in bold, for closeness centrality, lower values mean higher centrality.

One respondent commented positively on the fact that when the government (through NVWA) does monitoring and is discontent with certain things, Natuurrijk Limburg takes over the negotiations, so the individual no longer has to worry about it. The fact that the collective had more concentrated knowledge and better connections to the authorities made it easier to negotiate possible conflicts instead of the farmers having to face the argument (P5). In general, several interviewees commented positively on the fact that there is only one main collective in the province, which maintains the link with the authorities. This generally helped to save transaction costs and to keep the big picture in mind (P2, P1, P5).

However, it became clear that although the collective had developed characteristics of a public agency, like being responsible for the contracting, the control and payment to the individual farmer (Westerink 2020), they see themselves as distinct from state actors. In part, respondents complained that they do not receive enough support from the responsible authorities (P3, P6, P5) in this case the province. *“The province of Limburg is not so ambitious, and we feel we do not get enough support [from them].”* This referred to money, for one thing, but that would not be the only important resource. *“There are still other ways to support us by just promoting, discussing with us finding*

ways to do it differently. Changing rules that farmers have to meet with for other purposes. But yeah, that's really, not so much done in this province. [...] And that differs very much in the country, our neighbouring province Brabant³ is very much more ambitious in that goal.” (P3). There seems to be a lack of linking social capital between the actors, which could also be explained by ideological differences, which were sometimes mentioned. Often a distinction is made between participants of the collective, who are in favour of a nature inclusive farming, with more sustainable farming methods and political stakeholders who do not share this view. “[T]hey feel that nature is best served by putting a fence around it and designating it as nature for the rest of our lives. Where we believe that no, [...] you get rich of nature by letting farmers do it in a more sustainable way.” (P3).

While limited financial resources were mentioned often, one respondent also described the difficulties of being in between the farmers and the authorities who have the financial decision-making power. *“We have certain kinds of money [from the regional government], but now they want to cut this off. So they want to give us less money. So that we have to decide which part will we not continue with. And that's very strange, because [...] we are only working with subsidy. And we have to actually do, yeah, doing kind of work actually for the government. And then we are the one that has to communicate with the participants, and they are then disappointed and they won't understand [...]. (P2). According to that person, there is then also a lack of feedback options to the regional government, to communicate that the farmers are actually willing to do more. The collective depends on how much money the province is willing to spend.*

Another respondent expressed that with the taxpayer money channelled through the province, a lot of important work is done in terms of preserving the landscape and biodiversity. However, it remained difficult to show the results to the local community and also the regional government, to make clear what is being worked on and what has been achieved. *“To make sure that people see results because people walk or bike through a landscape. They see things, but they don't know why it is like it is. [...] Because the province is important for the financials. You have to make sure that they also know what you were doing for that money.” (P1). Linking social capital in terms of reciprocal relationships to share knowledge between these institutions could be a helpful asset here. Being asked about the character of the relationship between collective and province, one*

³ Province of North Brabant, bordering the Province of Limburg to the north and north-west.

respondent explained, that's its *"most of the time [...] best to have a formal relationship. When it would be more informal or based on trust. It all gets blurt. It's not healthy."* (P4). This is, of course, an understandable statement for public authorities, as they strive for integrity in the way they work.

The following will focus on the role of the umbrella organisation BoerenNatuur. It sees itself as an organisation that connects the farmers collectives and represents their interests. BoerenNatuur is furthermore a partner for authorities, who seeks cooperation *"with the national government, the twelve provinces, the Ministry of Agriculture, Nature and Food Quality, the farmers union, local governments, research institutes, water authorities and other parties"* (BoerenNatuur 2019). It is thus evident from the self-image that BoerenNatuur wants to act as a bridging actor, bringing together different organisations that differ both on a vertical and horizontal level. The quantitative analysis first shows that BoerenNatuur has ten bridging ties and, together with NL, the highest degree centrality in the network. This means that they maintain the most contacts in the network. However, the interviews show that the number of organisations with which BoerenNatuur has exchanges is far greater. To maintain clarity not all these actors can be represented in this analysis. BoerenNatuur also has the second highest betweenness centrality of all actors, which implies its function as a bridging actor. They operate as a connector and broker between different organisations. Interestingly, BoerenNatuur also has the highest eigenvector centrality in the network (Table 3). Actors with high eigenvector centrality are connected to other actors who also have many contacts. This increases their reach, their access to information and possibly also their influence. It can therefore be said that the network parameters reflect the role that BoerenNatuur wishes to take. One respondent expressed that, back when the collective system was established, *"the ministry in the provinces really much urged to have something like BoerenNatuur. Because otherwise, of course, they had to talk all the time to 40 collectives. How should you do that? So they're very much happy that there is something like BoerenNatuur"* (P6). BoerenNatuur has no contractual links with other (e.g. governmental) actors. In order to influence the decisions in the ANLb system, it is important for them to act as a knowledge broker and platform. *"It has to do with relation building, trust, all the soft skills. We have not so much to really... that we can hit with or something, so we need other skills for that. So we have influence."* and furthermore: *"We have trust relations with everybody here in this network. It is all about trust relationships between these actors and us."* (P6).

BoerenNatuur was named as a relevant actor by five out of eight respondents (P3, P4, P6, P7, P8), in fact they were always named by actors who have an administrative role in the network, while respondents who are more involved in the direct execution of the scheme did not name the umbrella organisation as relevant to them.

The role as a knowledge platform of BoerenNatuur is partly fulfilled through participation in institutionalized meetings and forums like the above-described Management Overleg ANLb, Taakgroep Agrarisch Beheer and Kommittee van Toezicht, where stakeholders of different hierarchical levels come together on a regular basis. In this context, the actor BIJ12 also becomes relevant. As an execution organisation of the Interprovinciaal Overleg (IPO), an association of the twelve provinces, their task is to ensure the implementation of provincial regulations for all provinces and the uniformity in the provision of information (BIJ12 2021). For the ANLb they take the role of a facilitator. In concrete terms that means that they are responsible for a certain number of meetings to happen, where they provide an agenda, information and plan the meeting itself (P8). Bij12 was mentioned by respondent P4, P6, P7, P8 which makes up 50% of the interviewees. In terms of calculated betweenness centrality, they are in fourth place behind the collective, BoerenNatuur and LNV. The value does not automatically indicate that they act as a special mediator between the parties and that also does not seem to be their actual role. By facilitating a number of meetings, they make exchange possible by creating platforms, but they are not themselves a mediator. Interestingly, they have the second highest eigenvector centrality after BoerenNatuur, which indicates that they are well-connected to actors who are themselves well-connected, meaning they have very good information access.

6. Discussion

The aim of this chapter is to discuss the meaning and relevance of the above-described findings. What has been found is put in context with existing theory and literature. In the next subchapter, the used materials and methods are discussed, and possible limitations of the research are highlighted as well as implications for further research and policy are given.

6.1. Discussion of results

The aim of this research was, in a first step, to gain insights into the governance structure of the ANLb subsidy programme by means of a case study in one of the twelve Dutch provinces. In a next step, based on established theory, an attempt was made to find out which forms of social capital exist between different actors and in what way this influences the mode of action in the network. Different authors, like Jongeneel and Pollman (2014) or Dik et al. (2021) have studied the Dutch agri-environmental collectives since they emerged in 2016. Westerink et al. (2020) studied social capital of the collectives under the theoretical framework of so-called boundary organisations. To my knowledge, this is the first study to look in detail at the structures that constitute the ANLb by using social network analysis. Stakeholders from a provincial and national level were included, but since this is a case study centred on only one large collective in the province of Limburg, the generalisability of the results is of course limited. Nevertheless, interesting insights could be found, some of which coincide with existing literature and some of which add new perceptions.

The first question guiding this research was: *How does the governance structure of the ANLb within and around the agricultural collective Natuurrijk Limburg work?* While authors like de Vries et al. (2019) have named different stakeholder of the ANLb based on a case study in Drenthe, no scientific publication had yet described the large number of actors involved comprehensively, what tasks they have and how they are connected to each other. However, in order to evaluate the success or failure of this relatively new policy in the future and to think of its applicability to other countries, it is of importance to get a hold on this complex structure. It became clear that it is a system of collaborative governance in which different public, private and state actors take on tasks.

In the middle of the network is the collective, which is organised as a cooperative under Dutch law. This means that the general meeting is the highest body and elects a board of directors to lead the collective. The board must act in accordance with the decisions of the general meeting. The administrative tasks are carried out by a handful of permanent employees. Close contact between the farmers and the collective is primarily established by the field workers, who consult with the farmers on which measures make sense and are the first point of contact for them. Although the collective takes over the monitoring and potential sanctioning, it is not perceived as an authority, but rather as an organisation that tries to achieve the goals together with the farmers. This means that there is trust between the members and the organisation. If a contract must be terminated because the measures do not have any effect or the farmers do not take the agreed measures, this happens in most cases by mutual agreement.

The literature describes the front-door back-door approach, in which the province concludes a contract with the collective through the front-door, which in turn concludes individual contracts with the members through the back-door (Westerink et al. 2020). This approach is confirmed in this study, but the implementation in reality is much more complex. A lot of other state actors play a role, for instance by taking over tasks for the province. RVO supervises the contracts between the province and the collective and takes care of the payments to the collectives. They also monitor the measures actually implemented, which are checked on the ground by another authority, NVWA. As already described by de Vries et al. (2019), this double monitoring causes irritation among the stakeholders, as the authority only appears randomly and then proceeds according to protocol. The collective and the respective field worker, however, know the situation on the ground much better and may have made other recommendations that deviate slightly from the standard procedure. This can lead to conflicts. However, a positive aspect found in this study was that unlike in the old policy model, the collective can conduct negotiations with NVWA in the event of problems, as it has the time and knowledge resources to do so and the individual farmer does not have to enter into time consuming negotiations.

The ANLb furthermore falls under the remit of other historically grown institutions. The water authorities play a historical role in the Netherlands, as some of them have existed since 1255 (Raadschelders and Toonen 1993). They are a separate authority and levy taxes to finance themselves. Since the concerns of the ANLb overlap with those of the water authorities, there is supposed to be cooperation for effective

ecosystem management. However, based on the interviews, it can be stated for the case of Limburg that there was hardly any relevant cooperation, but that this could play a greater role in the future.

Without the work of numerous volunteers, the implementation of the ANLb would not be possible. The volunteers take on small-scale monitoring tasks that are very time-consuming. This commitment has also grown historically in the Netherlands. The volunteers are coordinated by a number of organisations, which have a certain voice and are represented in institutionalised meetings concerning agri-environmental issues.

Through the Social Network Analysis, the importance of informal relationships become particularly apparent. This is mainly because knowledge about the state of the landscape and appropriate agricultural measures to protect biodiversity is a scarce resource. Knowledge on the right approach is shared between the participants and the collective, Nature Conservation Organisations, and other private lobby organisations like LLTB. BoerenNatuur plays an important role as a knowledge platform, whereby they also have administrative knowledge and can pool the experience of the 40 collectives nationwide.

Throughout the research, it became clear that the collectives are self-governing, and a network of various actors is important to implement the ANLb successfully. However, in line with Prager (2015) it can be stated that the actual scope for decision-making for the collective remains limited, as they are financially entirely dependent on subsidies, the province sets the goals and also what kind of agri-environmental measures are possible to reach them. The analysis showed that in the experience of the respondents, more farmers want to participate, and the members want to implement more measures. However, there is not enough public funding available for this.

Scholars like Krom (2017) and Polman and Slangen (2008) have written extensively on the motivation of farmers participating in AECS. While this lied beyond the scope of this study, nevertheless the motivation of different stakeholders was queried. In line with previous research, it was found that unsurprisingly economic motivation played an important role. Most of the respondents said that there were a number of reasons for engagement: economic, care for the environment but also social motivation, learning together and sharing knowledge. It also became apparent that not only the farmers, but various different stakeholders involved in the ANLb talked about an intrinsic motivation to take part in and improve it because of general concern for biodiversity and specifically preserving the local landscape in Limburg. The high intrinsic motivation of the

participants can therefore also be used for the previously described fact that there is more demand for funding by landowners than the collective is able to cover financially, which is why no further new contracts are being concluded right now, except when other participants drop out. Participants who have an intrinsic and social motivation for the goals of the ANLb are likely to pursue them with greater commitment than those who are motivated purely by economic factors. For the successful functioning of the ANLb, it is helpful that participants are also motivated by social factors, and this is an advantage of the collective system.

The second question addressed by this research is: *In which way does the presence of social capital influence the functionality of the network?* Indeed, different relevant types of social capital have been identified in the network. De Vries et al. (2019, p. 7035) found that while the old policy model was “*designed for minimal interaction*”, the new policy model “*strongly stimulated interaction and cooperation*”. Working at landscape level could be justified with social reasons, namely with creating conditions that facilitate shared responsibilities and cooperation, mutual learning and the flexibility to deal with uncertainties (de Vries et al. 2019). These findings can be reasserted by this thesis. Respondents reported that, in contrast to the previous policy model, they are now more in touch through the collective. Being able to network with each other and exchange information also increases the motivation and the joy to work in the scheme. This research shows clearly that farmers are also sharing more knowledge than in the past. There can be a lack of ecological knowledge and uncertainty about exactly how and when to implement measures, but through the contact and help by field workers ecological knowledge is increased in the long term, making the implementation of measures more effective.

Westerink et al. (2020) observed that because collectives adapted characteristics of a public agency and developed linking social capital with authorities, bonding between members could be eroded because they do not longer feel represented by their collectives. That is why a lot of the collectives preserved predecesing LEC as subgroups within the collective. First of all, through this analysis it was possible to ascertain that also within Natuurrijk Limburg four execution collectives were preserved, some of which existed before. The observation that Bonding SC suffers from the professionalization of collectives was not made. However, this may also be due to the selection of the sample and the fact that the focus was more on the status quo.

The collective studied is young, it has only existed since 2016. In general, there is an established trust in the collective, the participants also trust its help and advice and do not perceive it only as a controlling authority. This makes sense from the point of view that the administrative staff, field workers and members of the collective are driven by similar motivations. In the end, it is about implementing effective measures and compensating the farmers financially, as they have to continue to run their business profitably. With a size of 1300 members, it cannot be assumed that there is strong bonding between all the participants. However, feedback was in fact that on one hand a single large and strong central collective was useful, mainly to defend the interests against the province, to keep transaction costs low and to keep an overview over measures in the whole province. At the same time, the four regional collectives as nested structures were more on the ground and could therefore build more of a regional relationship with its members. Several interviewees thereby stressed that it was important to them to preserve the bottom-up structure and the cooperative spirit of the collective. By maintaining self-governance and also strengthening the initiative and bottom-up structure of the collective, one preserves the bonding social capital. Hence a situation is avoided where everything is delegated and decided from the top down like in an interaction between individual and authority. For the effective functioning it is therefore neither viable nor necessary to have strong bonding capital between all members. As shown through this research farmers interact within and with the collective in their region. This can increase ecological and administrative knowledge, build trust and improve cooperation among each other.

In line with other research (Westerink et al. 2020) it could be observed how the collectives adopted characteristics of public agencies, by carrying out monitoring and sanctioning or closing contracts. On the basis of this case study, it was possible to show the relationship of the collective to the various public authorities and that it perceives itself as a self-governing group which is dependent on the financial and political will of the authorities. If there is a lack of political ambition at the provincial level, the work of the collectives is made more difficult. At the same time, respondents expressed dissatisfaction with the situation that they are not responsible for potential budget cuts but are responsible to communicate them to farmers. Although there are linking ties and the joint work is not characterised by mistrust, the collective is still dependent on the authorities and there is a lack of perceived support.

This research highlights the importance of actors like BoerenNatuur. As the national representation of the collectives, they form bridging SC and link various stakeholders.

Alongside with the collective, they have the highest centrality measures in the network, indicating an important role as advocacy and knowledge platform of the collectives. Something similar can be said about the organisation BIJ12, who acts as a facilitator in the network. In line with Prager (2015) it can be said that these facilitators are important for knowledge brokering and establishing new connections. The importance of facilitators such as BIJ12 becomes clear, as only through a series of institutionalised meetings and round tables, it is possible for national and provincial policymakers to come together with the implementing institutions. Only in this they can discuss recent and possible future problems and thus influence agricultural policy and the ANLb in the future. Decision-makers and those affected can exchange ideas. This can lead to policy adjustments. These meetings are for once important to build bridging and linking social capital between the actors by creating a recurring common working environment where they work on the same goals. Secondly, this feedback is naturally also indispensable in a system of effective collaborative governance.

This study, in line with de Vries et al. (2019) underlines the usefulness of the new approach, as it offers advantages in terms of interaction, knowledge acquisition and sharing among participants. Bonding social capital is built up among participants. There was general agreement among respondents on the social advantages of the new approach over the old one. Westerink et al. (2020, p. 398) argues that for farmer groups at times, *“defending the boundary of self-governance may be required”*. I argue, based on the statements of the interviewees, that care must be taken to maintain member participation and thereby strengthen the bottom-up initiative, otherwise the sense of identity and bonding social capital within the collective could become eroded. Furthermore, it is important for authorities to trust the collectives. They are subject to an independent certification body that controls their administrative qualities. Therefore, they are also able to carry out effective monitoring by themselves, without the double control by the NVWA. This could save transaction costs and strengthen the collectives in their role in the governance process. The role of bridging organisations like BoerenNatuur as knowledge platforms and facilitators like BIJ12 cannot be underestimated. In order to ensure effective governance, there must be platforms for feedback and conflict resolution. Westerink et al. (2020) argues that the needs and capacities of agricultural collectives are likely to differ. This of course also holds true for the case of Limburg and it can only be recommended that the authorities closely coordinate with the collectives what kind of support is possible and needed. It is important particularly in the context of the realisation

that the collectives are strongly dependent on the authorities, but partly lack linking capital, as they report a lack of institutional support in Limburg.

6.2. Discussion of methods and limitations

This research including the applied method is subject to some limitations, which will be discussed in this sub-chapter. First of all, a single case study in a single province of the ANLb was conducted. Therefore, the findings cannot be generalised unconditionally.

The Net-Map Method proved to be well suited for investigating important actors in the network and their connections, may these be formal, informal, conflictual or trust relations. In addition, the motivation of the actors could be queried well, although this was partly subject to speculation on the part of the interviewees. Based on the drawn network, important roles in the network such as broker could be discussed well.

The Net-Map Method usually takes place in persona, interviewer and interviewee can design the network map together. They sit opposite each other and work with materials like a large sheet of paper and sticky notes. Due to travel restrictions during the ongoing pandemic, all interviews had to be conducted online. The interviews took place via Zoom and the networks were drawn with the help of the tool Mural. The conversation process generally was feasible and productive via Zoom. It must be noted that the interviews were not conducted in the mother tongue for neither interviewees nor interviewer(s). This was not an obstacle for most of the interviewees. Sometimes, however, it became clear that something was expressed differently due to language skills, whereas in the mother tongue it might have been more nuanced and multi-layered.

Unfortunately, the joint drawing of the Net-Map via the online tool Mural turned out to be difficult. The interviewees had problems to respond to it and the design was almost exclusively done by the interviewer and only verified by the interviewees. It also took time to draw the map, during which no real conversation could take place. The interviewees usually only made a maximum of 90 minutes of their time available. Online appointments often follow more fixed schedules than actually meetings in person. It often seemed impractical and very time-consuming to query every connection between every actor, as this would have blown up the already tight time budget. In addition, respondents were often able to give good information about their own organisation's connection, but not always about the others. In order to maintain a flow of conversation and not to lose too much time, the drawing of the Net-Map was partly neglected. The interviews then

focused on the relations between the actors in the ANLb, possible conflicts or which processes were going well or badly.

The collective alone has 1300 members, several employees and is embedded in a network of several smaller and larger organisations. The interviews were limited to a circle of eight people. These were five people from the provincial level and three from the national level. Two of the interviewees were farmers, but they also had other active roles in the collective. It was tried to include several more farmers in the sample, as they would have added an important perspective as members. Unfortunately, it was not possible on the part of the collective to establish further contacts for the research. Generally, a larger and more diverse sample could of course cover more opinions. Like any research, this one was subject to limited time resources. Each additional interview had to be scheduled, conducted, and transcribed. Due to a communication problem with the project partner, the process of interviews had already been delayed, and in the end eight interviews were conducted. Often, one person had to speak on behalf of an entire organisation. The information provided by the interviewees are naturally their subjective perceptions of reality and can be biased (Helfferich 2011). The respondents do not have access to perfect information and describe situations from their own role and position in the organisation.

The analysis of the data was partly based on qualitative network parameters that emerged from the method. These could be calculated from the data on the relationships of the actors. As already mentioned, the actors must not only provide information about themselves, but also about other actors (Schiffer and Hauck 2010). Accordingly, these data are subject to limitations because some actors did not name other actors or did not know whether they were in formal or informal contact. The calculated measures were mainly used to support and relate the qualitatively obtained data. For the reasons mentioned above and the difficulties of conducting the method online, the focus of the findings was based on the qualitative statements of the respondents. With the help of a coding process, the statements were assigned to various relevant categories such as bonding, bridging or linking. This is of course subject to a certain degree of interpretation by the researcher.

Another problem is the trust in confidentiality. The respondents were told that no clear names would be used and that no statements could be traced back to a certain person. However, some respondents were aware of the other stakeholders in the network who would be interviewed, and since sometimes only one person speaks for an entire

organisation, it was natural to think that conclusions could be drawn about this person in a possible publication. Of course, this may make it more difficult to talk openly about conflicts. In fact, at the time of the interviews, a conflict was taking place that was not openly addressed in the interviews but came to notice through other means of communication.

In March 2021, the Dutch newspaper NRC Handelsblad published on a corruption scandal revolving around Herman Vreken, at this time managing director of IKL, an organisation that does landscape maintenance for Natuurrijk Limburg on a fee basis. The person worked for many years at LLTB and was in the past on the board of Natuurrijk Limburg, too. At the same time, he was a politician with the Christian Democrat Party of the Netherlands. The misappropriation of millions of Euros in environmental subsidies by Vreken led to numerous political resignations in Limburg (van der Steen and Dohmen 2021) and supposedly also had an impact on Natuurrijk Limburg and the ANLb network. Because it was an ongoing scandal, it was not addressed by interviewees, at most hinted at. The problem is mentioned here as it has potentially led to conflicts in the network being concealed.

In conclusion, the Net-Map tool is suitable to get hold on a complex multi-actor governance system (Schiffer and Waale 2008). It is suitable for identifying actors, their roles and relationships in the network. Online, however, the method loses some advantages. It is very time-consuming and impractical to draw online while maintaining the flow of conversation. It is also difficult for the interviewees to familiarise themselves with it, especially if they do not know the website where it takes place beforehand. Hence, the emphasis for this study was placed on the qualitative statements obtained in the guided interview.

6.3. Implications for further research and policy

This thesis shows that the new approach has many social benefits. The collaboration of farmers through the collective contributes to the acquisition of knowledge about nature-inclusive farming practices and this could bring about a change in attitude towards biodiversity. Furthermore, measures are now more coordinated, follow a coherent habitat approach and are therefore likely to be more effective. However, studies on the ecological effectiveness since the implementation in 2016 are still pending. Of course, it also takes time for the results to become visible. Nevertheless, it must be remembered that the main

reason for the scheme is to protect and conserve biodiversity and that it ultimately is to be measured against this goal. Further research should therefore address the question of the ecological effectiveness of the ANLb system in the Netherlands.

ANLb measures are implemented on no more than 3% of the total agricultural area in Limburg (P3). Considering this low value, it will be difficult to generally shift to more nature-inclusive farming and hence stop the species rapid extinction which is proceeding in Europe as well as in the Netherlands. The ANLb offers a good start, but to create an ecological turnaround, the programme would have to be strongly upscaled. In the case of Limburg, the limiting variable is the level of public subsidies, as in fact more farmers would be willing to join the collective. This, of course, depends on the political will of the authorities, especially the provincial government.

One interviewee (P5) pointed out that these subvention programmes relied too much on government money. He advocated for greater involvement of private, local actors who co-finance agri-environmental measures. This could be local businesses that have an interest in preserving the local traditional landscape, for example. First pilot projects on this are already being carried out in South Limburg. Further research could address the question of how to attract more funding for these projects, as the public funding of the ANLb sets narrow limits.

7. Conclusion

The case study examined the Agricultural Nature and Landscape Management Scheme in the Province of Limburg, located in the south of the Netherlands. The questions guiding this research were twofold. Firstly: *“How does the governance structure of the ANLb within and around the agricultural collective Natuurrijk Limburg work?”* On this basis it was further asked: *“In which way does the presence of social capital influence the functionality of the network?”* The Net-Map Method was applied as a method for Social Network Analysis. A total of eight interviews was conducted and networks of actors were drawn. Thereby qualitative and quantitative data was obtained and analysed to provide insight into the stakeholder network.

The ANLb follows the idea of a front-door back-door approach, in which the agricultural collective closes one contract with the public agencies through the front door and individual contracts with land managers through the back door (Terwan et al. 2016). Through the analysis, it became clear that while this is the case, the collective is at the centre of a complex system of collaborative governance in which many actors are involved and interconnected. While a lot of decision-making power lies with the provincial authorities, various governmental authorities like the RVO and NVWA are entrusted with different tasks such as contract management and payments as well as monitoring. Furthermore, several other public and private actors take part in the implementation of the subsidy scheme. Through a series of institutionalised meetings that bring together different actors, there is also policy feedback. The importance of informal relationships in the network became clear as knowledge and information are crucial resources for a successful implementation.

To understand the mode of functioning of the ANLb network, the role of social capital was analysed. The focus lied thereby on bonding social capital between homogenous actors and bridging and linking social capital between heterogenous actors. Since the implementation of the new ANLb system in 2016, the exchange between farmers has increased. In line with de Vries et al. (2019) it was found that there is now more interaction and cooperation between farmers than before. Bonding social capital is evident between the members and the collective since actors with similar motives participate in the same organisation to achieve a common goal. The relationship between the collective and its members is largely characterized by trust. Although contracts exist and monitoring is carried out, the collective is not perceived as a pure controlling

authority. Particularly through the field workers who are an important connector, knowledge about biodiversity and landscaping is improved.

Collectives had to become bigger since 2016, adopt characteristics of a public agency and develop linking social capital (Westerink et al. 2020). In line with Westerink et al. (2020) it was found that the nested structures, in the form of four execution collectives persist within Natuurrijk Limburg and help to preserve the regional connection of the collective. The collective has to form a link between landowners and authorities and must take on tasks of an authority itself such as monitoring or sanctioning. Thereby the collective is very much dependent on the authorities, which both create the framework conditions for the agri-environmental measures and decide on the amount of funding. To maintain bonding and collaboration, the identity as a self-governing group must remain strong (Westerink et al. 2020). This means that within the collective, processes and decisions must be bottom-up, otherwise a situation will arise in which members fulfil their tasks in isolation as it was practiced in the old system. At the same time, linking to the authorities should be strengthened, as their institutional support is very important for the success of the programme. It is possible that experiences from neighbouring provinces can help, where, according to the stakeholders, cooperation works better. Additionally, it can be said that the role of actors such as BoerenNatuur who possess a lot of bridging social capital with various actors, should not be underestimated, as they serve as a knowledge platform and keep an overview of the overall situation of the collectives in the Netherlands, which is crucial for the successful implementation and future of the ANLb.

AECS have been implemented in 28 countries in the EU (Dik et al. 2021). The collective approach to it in the Netherlands is unique. The results show that the system has many social advantages, and it potentially could serve as a model for other EU countries. However, further research is needed to assess the ecological performance of the new system, against which it must ultimately be measured.

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Annex I: Complete interview guide

Status quo Net-Map Interview

1. Introduction

- Welcome
- Research Project at ZALF (Centre for Agricultural Landscape Research), EU Project Contracts 2.0
- Short introduction of myself
- Aim: analyse structures within the collectives and the network they are embedded in
- **How:** collecting personal view of different stakeholders on structures in and around the collectives
- Data will be analysed anonymously / interview will be treated confidentially
- Duration up to 90 minutes / what is possible for you?
- Recording / Consent form / any questions left?
- share link to MURAL

What is your role?

2. Current situation

- Who are currently the **central actors** for ANLb in Limburg in general?
- BoerenNatuur?
- Actors' interlinkages (<->)
- Which actors are linked through **formalized relations**, e.g. (monitoring) contracts and other formal agreements
- Which kind of contract? What is subject of the contract?
- How does the monitoring work? Who is involved and how?
- How is the sanction mechanism working? Who determines the individual level of a sanction?
- Which actors are linked through **informal relations**, e.g. information exchange, exchange of resources?
- What kind of information or knowledge is exchanged and how?
- What kind of machinery or labour is exchanged and how?
- Are there any **conflicts** between actors that disturb the process – which ones?
- Which kind of conflict and why?
- What is done to handle conflicts?
- Why don't you know about any conflicts?

Post-

Color

Color

Color

- For which actors do relationships of **trust** exist?

Color

- What are **motivations** of the actors to engage? (multiple possible)
- What is the main motivation of an actor?
- How are farmers motivated to participate?
- Do you think they are also motivated by social mechanisms? To what extent?

Icon

Icons of motivations -> leave open



economic



care for nature



social



curiosity

Influence and benefit (stacks: 1=very low, 5=very high, can also be a range)

What is the amount of **influence** each actor has on the rules and in the decision making process of ANLb?

Stack

Why are they very/not very much influential?

Specify: influence on rules, monitoring, sanctioning?

What is the amount of **benefit** each actor has from being involved in ANLb?

Why do they benefit that much/not very much?

Stack

3. Reflection (When you look at the Net-Map...)

- what works **well** and what do you consider successes so far?
- what works **less** well and where do you see remaining challenges?
- On a scale from 1 to 10, **how motivated are the farmers** in the/your collective to participate, including also engagement in collective decision-making, knowledge and capacity building?
- Does the collective still recruit new farmers or is the money barely sufficient for all farmers that want to participate?
- Are there farmers who stopped participation, how many and why?
- Do you want to share anything else important?

AUDI

Thank you!

Can you suggest possible further interview partners?

- analysis will take some time but will come back to you with summary of findings / send you the MURAL afterwards

Annex II: Table of all mentioned actors

Nr.	Name of the Actor	Administ. Level	Short Description of the Role	Times mentioned in the Interviews
1	Natuurrijk Limburg	Provincial Level	Agricultural Collective with about 1300 members, main purpose: Execution of the ANLb, individual contracts with the members	8
2	Farmers	Provincial Level	Farmers as members of the collectives sometimes mentioned as a separate actor, in the research conceptualised as part of the collective	4
3	Provincie Limburg	Provincial Level	Provincial government that signs a contract with the collective	8
4	Rijksdienst voor Ondernemend (RVO)	National Level	Paying Agency, responsible for administrative and financial checks	4
5	Nederlandse Voedsel- en Warenautoriteit (NVWA)	National Level	Technical Service, responsible for monitoring, in close collaboration with the RVO	4
6	Dutch Ministry of Agriculture, Nature and Food Quality	National Level	Implementing European agricultural policy in the Netherlands and therefore also the ANLb subsidy system	7
7	BoerenNatuur	National Level	Umbrella organisation of the 40 agricultural collectives of the Netherlands	5
8	Bij12	National Level	Public organisation that supports and connects the 12 Dutch provinces in various environmental matters	4

9	Nature Conservation Organisations e.g. LandschappenNL	Provincial Level	Coordinates volunteers that monitor biodiversity in the province	6
10	Volunteers	Provincial Level	Volunteers coordinated by Nature Conservation Organisations sometimes mentioned as an independent actor	2
11	Limburgse Land- en Tuinbouwbond (LLTB)	Provincial Level	Representation of farmers' interests in Limburg	4
12	European Commission	EU- Level	Agricultural policymaker	5
13	Waterschappen	Provincial Level	Regional water authority	3
14	Instandhouding kleine landschapselementen (IKL)	Provincial Level	Foundation for the preservation, conservation, and maintenance of small-scale landscape elements in Limburg.	1
15	Uitvoeringscollectieven	Provincial Level	All members of the main collective are also members of an implementation collective, that are responsible for projects complementary to the ANLb	1
16	Stichting Certificering	National Level	Independent organisation founded by the provinces, that certifies the agricultural collectives every few years and checks administrative and management quality	1
17	Wageningen University	National Level	Does scientific work on the subsidy programme and has produced an evaluation of the system	1

Table 5

Annex III: Raw data of network relations

	NL	Province	LNV	Boeren Natuur	Nat. Conser. Orga.	IKL	LLTB	EU Com.	Sub-collectives	Bij12	RVO	NVWA	Wageningen University	Waterboard
Natuurrijk Limburg	0	1	0	1	0	1	0	0	1	0	1	1	0	0
Province of Limburg	1	0	1	0	0	0	0	0	0	0	1	1	0	0
Ministry of Agriculture (LNV)	0	1	0	0	0	0	0	1	0	0	1	1	0	0
Boeren Natuur	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Nature Conservation Organisations	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IKL	1	0	0	0	0	0	0	0	0	0	0	0	0	0
LLTB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EU Commission	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sub-collectives	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bij12	0	1	0	0	0	0	0	0	0	0	0	0	0	0
RVO	1	1	1	0	0	0	0	0	0	0	0	1	0	0
NVWA	1	0	1	0	0	0	0	0	0	0	1	0	0	0
Wageningen University	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterboard	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Table 6 Confirmed formal relations, coded as binary variable

	NL	Provi nce	L N V	Boeren Natuur	Nat. Conser. Orga.	IKL	LLT B	EU Com.	Sub- collect ives	Bij12	RV O	NVW A	Wage ningen Univer sity	Wat erbo ard
Natuurrijk Limburg	0	0	0	0	1	0	1	0	0	1	0	0	0	1
Province of Limburg	0	0	0	1	0	0	0	0	0	1	0	0	0	0
Ministry of Agriculture (LNV)	0	0	0	0	0	0	0	0	0	1	0	0	0	0
BoerenNatu ur	0	1	0	0	1	0	0	0	0	1	1	1	0	0
Nature Conservatio n Organisation s	1	0	0	1	0	0	0	0	0	1	0	0	0	0
IKL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LLTB	1	0	1	0	0	0	0	0	0	0	0	0	0	0
EU Commission	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub- collectives	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bij12	1	1	1	1	1	0	0	0	0	0	0	0	0	0
RVO	0	0	0	1	0	0	0	0	0	0	0	0	0	0
NVWA	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Wageningen University	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterboard	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7 Confirmed informal relations, coded as binary variable