Financial Mechanisms for Landscape Management - Collaborative Governance and Ecosystem Services Enhancement in Berg en Dal, the Netherlands

A Master thesis

E.T. Budding Wageningen July 8, 2016

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Financial Mechanisms for Landscape Management - Collaborative Governance and Ecosystem Services Enhancement in Berg en Dal, the Netherlands

A Master Thesis

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Preface

Before you lies the MSc thesis 'financial mechanisms for landscape management – collaborative governance and ecosystem services enhancement in Berg en Dal'. This thesis is written as part of the MSc program Environmental Sciences at the Wageningen University and the cp3-project coordinated by ZALF, Germany. The research was written from January to July 2016 and provides information that can be used by stakeholders for landscape management in Berg en Dal, partners of the cp3-projects, and other interested parties.

During the process, several parties have contributed to this thesis. First of all, I would like to thank my supervisors Rolf Groeneveld and Roy Remme for the provided help and feedback during the writing of my thesis. It was not always easy to order and combine all the information, but after some discussions, we always found a way of structuring.

I am also very grateful to Barbara Schröter and Claudia Sattler from ZALF for their effort in organizing a workshop about network mapping. It has been very useful for the understanding and performing of the method. I would also like to thank Dolf de Groot for bringing me into contact with the cp3-project and its partners.

During the research, representatives of the Municipality of Berg en Dal, SLOG, Staatsbosbeheer, The Ploegdriever, Vereniging Nederlands Cultuurlandschap, Via Natura, and the Water Authority Rivierenland were willing to participate in interviews. I would like to thank you all for the provided information that was needed to write this thesis. Last but not least, I want to thank my family and friends for their help and support during the process.

I hope you enjoy your reading,

Ester Budding

Lunteren, July 7, 2016

Abstract

In the Netherlands, governmental financing for landscape management is decreasing and increasing attention is given towards multifunctional landscapes in which various social, economic and environmental functions are taken into account. In this research, it was investigated how financial mechanisms for landscape management contribute to collaborative governance and ecosystem services enhancement in the case of Berg en Dal.

For data collection, two methods were used: (1) interviews, and (2) stakeholder analysis. In both methods, network mapping was integrated as a way to collect information on involved stakeholders, including their links, goals, and perceived influence, with respect to landscape management in Berg en Dal.

Through interviews and a literature review, the current financial mechanisms for landscape management in Berg en Dal could be investigated. For the agricultural landscape, these are the 'streekfonds', contracts for landscape management, the 'landschapsfonds' and rights in rem. For the nature areas, these are private and public financing.

Stakeholders for landscape management in Berg en Dal are not familiar with ecosystem services, but use the term 'Groene en Blauwe Diensten' for the services that farmers and private landowners provide to society (e.g. creating ecological corridors between nature areas and increasing the aesthetic value of landscape).

The stakeholder network with respect to landscape management is stable. However, collaborative governance in Berg en Dal could be improved: governmental parties are still perceived to have an important role in the structuring and financing of landscape management while the perceived importance of small private parties is low.

Current financial mechanisms lack of sufficient financial sources and there is a demand for other / new financial mechanisms for financing landscape management in Berg en Dal. Some constructions of Payments for Ecosystem Services (PES) which are or have been used in other areas for landscape management are presented and applied for the situation Berg en Dal (adopt a field edge, pure water in the Bommelerwaard, farmers as water manages, cultivation of cranberries, and the landscape camping).

Two conclusions could be given with respect to the main question *'How do financial mechanisms for landscape management contribute to collaborative governance and ecosystem services enhancement?* First, ecosystem services and collaborative governance can play an important role in the construction of other / new financial mechanisms for Berg en Dal. Second, these other/ new financial mechanisms will stimulate the provision and enhancement of ecosystem services and may improve collaborative governance in Berg en Dal.

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1 Introduction

1.1 Background

The last decade, multifunctionality of landscapes has gained increasing attention (Mander et al., 2007, Jones-Walters, 2008, O'Farrell & Anderson, 2010). Landscapes have a main function for the primary production sector, but also consist of complex systems at different spatial levels. When managing these landscapes, these different functions have to be taken into account (Mander et al., 2007). With landscape management, actions from a perspective of sustainable development are taken to ensure the regular upkeep of a landscape through the guidance and harmonization of changes that are brought about by social, economic and environmental processes (Council of Europe, 2000). In multifunctional landscapes, traditional cultural practices sustain a range of such processes (Jones-Walters, 2008). However, management of landscapes, including its ecosystems, is difficult since the natural environment and human societies are characterized by uncertainties, complex dynamics, natural variations and scale dependencies (Bodin & Crona, 2009). The different functions of landscapes are often a source of stakeholders' conflicts. As an example, agricultural productivity and conversion of natural landscape elements result in a loss of ecosystem services that are provided by ecosystems (Laterra et al., 2012). Many of these ecosystem services are common pool resources that multiple stakeholders are competing for, often leading to resource depletion (Bodin & Crona, 2009). Safeguarding and enhancing these services is crucial from both the human and economic perspectives (Rodriguez-Loinaz et al., 2014).

Not only competition, but also responsibility for landscapes is a problem: it is often unknown who is exactly responsible for what and management conflicts are not uncommon (Bodin & Crona, 2009). Inappropriate landscape management impacts the ongoing ability of ecosystem services to support agricultural production and will increase the export of dis-benefits such as water pollution, biodiversity loss and greenhouse gas emissions (Smith & Sullivan, 2014). To solve these management conflicts, agreement of stakeholders on common rules and practices is needed (Bodin & Crona, 2009). Top-down centralized management is poorly suited for this and therefore focus is on governing systems where multiple stakeholders are involved in governing processes to various degrees (Bodin & Crona, 2009).

This research focuses on the governing systems of landscapes in the Netherlands. Here, the national government currently aims to combine nature with other functions, such as agriculture, recreation and country estates. However, as stated in the nature vision of the state, current regulations focus on the protection of biodiversity or the improvement of agricultural production rather than on multifunctionality of landscapes (Ministerie van Economische zaken, 2014).

The responsibility for Dutch landscapes is not only an issue in organizational terms but also financially (Verburg & Cramer, 2009). The former Dutch ministry of agriculture, nature and food quality (LNV) and ministry of public housing, spatial planning and environment (VROM) therefore wanted to increase the sense that landscapes are for and of everybody and searched for sustainable financing by private parties (Overbeek & de Graaff, 2010; Verburg & Cramer, 2009). These parties also include entrepreneurs in tourism, recreation and the agricultural sector that are nowadays striving for Corporate Social Responsibility (CSR): their aim is not only to optimize profits but also to take into account the effects on the environment and society (Overbeek & de Graaff, 2010; Verburg & Cramer, 2009). The amount of multifunctional farms in

the Netherlands is increasing for example. Agricultural entrepreneurs do not only rear livestock or grow crops, but they also practice activities such as care, recreation, education, agricultural nature and landscape management, and the production of local products (Verburg & Cramer, 2009). Multifunctional farms provide more income to farmers, strengthen the relationship between farmers and citizens, and create a more vital and versatile rural area (Roest et al., 2009). However, the current governmental subsidies for these activities are limited by European restrictions and inadequate to compete with the profits of agricultural production (Rijksoverheid, 2008). According to the Task Force Financiering Landschap Nederland, the government should focus on activities that cannot be financed by private funding and make the use of private funding more attractive. Private investments should be beneficial for both the landscape and the agricultural entrepreneur (Rijksoverheid, 2008).

The 'Deltaplan Landschap' project is already introduced as a way to help these farmers. The objective of the project is to make agricultural landscapes more attractive by the construction and sustainable management of the landscape, which includes the improvement of landscape, ecological and recreational values while taking into account its agricultural entrepreneurship (VNC, 2008). The 'Deltaplan Landschap' project is funded by the government. However, these funds are not sufficient to realize all plans of the project (VNC, 2008). Therefore, the project aims to develop sustainable market-based finance structures together with private parties (VNC, 2008; Overbeek & Graaff, 2009). The innovative and stakeholder-participatory financing model 'Streekfonds' for regional accounting has been developed for the financing of several agricultural landscapes (LandschappenNL, 2016).

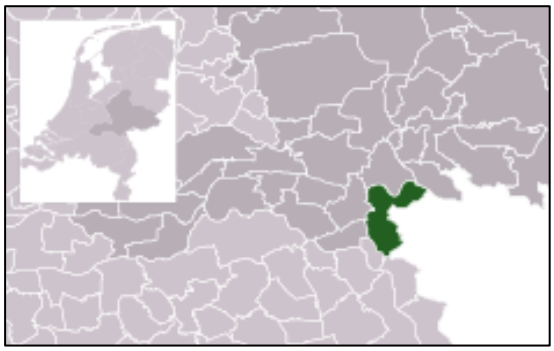


Figure 1: Case study area Berg en Dal
Based on: http://www.gemeentenatlas.nl

Figure 2: Area belonging to the municipality of Berg en Dal.
Retrieved from: http://www.gemeentenatlas.nl

This thesis includes a case study of Berg en Dal in the Netherlands about multifunctional agricultural landscapes and governance strategies. The municipality is part of the National Landscape Gelderse Poort and represents an agricultural landscape of 93 km^2. The area is situated in the province of Gelderland (figure 1). Since 2016, the municipality Berg en Dal consists of several villages, namely Berg en Dal, Ubbergen, Groesbeek, and Millingen aan de Rijn (figure 2). The landscape in the area is characterised by its variety, ranging from forests and hills to polders and floodplains. The municipality is one of the four pilot areas selected by the former LNV on regional and local plans for improvement of landscapes by generating private funding (Overbeek & Graaff, 2009).

The research area is also part of the project 'Civil-public-private-partnerships (cp^3)' that investigates governance models for agro-ecosystem management in rural landscapes (figure 3). At this moment, most governance approaches are based on command and control or on the market. However, these approaches are often ineffective since they are focussed on the short term, scattered over the landscape and insufficient matched with ecosystem services. The project focusses on collaborative governance approaches in which stakeholders from all spheres of society are involved. Next to the Berg en Dal municipality, also the biosphere reserve Spreewald in Germany and the Nature Park Jauerling-Wachau in Austria are analysed (ZALF, 2015).

Figure 3: Cp3 project.
Retrieved from www.cp3-project.eu

1.2 Problem definition

The Berg en Dal Municipality aims in their landscape development plan (LOP) to embrace the variation of the landscape that is present in the area and to create a multifunctional and varying landscape (Gemeente Groesbeek, 2015). However, also this Municipality faces financial problems since the national government has stopped funding and the provincial government of Gelderland is economizing. The Municipality has to act more as a director and needs to involve local stakeholders that can financially contribute to the quality of the area. The LOP 2015-2025 is therefore also called: 'Landscape of everyone'. As in the 'Deltaplan Landschap' project, the Municipality wants to integrate the landscape and spatial value of the area with rural initiatives (Gemeente Groesbeek, 2015).

At this moment there is no complete overview of the stakeholders that are present in Berg en Dal, including their interest and influence power. Such overview is necessary to know which stakeholders are or could be involved in the management of the area. Next, also an overview of (possible) financial mechanisms in the case study area is necessary. The identification of stakeholders is not enough to create an integrated landscape. Since funding from the government is decreasing and private investment is becoming essential, time-adjusted instruments are required (Gemeente Groesbeek 2015).

1.3 Aim of the study and research questions

To develop an integrated landscape, collaborative governance approaches are needed. Therefore it is needed to investigate the current and possible future management of the landscape in Berg en Dal. This knowledge can be provided by stakeholders that are active in this area. This research aims to provide an overview of relevant and essential stakeholders and to analyse their insights and interests with respect to the integration of ecosystem services and agricultural production. These insights also include financial flows, needed to realize an integrated landscape. The outcomes can be used to identify, describe and analyse successful collaborative governance models. To reach the objective, the following main question will be analysed:

'How do financial mechanisms for landscape management contribute to collaborative governance and ecosystem services enhancement in Berg en Dal?'

For answering the main question, it is first needed to analyse some sub questions ranging from the present situation to future goals and possibilities. The questions, including a description of how they will be answered, are as follow:

1. ***Which stakeholders are connected to the landscape in Berg en Dal?***

This first research question will be answered through a stakeholder analysis. First, stakeholders will be identified and selected on their involvement in the management of the landscape in Berg en Dal. Next, some of these stakeholders are selected and asked to perform in individual interactive interview. During these interviews, they may come up with new stakeholders.

2. ***What interest do these stakeholders have with respect to ecosystem services?***

For this question, first some economic theory is described with respect to motivation for landscape management, Next, the interviewee's interest and contributions with respect to ecosystem services will be investigated during the individual interactive interviews. Also the general motivation of stakeholders to manage landscapes will be asked during these interviews. It is often expected that privatization of landscapes is supported by stakeholders, but this has to be investigated first.

3. ***Which financial mechanisms can contribute to achieve these interests?***

For this question, financial mechanisms for landscape management will be analysed in three ways. First, the financing mechanisms already existing in Berg en Dal will be investigated through interviews and a literature study. Second, financial mechanisms used in other parts of the Netherlands or West-European countries will be investigated and analysed on their potential to contribute to landscape management in Berg en Dal. Third, in every interview the existing financial flows for landscape management are investigated through interviews based on network mapping (Schiffer, 2007). Through network mapping, linkages between stakeholders are investigated, including the financial flows that are present with respect to landscape management in Berg en Dal. All information from this network mapping is aggregated into one overview.

4. ***Which stakeholders are essential for the establishment and implementation of landscape management in Berg en Dal?***

For this question, two other linkages between stakeholders had to be investigated through network mapping, namely the exchange of knowledge and the existing conflicts. After the investigation, a resilience analysis was performed to check the stability of the network. With the information from the investigation and analysis, the collaborative governance model of Berg en Dal could be reviewed.

1.4 Reading guide

In this report, an overview of involved stakeholders and (potential) financial mechanisms with respect to landscape management in Berg en Dal will be provided. In chapter 2, the theoretical background of this research is described on (1) Ecosystem services and 'Groene en Blauwe Diensten', (2) Agricultural landscapes, and (3) Social analysis and property rights. In chapter 3, network mapping is explained and its general procedure is described. The methodology as applied for this thesis is described in chapter 4. Next, the results are shown. In chapter 5, the current financial mechanisms are described, followed by a description of the involved stakeholders for landscape management in Berg en Dal in chapter 6. Opinions on ecosystem services and landscape management in Berg en Dal are described in chapter 7. In chapter 8, the relationships between stakeholders are described and a resilience analysis is performed on essential stakeholders in the network, followed by a description and analysis of potential financial mechanisms for landscape management in Berg en Dal in chapter 9. After a discussion of the results, the conclusion of this research is given.

2 Theoretical background

Chapter 2 provides a theoretical background which is necessary for the analysis of landscape management in Berg en Dal. The background consists of three subjects: (1) ecosystem services and 'Groene en Blauwe Diensten', (2) agricultural landscapes, and (3) social analysis and property rights

2.1 Ecosystem services and 'Groene en Blauwe Diensten'

2.1.1 Ecosystem services

Ecosystem services are the direct and indirect contributions of ecosystems to human well-being (TEEB, 2010). Ecosystem services in agricultural landscapes provide, next to food, fibre and biofuels, also public benefits to society such as carbon sequestration, aesthetic landscapes, and biodiversity conservation (Smith & Sullivan, 2014). Four categories of ecosystem services exist, namely provisioning services, regulating services, habitat or supporting services and cultural services (TEEB, 2010), see table 1. Based on the Millennium Ecosystem Assessment (MA), a list of ecosystem services on the farm level is created for Australia and put on an importance matrix (Page, 2015). The most important services are in the table marked with IM.

Table 1: Relevant ecosystem services for Berg en Dal, divided over four categories.
Based on TEEB (2010).

CATEGORY OF SERVICES	EXAMPLES OF SERVICES
Provisioning services	• Food (IM) • Raw materials • Fresh water • Medicinal Resources
Regulating services	• Local climate & air quality regulation (IM) • Carbon sequestration and storage (IM) • Waste-water treatment • Erosion prevention and maintenance of soil fertility • Pollination (IM) • Soil moisture (IM) • Biological pest control (IM)
Habitat or supporting services	• Habitats for species • Maintenance of genetic diversity
Cultural services	• Recreation, and mental and physical health • Tourism • Aesthetic appreciation (IM) • Spiritual experience

2.1.2 Economic valuation

A major driver of production strategies which in turn affect the design and change of landscapes is economics. In the past, this was only practised in analysing what advantages the growing of one crop had compared to another crop. Nowadays, ecosystem service values are getting included in economic analysis (O'Farrell & Anderson, 2010).

In economic valuation, ecosystem services can be divided into three categories: (1) direct use values, (2) indirect use values, and (3) non-use values (TEEB, 2010). Direct use values are given to services from which benefits can be obtained through direct use. These services can be

consumptive and non-consumptive. Only few ecosystem services have explicit prices and are traded in an open market. Examples are the consumptive provisioning services. Other ecosystem services cannot be traded and have non-consumptive use values. The cultural services are examples of services with such direct use values. The regulating services provided by species and ecosystems are examples of services with indirect use values. These can be seen as public services that are generally not reflected in market transactions. The last category of non-use values reflect the satisfaction that individuals derive from the knowledge that biodiversity and ecosystem services are maintained (existence values) and that other people have access to these services, now and in the future (bequest values) (TEEB, 2010).

Through economic valuation, opportunity costs and trade-offs of environmental costs become more visible. As an effect, financial mechanisms such as payments of ecosystem services could be developed to promote sustainable land use (O'Farrell & Anderson, 2010). Such payments are paid by the beneficiaries and shifted towards the providers of the services (Pascual, 2007).

2.1.3 Groene en Blauwe Diensten

The concept of 'Groene en Blauwe Diensten' (GBD, Green and blue services) was introduced to describe the services that landowners provide to society (Stichting Groene en Blauwe Diensten, 2015). These include the implementation, management and maintenance of landscape features on their own lands. In this concept, economic value is given to these services and the involved landowners are rewarded for their efforts. GBD can include all three types of economic values. Landscape features can provide wood, nuts, and fruits, but are also effective in decreasing emissions from agricultural land to the water system. Moreover, the old agricultural landscapes often have large existence values. GBD are not only important for the landscape, but also for the economy: the landscape delivers employment and is a source of income for the touristic sector. GBD are important to maintain both the quality and experience of the landscape (Stichting Groene en Blauwe Diensten, 2015).

2.2 Agricultural landscapes

2.2.1 Development of Dutch agricultural landscapes

For centuries, Dutch farmers had an important role in the management of landscapes. They constructed farming systems that shaped and managed the landscapes of The Netherlands, including areas that we call 'nature' nowadays, such as heathlands and wet grasslands. More, much of the Dutch biodiversity was a result of these farming systems (Westerink et al., 2013).

Over years, this role changed. The Netherlands developed a strategy in which agriculture and nature were spatially and organizationally separated and old farming systems, including their ancient functions, were mostly lost. This also included the removal of landscape elements for a more efficient layout of parcels. As a result, farming is more seen as an enemy than as a partner of landscape management (Westerink et al., 2013).

In the last decade, initiatives and researches were set up through which the old agricultural landscape is and will be restored (among others in VNC, 2008 & KPMG, 2010). The agricultural sector is challenged to take initiatives with respect to societal objectives on the quality and liveability of the rural area (Stortelder et al, 2001). In the literature, farmers are even categorized in three groups based on their contribution to the management of landscape (Stortelder et al., 2001). The first group is the intensive farming in which management of

landscapes is unimportant. The second group consists of farms focused on landscapes. These farms follow a less intensive concept which mainly consists of the implementation of landscape elements, such as hedgerows. The third group are the farms focussed on nature. These farmers receive their income especially from nature management. The intensity of management has consequences for the farmers' average loss in earning: 50% for nature management, while only 10% for landscape management (Stortelder et al., 2001).

2.2.2 Current European agricultural policy

The European Union aims in its agricultural policy at sustainable rural development. This is practised in the second pillar of the Common Agricultural Policy (CAP). Three priorities of this pillar are relevant for this research. One priority in the pillar is to restore, preserve and reinforce agricultural and forest ecosystems (biodiversity, water, and soil). This can be reached through the recovering of the old agricultural landscape. The promotion of efficient use of resources and the transition to a low-carbon economy is a second priority in the pillar of the CAP and related to the one mentioned before. Through hedgerows for example, more carbon can be captured and less phosphate and nitrogen will pollute the water system. A third priority is to increase the viability and competitiveness of all types of agriculture. In the Netherlands, agricultural entrepreneurs face difficulties in keeping their sector viable and competitive. By creating a multifunctional landscape, they may get other sources of (stable) income (European Parliament, 2016).

2.2.3 Landscape of Berg en Dal

In literature, landscapes are defined differently. In this research, the definition given by the Council of Europe will be used: 'landscapes are areas as perceived by people, in which the characteristics are determined by natural or human factors and the interaction between these factors' (Council of Europe, 2000).

Landscapes involve natural, agricultural and urban areas (LNV, 2007). For this research about Berg en Dal, two relevant landscape categories are included, namely the agricultural landscape and the natural areas (Gemeente Groesbeek, 2015). Over years, the currently high valued agricultural landscape has been created through unintended by-products of the economic agricultural land use. Farmers used wooded banks and plashes to keep their livestock together and to provide them with water (Rijksoverheid, 2008). In modern economy, these characterizing landscape elements have lost their value. Currently, the main players that are responsible for the agricultural landscape are agricultural entrepreneurs, recreation entrepreneurs and new inhabitants (Rijksoverheid, 2008).

In natural areas, farmers are not the responsible party for management. These areas often include only a few stakeholders and are developed and managed by governmental parties, associations and foundations. Some of these parties also have economic interests in managing these areas (wood revenues, revenues from recreation etc.).

2.3 Social analysis and property rights

2.3.1 Four levels of social analysis

Landscape management can be influenced at four different levels in social analysis (see figure 4). These levels are connected through arrows that represent constraints (down) and feedbacks (up). The first level is embeddedness where norms, traditions and religion play an important

role. Changing these aspects goes very slowly. The second level is the institutional environment which consists of formal rules (execution, legislation and jurisdiction). The third level, governance, includes the defining and enforcing of contracts. The fourth level, resource allocation and employment, is characterized by production functions and optimization (Williamson, 2000). Focussing on landscape management in Berg en Dal, the market only manages landscapes when it optimizes their own revenues (level 4). Since this is often not the case, contracts such as GBD are introduced that safeguard the income of individuals, while improving the quality of the area (level 3). The institutional environment is another level that can enforce landscape management through formal laws, regulations, and property rights (level 2). However, this is only the case for private goods. When it comes to common-pool resources, no property rights are assigned and no party increases its own income by managing these resources. Taking the example of ecosystem services, everyone can benefit without having to pay for it. In most cases, the institutional environment (level 2) would enforce the management through intervening. However, in many areas the government pulls back and in theory, these resources would be exploited. The reason that these resources are still managed is in the other levels, with perhaps the top level of embeddedness (level 1) as the most important one. Because of informal institutions, resources are managed that would otherwise not be taken into account. In Berg en Dal, this intrinsic motivation is a main reason for the introduction of several financial mechanisms to manage landscapes. This motivation is also described by Bouma & Koetse (2016): in modern society, entrepreneurs and citizens take more initiatives, while the government shifts towards a more supporting role.

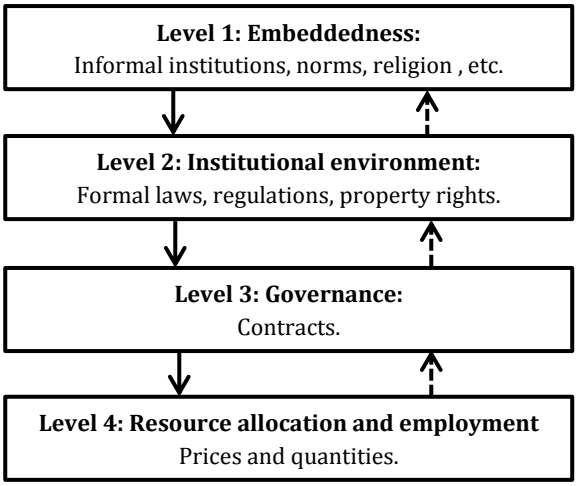


Figure 4: Four levels of social analysis
Based on Williamson (2000)

2.3.2 Resource management regime

In this research, landscapes are defined as areas as perceived by people, in which the characteristics are determined by natural or human factors and the interaction between these factors (see § 2.2.3). These factors have created ecosystems that deliver several flows. In the institutional environment (level 2 of figure 4), a resource management regime is introduced to manage people in their use of these flows. This is a structure of rights and duties that characterizes the relationship of one individual to another with respect to a particular environmental resource (Bromley, 1991). The regime is practised through the development of property rights: one who has the property is in control of a benefit stream of the resource. Bromley (1991) has defined four types of property regimes for resource management: (1) state property, (2) private property, (3) common property, and (4) non-property. In the first regime of state property, the state is responsible for the ownership and control of natural resources. Individuals and groups may only use the natural resources if the state allows them to. The second regime is private property. In this regime, the property belongs to an individual or group and others are excluded from use and decision making. However this regime is often still faced with restrictions and obligations to reach socially acceptable use of properties. Common property is the third type of property regimes. This type represents property owned by a group of co-owners. As in the private property regime, others are excluded from use and decision

making. The fourth category is the non-property regime in which there is no property. If property and management arrangements are not determined, depletion of resources may occur.

In Berg en Dal, some parts of the landscape are in the private property regime (owned by farmers, private landowners, etc.), while other parts are in the state property regime. When private and public parties invest in landscapes (cultural and natural), also the free enjoyers benefit (free-riders). Investments may even be only beneficial for the enjoyers and not for the investor himself (SER, 2008; Vreke, 2010).

2.3.3 Ecosystem services, natural capital, and common property

The problem of free riding is also the case for ecosystem services. Next to the classification in provisioning, regulating, cultural, and supporting services, ecosystem services can also be classified on their excludability and rivalry (table 2). Excludability means that individuals can be excluded from the benefits of ecosystem services. The rivalry of ecosystem services means that if one person benefits from a service, it may affect the benefits for another person (Costanza, 2008).

Table 2: Ecosystem services classified according to their excludability and rivalry
Constanza, 2008

	EXCLUDABLE	**NON-EXCLUDABLE**
RIVAL	Market goods and services (most provisioning services)	Open access (some provisioning services)
NON-RIVAL	Club goods (some recreation services)	Public goods and services (most regulatory and cultural services)

Ecosystem services are almost unnoticed by the vast majority of people, especially when they are public, non-excludable, and never enter the market for private (i.e. excludable) goods (Constanza, 2008). Moreover, current economic incentives and the privatization of landscapes can encourage mismanagement and rapid degradation of the ecosystems that provide the services (Lant, 2008; Kemkes et al., 2010). Sufficient markets exist for most ecosystem goods (such as timber, food, and water), but ecosystem services that are either nonmarketable or that derive from natural capital lacking clearly defined property rights regimes are usually free to use (Lant, 2008; Salzman, 2005). As a result, there are no direct price mechanisms to safeguard these services and conversion is preferred over conservation (Salzman, 2005; Kemkes et al., 2010).

When speaking about ecosystem services in the sense of property rights regimes, the term natural capital has to be explained. In general, capital is a stock of materials that exists at a point in time. Each form of capital stock generates a flow of services to enhance the welfare of humans (Constanza et al., 1997). Four types of capital exist, namely manufactured capital, social capital, human capital, and natural capital. Natural capital provides the basic conditions for human existence. Continuous flows of material inputs and ecosystem services are necessary to provide food, clean water and air, and essential resources (EEA, 2015).

Natural capital can be common property. Common property differs from common-pool resources (Lant, 2008). Common-pool resources consist of two components: (1) a fund (natural capital), and (2) a flow of benefits (including ecosystem services). It is difficult to exclude potential beneficiaries the use of such resources. Common property refers to a property rights regime in which rules can be determined under which members of a community may access and

use a common-pool resource. In the absence of a common property regime, common-pool resources become open-access resources and can be exploited to the point of collapse. This is also called the tragedy of the commons (Lant, 2008).

Natural capital stocks can also have a state or private property regime. The provision of ecosystem services from natural capital stocks that have a state property regime is not the problem. Usually, the government aims to serve society and is willing to spend money to increase the environment. The natural capital stocks owned by private parties are more difficult to stimulate. Since private parties do not gain income from managing non-market services, they are also not willing to invest in these services. This regime needs the institutional environment for the development and enhancement of restrictions and obligations to reach socially acceptable use of natural capital stocks and thus to safeguard the provision of ecosystem services.

2.3.4 Financial mechanisms

Ecosystem services that are either nonmarketable or come from natural capital stocks that have a private or common property regime can be stimulated through financial mechanisms (Lant, 2008; Smith & Sullivan, 2014). Landholders are not financially rewarded to support and protect these services (Smith & Sullivan, 2014). Since governmental funding is decreasing, financial mechanisms can play an important role in collaborative governance models.

In this research, financial mechanisms are defined as constructions through which public and/or private parties make use of financial instruments for the purpose of landscapes (Rijksoverheid, 2008). These mechanisms can be divided into three categories. The first category is public financial mechanisms. For such mechanisms, the government determines who is paying and how much. Examples are taxes, subsidies, or other incentives. The second category includes the mixed public-private financial mechanisms. Both, public and private parties are involved in public-private contracts. The third category involves the private financing mechanisms. Especially private parties are involved in these mechanisms and the market plays an important role in the selling of products, buying of land, certification, and donations. Involvement of the government is possible, but not essential (Vreke, 2010). All mechanisms always include payers and receivers of money. Private money is provided by private landscape users and public money is provided by the government. Often, the money is managed, monitored, and transferred by an intermediary (Vreke, 2010). Figure 5 shows this system.

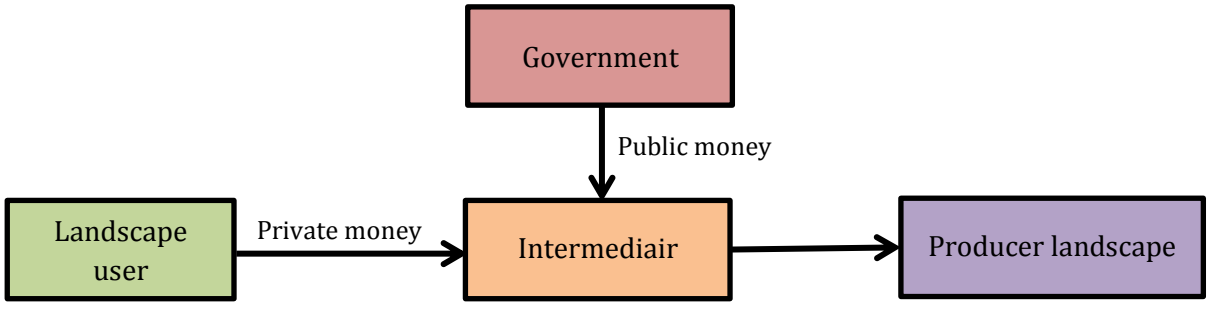


Figure 5: System of money flows for financial mechanisms.
Based on Vreke (2010). Private (from landscape users) and /or public money (from government) flow via an intermediary to the producer of landscape

At the European level, the importance for financial mechanisms is also recognized. In Drucker et al. (2002), it is described what efforts should be taken to promote biodiversity through financial resources and mechanisms. Three points are relevant for this research. First, efforts should be increased to mobilize financial resources, for example through incentive measures and greening taxes, integration of biodiversity into policies, and programmes and actions of socio-economic and financial sectors. Second, there is a need for joint funding with the private sector. Businesses can fund if they profit directly from biodiversity conservation, if they use or affect the biodiversity, if they see it as their social responsibility, or if they want to raise their public profile. Third, there is a need for cooperation between various existing national, European, and global funding mechanisms and institutions (Drucker et al, 2002).

In June 2008, the independent organization 'Task Force Financiering Landschap Nederland' was introduced in the Netherlands to advise on possible financial mechanisms for investments in the landscape. This organization especially focussed on continuity in financing, optimal use of entrepreneurship and local initiatives, and exploring the possibilities of private funding. Their final report in November 2008 formed the base for the Agenda Landscape in which ways are described how private parties can contribute to develop sustainable landscapes (Verburg & Cramer, 2009). On Dutch level, five starting points for financial mechanisms are established: (1) Producers of landscapes must receive a remuneration paid in line with market conditions, (2) There must be continuity in financing, (3) There must be optimal utilization of entrepreneurship and local initiatives, (4) There must be a maximum effort of private resources, and (5) public resources must be primarily used in high-urgent areas and for measures that cannot be financed by private resources (Verburg & Cramer, 2009).

2.3.5 Collaborative governance

The use of private- and mixed public-private financial mechanisms ask for collaborative governance. Governance in this research is defined as the establishment, reconfirmation or change of institutions to resolve conflicts of interest between involved parties on environmental resources (Paavola, 2006). Three types of governance exist, namely (1) hierarchies, (2) markets, and (3) collaborative governance (Vatn, 2010). In a hierarchy, a top level has the power of decision and command at various subordinate levels. A market includes a system of voluntary exchange and allocation of resources is determined by the willingness to pay of individual agents (Vatn, 2010). Collaborative governance is a strategy in which multiple stakeholders and public agencies collaborate in consensus-oriented decision making with the aim to develop or implement policies or to manage public programs that could not otherwise be accomplished (Ansell & Alison, 2008; Emerson et al., 2012; Vatn, 2010). Knowledge makers and decision makers communicate across disciplines and governance levels with the aim of finding ways to advance shared goals (Primmer et al., 2015). In the case of landscape management in Berg en Dal, the governance system shifts from hierarchies towards collaborative governance and markets. Since the government is decreasing its fundings, the landscape needs to be restored and improved through private- and mixed public-private financial mechanisms. Collaboration between multiple private stakeholders and public agencies is needed to set up and manage such mechanisms.

3 Network Mapping

This chapter includes (1) an explanation of network mapping, and (2) a description of the procedure of network mapping. The theory of the method was integrated and elaborated for this research in chapter 4.

3.1 Explanation of network mapping

Network Mapping is an interactive method of interviewing, based on Social Network Analysis (SNA). SNA is a tool to understand complex and dynamic structures based on data collected through questionnaires. In this method, the most common approach is stakeholder identification through a name generator, followed by a questionnaire that asks about links for each possible pair of stakeholders (Schiffer & Hauck, 2010). The main disadvantage of this approach is that the questionnaires are often long and tiring and lacks of learning effects for the interviewee. Network Mapping makes the data collection method more interesting and increases the learning effects (Schiffer & Hauck, 2010). It is an interview-based tool that helps people to understand, visualize, discuss, and improve situations in which many different actors influence outcomes (Schiffer, 2007). By drawing multiplex networks that include both formal and informal links, the complexity of governance situations becomes more visible (Schiffer & Hauck, 2010). The method helps to identify more effective ways of collaborating with actors to achieve mutual goals (Schiffer, 2007).

The method of Network Mapping has four aims, namely:

1. To visualize implicit knowledge and understand the interplay of complex formal and informal networks, power relations, and goals of stakeholders
2. To uncover sources of conflicts and potentials for cooperation
3. To facilitate knowledge exchange and learning processes
4. To develop visions and strategies to achieve common goal

(Schiffer & Hauck, 2010)

During interviews, four questions are asked to the interviewee to collect all information that is necessary to reach the aims of the method, namely:

(1) Who is involved?
(2) How are these stakeholders linked?
(3) What are their goals?
(4) How influential are these stakeholders?

These questions represent the four steps of the method. For the first question, the interviewees were asked to identify all stakeholders that are related to a certain topic. In the next step, these stakeholders were linked by drawing arrows between them on a Net-Map sheet. When analysing these arrows, it will show how the stakeholders are (not) connected to each other. For the third question, the motivation of stakeholders was investigated. In the last question, the interviewee was asked to 'build' influence towers to reflect the relative power of each stakeholder (Schiffer, 2007).

With this data can be analysed which stakeholders have influence based on their position in the network. Calculations of indices centralities show which stakeholders have the most links (degree centrality), which stakeholders are on the closest link between other actors

(betweenness centrality), and which stakeholders can reach everyone in a network on a short path (closeness centrality). If a stakeholder has a high betweenness centrality and closeness centrality, he is able to combine control (betweenness) and access (closeness) and has the most power in the network. By correlating these centralities with the height of the influence towers, it can be analysed if centralities make stakeholders influential (Schiffer & Hauck, 2010).

3.2 Procedure of network mapping

The network mapping procedure consists of four phases: (1) preparation, (2) setting up the interview, (3) pre-testing, and (4) the interview (Schiffer, 2007; Schiffer & Hauck, 2010).

Phase 1: Preparation

In this phase the overarching aim has to be clearly defined. With this aim in mind, the basic structure of the interviews can be set up by answering some sub-questions belonging to the four questions included in the Net Mapping method (Schiffer, 2007; Schiffer & Hauck, 2010).

Who is involved?

To narrow the amount of stakeholders that the interviewee can identify, the interviewer has first to decide which stakeholder levels are included. The interviewer can decide to develop a list of names on beforehand (Schiffer & Hauck, 2010).

How are these stakeholders linked?

Before interviewing, the relevant linkages have to be defined. Two ways of defining are possible. One kind of link can be chosen and divided into subcategories, or more different links can be defined. Since networks must not be too cluttered, no more than five links should be included (Schiffer, 2007).

What are their goals?

Goals have to be defined that will be examined. Categories can be chosen on forehand, but can also be given by the interviewees. However, consistence in all interviews is necessary for representative results (Schiffer, 2007).

How influential are these stakeholders?

Before building the towers, the word influence had to be defined in such a way that interviewees will understand the terminology. Most often, 1 to 2 influence towers are included in network mapping (Schiffer, 2007).

Phase 2: Pre-testing

After preparation, the issue, defined links and goals have to be discussed with an expert to check if these have to be modified. Next, the interviewing and drawing of maps has to be pre-tested with (representative) interviewees to check if all information can be gathered or something has to be modified (Schiffer, 2007).

Phase 3: Setting up the interview

In this step, interviewees are selected from a list of stakeholders. Next, some equipment is needed: mapping sheets must be set up on which actor cards (multi-coloured post-its for different actor groups) can be distributed over the empty Net-Map sheet and the material for the influence towers has to be gathered. More, different colour pens are needed to draw the links between stakeholders. To have efficient interviews, also time schemes have to be made. The list

of interviewees can develop during the process because of new information, derived during interviews through drawing network maps (Schiffer, 2007).

Phase 4: The interview

The interview starts as usual by explaining the set-up and aim of the interview, followed by asking if recording is allowed. More, the time schedule has to be confirmed by both, the interviewee and interviewee and it is explained what will be done with the information given by the interviewee. Next, some background information about the interviewee is asked.

After the introduction, the four steps of the method have to be followed. In the first step, the mapping sheet will be presented to the interviewee and explained. Next, the interviewee is asked to mention involved stakeholders which were written on actor cards and spread over the mapping sheet (Schiffer, 2007). The stakeholders had to be in the defined levels of phase 1. Through the whole interview, it had to be taken into account that Net-Mapping in this research helps to explore those relationships that shape and affect the landscape in Berg en Dal at stake but are not necessarily reflected in formal hierarchies or otherwise easily visible (Schiffer & Hauck, 2010).

When all actor cards were on the sheet, linkages and directions arrows had to be drawn between stakeholders based on the interviewee's opinions. New stakeholders can be introduced by the interviewee (Schiffer, 2007).

In the third step, the pre-defined goals are discussed and abbreviations for these goals are noted next to the actor cards. If necessary, more than one abbreviation can be noted (Schiffer, 2007). These goals can give important information on possible alliances or conflicts (Schiffer & Hauck, 2010).

Last for the interactive part, the perceived influence of the stakeholders had to be investigated. After having explained the definition of influence, the interviewee had to assign influence towers to actors, starting at the actor with the most perceived influence. The higher the tower, the more influence an actor has. Through an afterwards discussion, the height of a tower could be changed (Schiffer, 2007; Schiffer & Hauck, 2010).

Having ended the network mapping, the interview continued by a discussion on aspects that were remarkable from the sheet and/or aspects that the interviewee wanted to discuss. When all main remarks and/or comments were covered, the interview can be finished.

The data collected with Net Mapping is analysed with software for SNA, namely UNICET and NetDraw. With UNICET, centralities can be calculated. In NetDraw, the linkages, influence, and goals of the stakeholders can be visualized.

4 Methodology

This chapter involves a description of (1) the conceptual framework, (2) the interviews, and (3) the stakeholder analysis. The method of network mapping is integrated in the interviews and stakeholder analysis and elaborated for this research.

4.1 The conceptual framework

Figure 6 shows the conceptual framework of this thesis. The landscape in Berg en Dal (case study area) provides ecosystem services that are beneficial for the stakeholders in the area. For successful collaborative governance models, collaboration between stakeholders is essential. To reach this, elaboration on the present situation is essential. Therefore, it is necessary to identify involved stakeholders and their contributions to the landscape in Berg en Dal (RQ1). Furthermore, the stakeholders' interests on ecosystem services must be investigated: models on these themes can be introduced, but stakeholders should also be able and willing to work with them (RQ2). Next, the current financial mechanisms have to be analysed: since funding from governmental bodies is decreasing, financial mechanisms are essential for successful collaborative governance models (RQ3). Last, it has to be analysed how a collaborative governance model could be implemented in Berg en Dal and can contribute to an integrated landscape (RQ4).

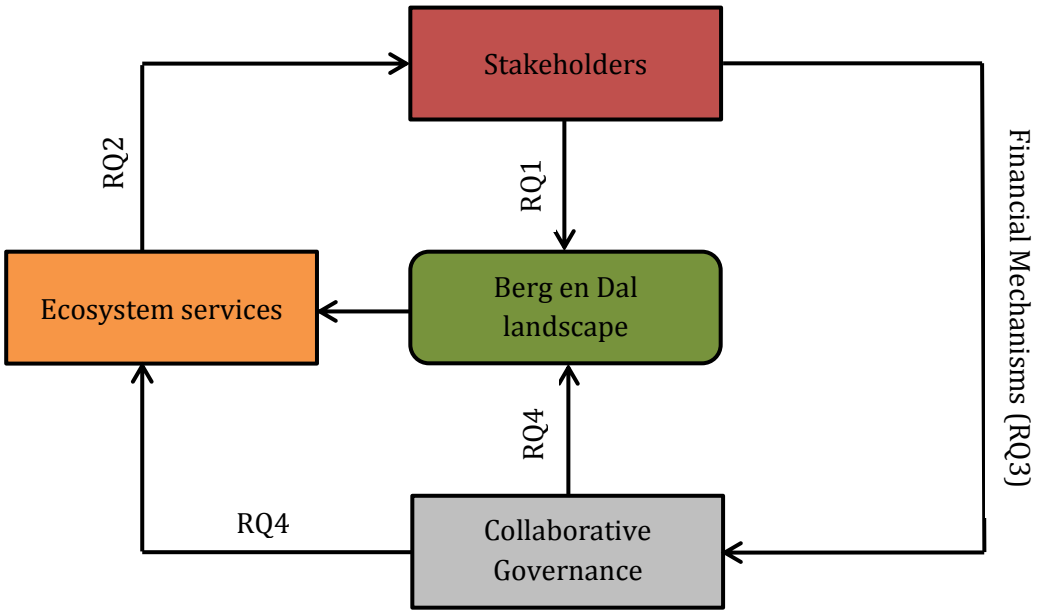


Figure 6: Conceptual Framework

The conceptual framework shows which concepts are researched in each question: (1) the stakeholders for landscape management in Berg en Dal are identified, (2) stakeholders' interests on ecosystem services provided in Berg en Dal are investigated, (3) in the context of collaborative governance, a research to the current and potential financial mechanisms for landscape management, including the management of ecosystem services, is performed, and (4) the essential parties for collaborative governance in Berg en Dal are analysed.

4.2 Interviews

Through interviews with stakeholders, data was collected for five goals: (1) investigating opinions on privatization, (2) investigating the awareness on ecosystem services, (3) investigation of financial mechanisms, (4) identification of stakeholders, and (5) construction of Net-Maps. This is visualized in figure 7. After questions with respect to the goals 1-3,

information for goal 4 and 5 was gathered through the interactive interviewing method of network mapping. With the gathered information of the interviews, stakeholders were categorized and network maps were aggregated in a stakeholder analysis (see §4.3). The manual used for the interviews can be found in annex A.

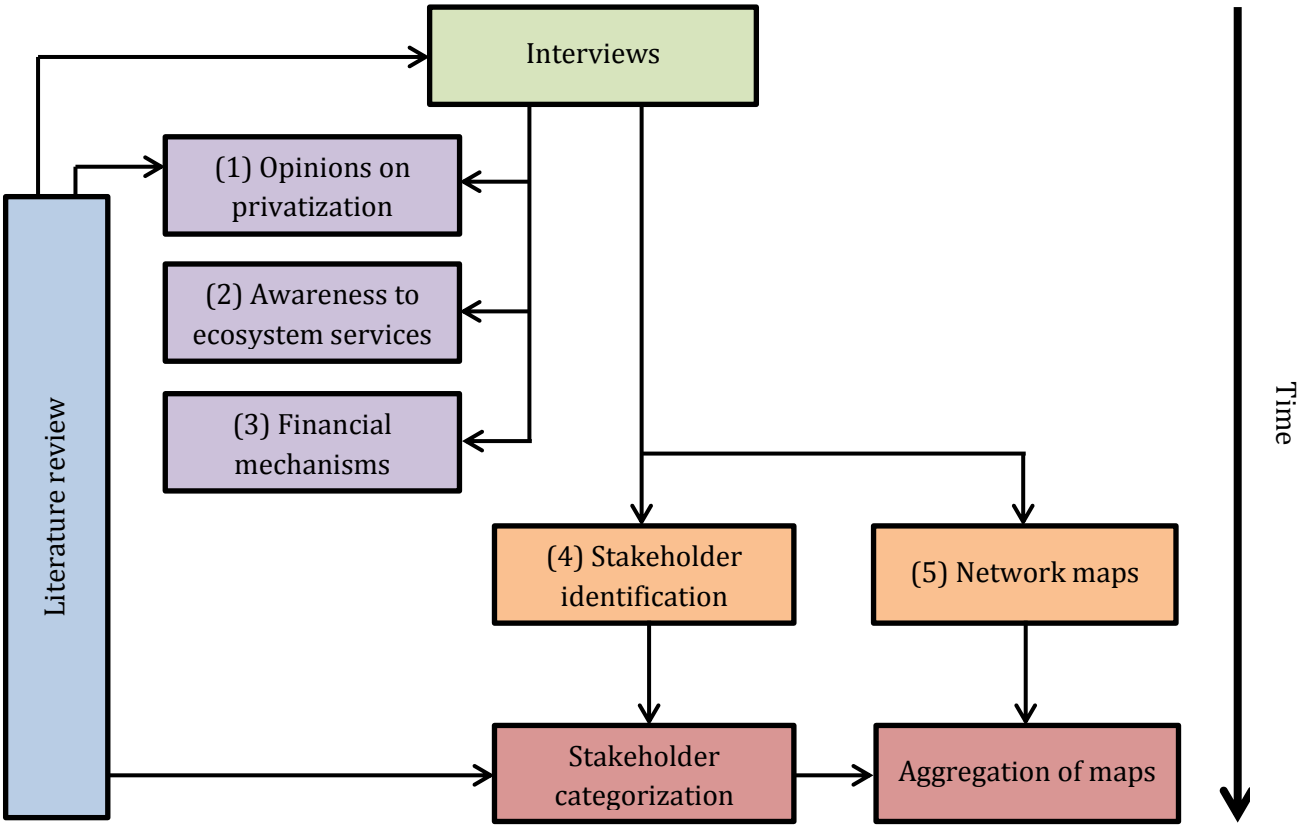


Figure 7: Information gathered through interviews on a time scale
Literature is reviewed to find relevant interviewees. During the interviews, questions are asked on privatization, ecosystem services and financial mechanisms, followed by a stakeholder identification and drawing of a network map by the interviewee. After the interviews, stakeholders are categorized. This categorization is used as a base for the aggregation of maps.

4.2.1 Opinions on privatization

During the interviews, the opinions of interviewees on the privatization of landscape management were investigated. The government is decreasing its funding and it is often expected that this is supported. However, this had to be investigated for the case of Berg en Dal. Questions were asked about their perception on the current role of the government and their opinion on this role.

4.2.2 Awareness on ecosystem services

This research also investigated the role of ecosystem services in the landscape management of Berg en Dal. Therefore, it was asked during interviews if the interviewee is familiar with the term ecosystem services and if he/she could give some examples of ecosystem services in Berg en Dal. Next, it was asked which ecosystem services are most important and which services are lacking in Berg en Dal. Last, it was investigated how several stakeholders contribute to these services in Berg en Dal.

4.2.3 Investigation of financial mechanisms

Through interviews, also information on the current financial mechanisms for landscape management in Berg en Dal was gathered. More, the interviewees were asked to give their

opinion on these current mechanisms and to come up with other possible mechanisms that can be used in Berg en Dal. For more detailed information about the current and potential financial mechanisms, also a literature review was performed. To provide a list of effective financial mechanisms, it was important to not only look at the mechanisms mentioned by the interviewees, but also to take a broader look at other mechanisms that have been used in West Europe.

4.2.4 Identification of stakeholders

Stakeholders were identified through interviews. First, some relevant actors for landscape management in Berg en Dal were identified through a literature review. A generic list of stakeholder categories and types was used as a base for this identification (cf. Mathur et al., 2007). This list summarizes who were considered for engagement in interviews (Table 3). Depending on their primary motivation, knowledge and interests, different categories of stakeholders value landscapes (and ecosystem services) to varying degrees (Smith & Sullivan, 2014).

Table 3: Stakeholder identification categories
based on Mathur et al. (2007)

CATEGORY	SUB-CATEGORY		TYPES OF INDIVIDUALS/GROUPS
Those involved in the landscape management	Financing parties	Private	Companies Institutes
		Public	Local government Regional government Non-departmental public bodies
	Investing parties	Private	Landowners Investors Developers
		Public	Local government Regional government Non-departmental public bodies
	Consulting parties	Private	Consultancies Investors
		Public	Local government Regional government Non-departmental public bodies
	Managing parties	Private	Landowners (agricultural) Entrepreneurs & Land users Volunteers
		Public	Local government Regional government Non-departmental public bodies
Those who determine the context of the landscape	Governmental levels		Local government Regional government Non-departmental public bodies
Those who may be affected	Directly		(agricultural) Entrepreneurs & Land users Landowners
	Indirectly		Local community groups General public
Others who may be interested			Environmental organizations Researchers Potential users/clients for future projects

After possible stakeholders had been identified through this generic list, more stakeholders were added by snowball sampling. This sampling method is often used in qualitative data collection for researching social networks (Illenberger & Flotterod, 2012). In snowball sampling, an initial set of respondents is asked to come up with other potential respondents. These potential respondents are asked to participate. When they accept to respond, they can again be asked for potential respondents (Illenberger & Flotterod, 2012).

In this research, the method used for snowball sampling is network mapping (see chapter 3). For the first question of this method ((1) who is involved?), interviewees were asked to identify all stakeholders that are, according to him/her, involved in the management of the landscape in Berg en Dal. The interviewees often came up with new important stakeholders. These new stakeholders were added to the list of identified stakeholders and, if relevant, asked to participate in an interview in which again snowball sampling could take place.

To narrow the amount of stakeholders that the interviewee could identify, the interviewer had first to decide which stakeholder levels were included. For this research, three levels were included, namely the local level, the regional level, and the national level. The identified stakeholders had to be involved in the management of the landscape in Berg en Dal.

4.2.5 Construction of net-maps

Next, net-maps were constructed during the interviews. These maps are part of the network mapping method (see chapter 3). For the identification of stakeholders the first question of this method was asked. For the construction of net-maps, the three remaining questions were asked, namely (2) How are these stakeholders linked, (3) What are their goals?, and (4) how influential are these stakeholders?.

(2) How are these stakeholders linked?

Before interviewing, the relevant linkages had to be defined. For landscape management in Berg en Dal, three linkages were examined, namely knowledge, cash flows, and conflicts. The first link of knowledge was chosen because this gave more information than only having contact. It included the transfer of knowledge on landscape management from one stakeholder to another (on policies, subsidies, contracts etc.). The second linkage, cash flows, was drawn to collect information on the centrality of stakeholders, thus if they have financially an important position in the social network. Last, conflicts were examined to investigate where disagreements between stakeholders on landscape management could be found in the study area.

(3) What are their goals?

The goals of the stakeholders were investigated by asking the interviewee's perception on the motivation of stakeholders to contribute in landscape management. Categories were defined and assessed by the interviewees to the stakeholders. These categories are environmental motivation, economic motivation, and social-recreational motivation. Stakeholders could have more than one motivation.

(4) How influential are these stakeholders?

Before building the towers, the word influence had to be defined. In this research, only one category of influence was examined, namely the influence of stakeholders in the management of the landscape in Berg en Dal.

4.3 Stakeholder analysis

After an explanation of the stakeholder analysis, it is elaborated on two aspects (1) categorization of stakeholders, and (2) investigation of relationships between stakeholders through the aggregation of network maps.

Reed et al. (2009) review some methods of stakeholder analyses and link them to natural resource management. They define a stakeholder analysis as a process that 1) defines aspects of a social and natural phenomenon affected by a decision or action, 2) identifies which individuals, groups and organisations are affected by or can affect these aspects, and 3) prioritizes these individuals, groups and organizations for involvement in the decision-making process (Reed et al., 2009). A modified stakeholder analysis for this research can be found in figure 8. In this research, the phenomena were ecosystem services and financial mechanisms in agricultural landscapes. Step 1 of the stakeholder analysis involved the identification of stakeholders (see figure 8). This identification was also part of the interviews and explained in §5.2.4. After the identification, stakeholders were categorized (figure 8: step 2). Last, the relationships between the stakeholders were analysed in aggregated network maps (figure 8: step 3). In the following paragraphs will be referred to this scheme.

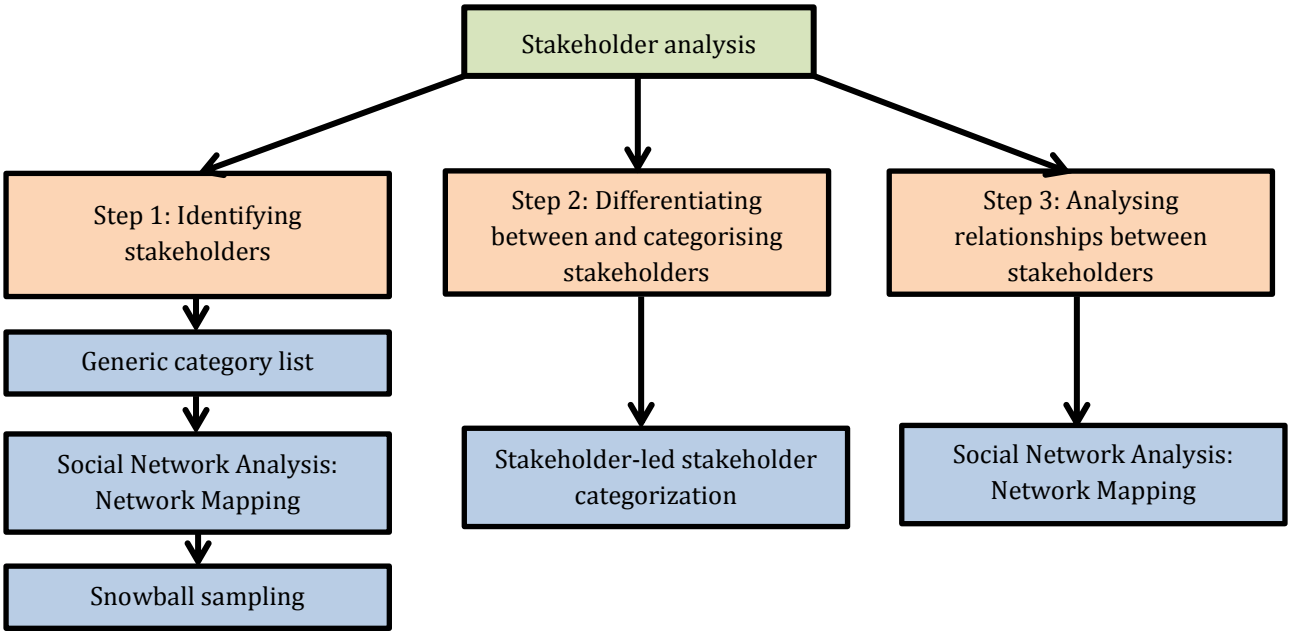


Figure 8: Model of Stakeholder Analysis.
Based on Reed et al. (2009). The stakeholder analysis for this research consists of three steps: (1) stakeholder identification (see §4.2.2), (2) stakeholder categorization by the interviewees, and (3) analysis of the relationships between stakeholders through the drawing of net-maps.

4.3.1 Stakeholder categorization

After the stakeholder identification, stakeholders were categorized based on stakeholder-led stakeholder categorization (figure 8, step 2). This means that stakeholders were categorised into categories created by the stakeholders (interviewees) themselves. Because interviewees categorized stakeholders in different ways, an afterwards recategorization was necessary.

Berg en Dal includes a lot of stakeholders. To create a stakeholder overview that is relevant in the context of this research, it was necessary to use a systematic approach with pre-conditions and boundaries to 1) narrow the amount of included stakeholders, and 2) (re)categorize the stakeholders. The following pre-conditions and boundaries were used:

To narrow the amount of included stakeholders:

- Only stakeholders that are currently actively involved in the management of the landscape in Berg en Dal are included.
- Only local and regional stakeholders will be involved in the stakeholder analysis.
- Only parties that are mentioned in more than one interview will be included

To (re)categorize the stakeholders:

- Only organizations and groups are involved in the stakeholder analysis. Individuals as landowners, farmers, or other entrepreneurs, will be included in groups.
- When groups involve multiple categories of stakeholders, a separation into more categories is necessary.

4.3.2 Analysis of relationships between stakeholders

Data on relationships between stakeholders was collected through interviews based on network mapping (see §4.2.5). This data, together with the stakeholder categorization were the base for the construction of aggregated net-maps. Three aggregated net-maps were constructed (1) net-map on knowledge exchange, (2) net-map on financial flows, and (3) net-map on conflicts.

The importance of stakeholders in the network was investigated by analysing two types of centralities, namely the betweenness centrality and degree centrality. The closeness centrality will not be analysed since some individuals are part of more than one party (for example *farmers* and *The Ploegdriever*).

The net-maps were described, followed by a resilience analysis. In this analysis, the focus was on two aspects: (1) the stability of the network was tested, and (2) the essential stakeholders for the establishment and implementation of landscape management were investigated. Information on these aspects was gathered through two actions:

1. Exclusion of drawn arrows that were only mentioned once.
2. Exclusion of a party from the net-maps of knowledge exchange and financial flows.

5 Current financial mechanisms in Berg en Dal

The existing financial mechanisms in Berg en Dal are divided into (1) mechanisms for cultural landscapes (i.e. the Streekfonds, contracts for landscape development and management, the landschapsfonds, and rights in rem), and (2) mechanisms for natural landscapes (i.e. private financing, and public financing).

5.1 Financial mechanisms for cultural landscapes

5.1.1 The Streekfonds

In 2011, *streekrekeningen* (regional bank accounts) were signalized as a new form of financing cultural landscapes. Enterprises and institutes put their money on such an account and receive next to the savings interest also a bonus interest. This bonus interest will be put in a *streekfonds.* This is a regional fund from which the management, restoration and development of nature, landscape or culture historical measurements are paid. Next to the bonus interest, the enterprises and institutes can also donate more money to the *streekfonds* (regional fund) or use other constructions through which they can contribute to the *streekfonds* (Tekelenburg, 2011). The *streekrekeningen* are private financial mechanisms (Vreke, 2010). Since the government also provides money to the regional funds, the *streekfonds* is a mixed public-private financial mechanism. From the *streekfonds*, money flows towards landscape managers (volunteers and entrepreneurs) and projects for landscape development. For these investing parties and the managing parties, other financial mechanisms exist. These will be explained in the next paragraphs. An overview of the *streekfonds* system of the cultural landscape in Berg en Dal can be found in figure 9. In Berg en Dal, the Stichting Landschapskapitaal (Foundation landscape capital) is set up to manage the money in the *streekfonds.*

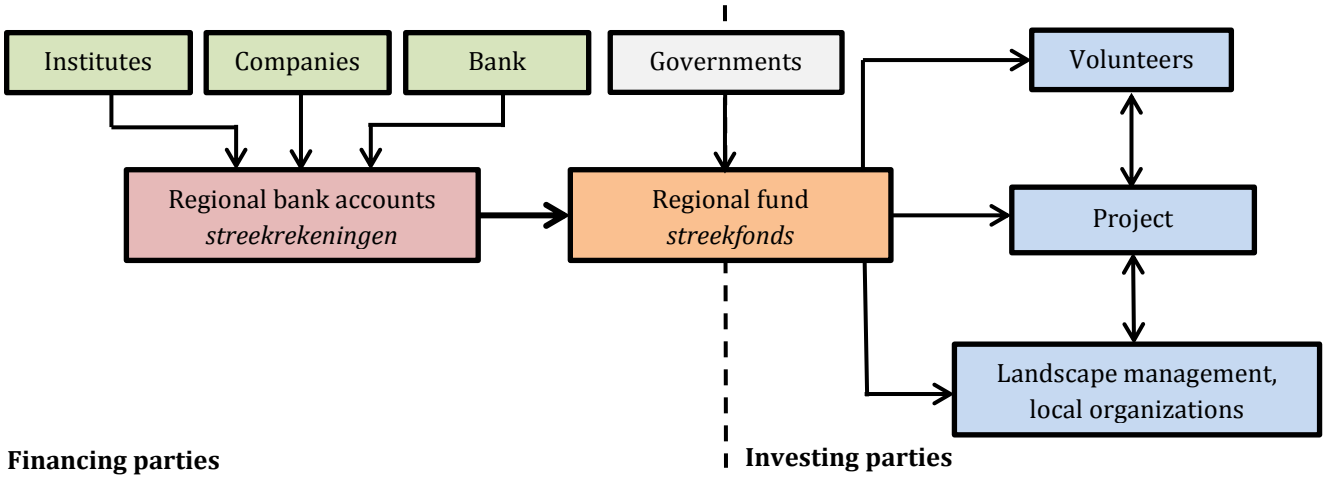


Figure 9: System of regional bank accounts and regional funds in Berg & Dal.
based on Tekelenburg (2011). Institutes and companies put money on regional bank accounts. The bank provides a bonus interest over this money which will be transferred to the regional fund. From this fund, parties are paid for the development and management of the landscape. The government can also finance and/or invest through this fund.

5.1.2 Contracts for landscape development and management

Since 2011, a concept often used in the management of the agricultural landscape in Berg en Dal is 'Groene en Blauwe Diensten' (GBD). Through contracts, landowners are rewarded for the social services that they provide to society such as the development and management of landscape features on their land. Often, the municipality sets a yearly maximum of subsidies and takes care of the payments for the implementation and management of approved landscape

plan. These payments are mainly coming from the *Streekfonds* (Stichting Groene en Blauwe Diensten, 2015).

Next, there are contracts that include agri-environmental contracts for target species (bird species). These contracts were provided by the government, but are currently under the responsibility of collectives: overarching cooperatives that includes several agricultural nature associations. There are contracts for meadow birds, landscape features, standard orchards, watercourses, wetlands, and land borders. The collectives are not only involved in the construction of the contracts, but also in the guidance and control of the implemented packages (Collectief Rivierenland, 2016).

5.1.3 Landschapsfonds

Landschapsfondsen (landscape funds) are introduced to develop agricultural landscapes with GBD and to make the landscapes more accessible. Every landschapsfonds is organized differently and have different projects in which they participate. The funds are financed by private and/or public money (Schuringa, 2006). In Berg en Dal, there is also a landschapsfonds present, namely Via Natura. This foundation started with subsidies from the Municipality. Nowadays, after some beneficial investments, Via Natura also has some own money. One source of money is the *landschapsveiling* that was held in Berg en Dal (Tekelenburg, 2011; ARK et al., 2007). Land and landscape features in the area (for example meadows, hedges, bridges, or bushes) were auctioned to private parties. These parties aim for a high quality living and working environment. More, it improves their green image. The donators do not own the auctioned landscape elements, but are involved in the management and development. The landowners will manage the landscape elements for a period of ten years. In return, they will have ten years of income insurance without having to deal with governmental rules (ARK et al., 2007).

5.1.4 Rights in Rem

Another instrument used in the area is 'rights in rem'. This instrument puts a qualitative obligation on land. When land with these rights is sold, the new owner is obligated to maintain the landscape. 'Rights in rem' is an effective instrument because of its continuity in time. An extra advantage of this mechanism is that land keeps its agricultural function in the land use plan and thus its value (VNC, 2016).

5.2 Financing mechanisms for nature areas

5.2.1 Private financing

A financial mechanism used for the nature areas in Berg en Dal is private financing. Some nature areas in Berg en Dal are not owned by the government, but by privatized parties who take responsibility for the development and management of these areas. Resources of financing become available through the selling of marketable products, revenues from recreation, revenues from projects, leasing of land, sponsoring, and donations. The sources can vary between parties.

5.2.2 Public financing

The government has two roles in the development and management of nature areas: (1) some areas are owned by public parties and financed with public resources, and (2) most nature areas owned by private parties cannot be managed with private financing only and therefore public financing in the form of subsidies are provided by the government.

6 Involved stakeholders in Berg en Dal

This chapter involves (1) a categorization of the stakeholders from the stakeholder analysis, followed by (2) a description of these stakeholders and (3) their roles. Most information is collected through 7 anonymous interviews. The following parties were interviewed: *Municipality of Berg en Dal, Staatsbosbeheer, The Ploegdriever, Stichting Landschap Ooijpolder-Groesbeek, Vereniging Nederlands Cultuurlandschap, Via Natura,* and *Water Authority Rivierenland*.

6.1 Categorization of the stakeholders

Before the description of all stakeholders, the pre-conditions and boundaries as described in §3.1.1 were elaborated based on the information given by interviewees. Some stakeholders that were mentioned during the interviews are categorized because of overlapping (figures 10-13). The instances of the figures 10 and 11 are closely connected and therefore categorized into one term. The figures 13 and 14 group some individual - and groups of – *entrepreneurs* and *private landowners* that were mentioned during interviews. The categorization was most difficult for the *providers of green and blue services*: two interviewees used the general term *providers of green and blue services*, while three other interviewees divided these providers into *farmers* and *private landowners*. At the same time, the *farmers* and *private landowners* include both providers and non-providers of green blue services. Since the majority of the interviewees made a distinction between *farmers* and *private landowners*, both categories will be included. The *providers of green and blue services* will be separated in both, the *farmers* and *private landowners* (figure 12). Table 4 shows the excluded parties that could not be categorized and were only mentioned in one interview.

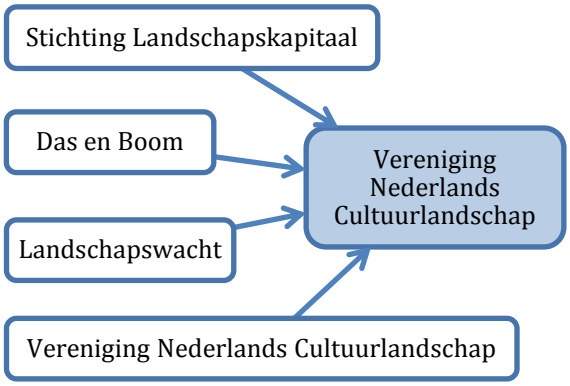


Figure 10: Categorization of Vereniging Nederlands Cultuurlandschap

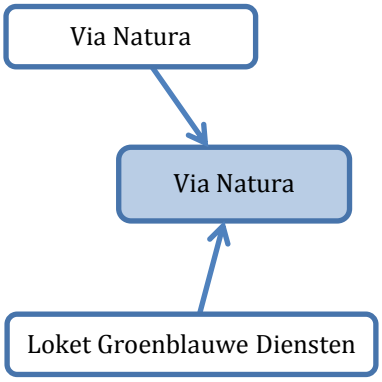


Figure 11: Categorization of Via Natura

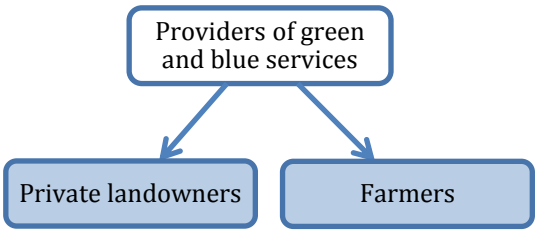


Figure 13: Seperation into private landowners and farmers

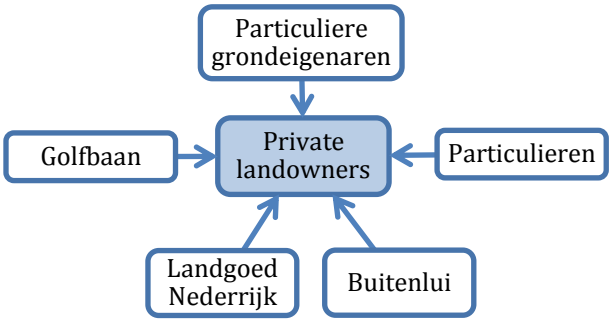


Figure 12: Categorization of private landowners

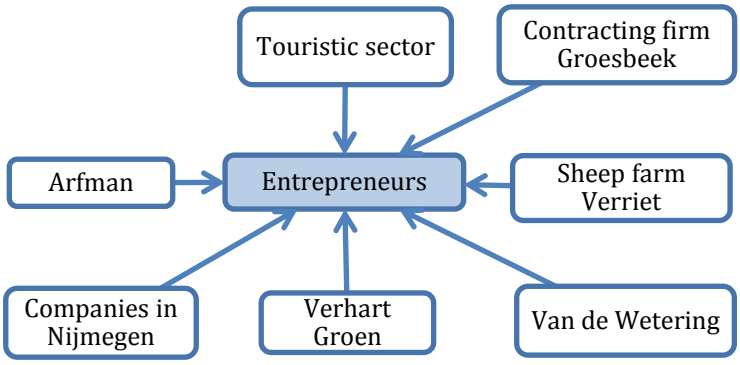


Figure 14: Categorization of entrepreneurs

Table 4: Stakeholders that are excluded (only mentioned once)

Stakeholders mentioned once
○ 'De Wassum'
○ 'Free Nature'
○ 'Monument en Landschap'
○ WNF
○ Citizens
○ Deichverband
○ Stichting landschapsbeheer Gelderland

Another pre-condition in this research is that only stakeholders that are currently actively involved in the management of the landscape in Berg en Dal are included. Foundation *ARK* was mentioned twice, but explained to be not actively involved in the management. *ARK* played a temporary role in the management of some nature areas, but turned it over to *Staatsbosbeheer*. In the context of this research, *ARK* will therefore not be included as a stakeholder.

6.2 Description of the involved stakeholders

Table 5 shows which (categories of) stakeholders were included in this research. In this paragraph, these stakeholders will be introduced. The stakeholders are divided into private and public parties and are ranged in alphabetic order. Many stakeholders are members of the landschapscommunity and collaborate on the fields of agriculture, landscape, nature, education, recreation and cultural history (Landschap van iedereen, 2016).

Table 5: Overview of included stakeholders

STAKEHOLDERS	IN # OUT OF 7 INTERVIEWS MENTIONED	IN LANDSCHAPSCOMMUNITY
Municipality of Berg en Dal	7	X
The Ploegdriever	7	X
Province of Gelderland	7	
Via Natura	7	X
Vereniging Nederlands Cultuurlandschap	7	X
Staatsbosbeheer	6	X
Stichting Landschap Ooijpolder-Groesbeek	6	X
Private landowners	6	
Werkgroep Milieubeheer Groesbeek	4	
Geldersch Landschap & Kasteelen	4	
IVN Rijk van Nijmegen	4	X
Farmers	4	
LandschapsBeheer Groesbeek	4	X
Municipality of Nijmegen	3	
Entrepreneurs	3	
Natuurmonumenten	3	
Rijkswaterstaat	3	
Flora- en Faunawerkgroep Gelderse Poort	2	X
ZLTO	2	X
't Zwanenbroekje	2	X

6.2.1 Public Parties

Municipality of Berg en Dal

In 2015, the municipalities of Groesbeek, Millingen, and Ubbergen have merged into the *Municipality of Berg en Dal*. This *Municipality* has, together with some other parties, developed the landscape development plan (LOP) and municipal implementation program, and is responsible for the monitoring of the quality of the landscape in Berg en Dal. Although it is one municipality, the villages are managing the landscape to different extents. Berg en Dal and Ubbergen are most motivated and try to convince the other villages on sustainable landscape management.

The *Municipality of Berg en Dal* manages the contracts for GBD and mows the roadsides in the area. The governmental body is active with respect to new development in the area, but more passive when it comes to the management of the already existing landscape.

Municipality of Nijmegen

The *Municipality of Nijmegen* owns and manages a nature area near Groesbeek. Next, the landscape of Berg en Dal is a source of income for Nijmegen. Tourists visiting Berg en Dal for recreation, also spend their money in Nijmegen. Also the inhabitants of Nijmegen make use of the landscape for recreation. This also positively influences the health of the people in the city.

Province of Gelderland

The municipality Berg en Dal is sited in the province of Gelderland. The *Province* develops an environmental vision on which the regional LOPs have to be based. This governmental body is mostly involved as coordinator and director. More, the *Province of Gelderland* manages some roads and practices ecological roadside management.

Rijkswaterstaat

This executive body of the government is in Berg en Dal responsible for the protection of land against flooding and the quality of the water. *Rijkswaterstaat* manages some dikes and gives the Waal River in Berg en Dal more space to flow.

Water Authority Rivierenland

The *Water Authority Rivierenland* is responsible for the water system in the area; the discharge and quality of the water. This governmental body contributes to the blue services in the area. Sometimes, the *Water Authority Rivierenland* hires entrepreneurs to do this work for them.

6.2.2 Private Parties

Entrepreneurs

This category not only includes individual *entrepreneurs* mentioned during interviews as managers of the landscape in Berg en Dal, but also other *entrepreneurs* that are involved because of their financing role for landscape management. These financing parties are not only located in Berg en Dal, but also in Nijmegen.

Farmers in Berg en Dal

Farmers are the main players in the agricultural landscape and therefore play an important role in the management of these areas. The farmers in Berg en Dal have various activities, such as growing crops, producing wine, keeping livestock, camping, et cetera. The farmers may be member of the *ZLTO* and some are also providers of GBD.

Flora- en Faunawerkgroep Gelderse Poort
This working group aims to organize excursions and readings, to stimulate and coordinate research, and to collect observations (Flora- en Faunawerkgroep Gelderse Poort, 2016). *Flora- en Faunawerkgroep Gelderse Poort* is mainly a critical group and provides maps with bottlenecks and/or shortcomings in landscape planning and management.

Geldersch Landschap & Kasteelen (GLK)
GLK is a foundation in the province of Gelderland. The foundation manages and repairs the landscape including its biodiversity, and reunites country houses with their surroundings (Geldersch Landschap & Kasteelen, 2016). In Berg en Dal, this foundation only manages the forests near Beek & Ubbergen (Elyseesche velden).

IVN Rijk van Nijmegen (IVN)
The *IVN Rijk van Nijmegen* is an association consisting of volunteers who provide ecological education and promote sustainability (IVN RIjk van Nijmegen, 2016). The volunteers are managing parts of the landscape in the municipality Berg en Dal. This is mostly commissioned by *Staatsbosbeheer*.

Landschapsbeheer Groesbeek (LBG)
Landschapsbeheer Groesbeek (Landscape Management Groesbeek) is part of the *WMG.* Members of the organization manage, just as the *IVN*, voluntary some parts of the landscape in the municipality Berg en Dal. Near Groesbeek, this organization is responsible for the old railway.

Natuurmonumenten (NM)
The association *Natuurmonumenten* is also active in the area, but in contrary to *SBB*, *NM* manages only a small part of the landscape in Berg en Dal, namely the Sint-Jansberg. *Natuurmonumenten* secures nature, landscape and the belonging cultural heritage by purchasing areas and manage these at professional level (Natuurmonumenten, 2016).

Private landowners in Berg en Dal
Next to farmers, also private landowners practise land management. In Berg en Dal, there are among others private landowners who own estates, or a golf course. Some of these landowners are also providers of GBD.

Staatsbosbeheer (SBB)
As independent administrative body of the government, *Staatsbosbeheer* maintains, restores and develops many Dutch natural and cultural areas and tries to open their sites to the public as much as possible (Staatsbosbeheer, 2015). *Staatsbosbeheer* manages also some parts of the landscape in Berg en Dal, especially natural areas.

Stichting Landschap Ooijpolder Groesbeek (SLOG)
In 2000, The *SLOG* (Foundation Landscape Ooijpolder-Groesbeek) is founded out of the *WMG*. The foundation has a contract (for 6 years) with the *Municipality of Berg en Dal* to manage small plots in Berg en Dal and manages some plots of *Staatsbosbeheer. SLOG* is responsible for many ecological connection zones, for example between the moraine and Waal River. Some work of *SLOG* is done by volunteers of *Landschapsbeheer Groesbeek*, while the real work is executed by processors or *the Ploegdriever*. Another activity of the foundation is the provision of suggestions for landscape improvement to the *Municipality of Berg en Dal*, mostly with respect to the

management of landscape elements. *SLOG* also tries to involve the population and tourists to the landscape for example by providing a walking map.

The Ploegdriever

Another association that focusses on the landscape management in Groesbeek-Ooijpolder is the agricultural landscape association *The Ploegdriever*. *The Ploegdriever* manages some areas that are commissioned by the *Water Authority Rivierenland* (dikes), the *Berg en Dal Municipality*, or *farmers* and *private landowners* who provide GBD. These areas also include some sandy roads. The association is part of the *Collective Rivierenland Oost*. This party distributes subsidies over several associations with respect to agricultural landscape management. The collective has a management package for target species (birds) for which they sign contracts.

Vereniging Nederlands Cultuurlandschap (VNC)

The *VNC* (Association Dutch Cultural Landscapes) consists of three other parties, namely the *Stichting Landschapskapitaal* (Foundation Landscape Capital), *de Landschapswacht*, and *Das en Boom.* The *Stichting Landschapskapitaal (SLK)* is established to manage the money flows, the *Landschapswacht* is responsible for the implementation of projects, and *Das en Boom* is introduced for the protection of endangered species in the Netherlands. In general, *VNC* aims to maintain the cultural history, recreation and biodiversity of the area. The association manages some plots themselves.

Via Natura

Via Natura is founded by the three former municipalities for the execution of the previous LOP. The foundation aims to maintain and develop the landscape in Berg en Dal. *Via Natura* stimulates stakeholders in the area to implement projects with this aim in mind. The foundation has set up the *Loket Groenblauwe Diensten* (Desk GreenBlue Services) to be able to provide management contracts to individuals. These contracts include a time frame of 30 years in which the individual is rewarded for the management of the landscape. Both, *Via Natura* and the *Loket Groenblauwe Diensten* are only organizationally involved in landscape management. After some years, the foundation will be lifted and the *Berg en Dal Municipality* will take over their responsibilities.

Werkgroep Milieubeheer Groesbeek (WMG)

The *WMG* (Working group environmental management Groesbeek) aims to maintain and create a good balance between nature, housing, work, and environment. This aim is pursued through, among others, education, consultation, and voluntary landscape management (WMG, 2016).

ZLTO

The *ZLTO* is an association which is introduced for entrepreneurs in the rural areas of Noord-Brabant, Zeeland, and Southern Gelderland (ZLTO, 2012). Also *entrepreneurs* in Berg en Dal, especially *farmers*, are member of this association. The *ZLTO* only focusses on the agricultural landscapes.

't Zwanenbroekje

A private initiative to convert agricultural plots to nature is *'t Zwanenbroekje*. The area is part of the ecological corridor between the moraine and the Waal River ('t Zwanenbroekje, 2016). The organisation works together with *IVN.*

6.3 Roles of the stakeholders

The roles of the stakeholders with respect to landscape management in Berg en Dal are divided into the 6 (sub) categories from the stakeholder identification table: (1) financing parties, (2) investing parties, (3) managing parties, (4) consulting parties, (5) determining parties, (6) affected parties, and (7) others who may be interested. The first three categories include different pathways of financing, investing and managing (see figure 15). Information on these pathways is gathered through the drawn linkages of financial flows during the method of Network Mapping. At the end of the paragraph, a summary of all roles can be found in table 8 (p.35/36).

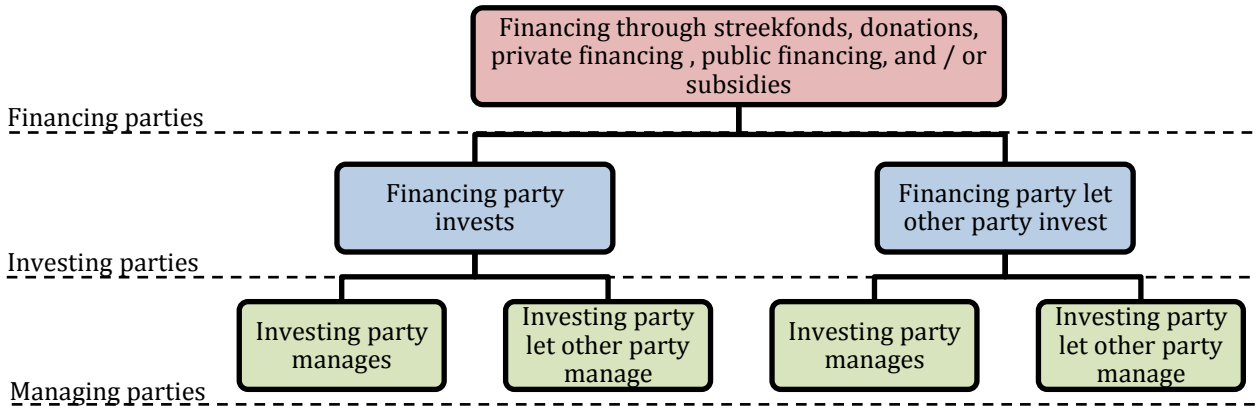


Figure 15: System of financing, investing and managing parties

6.3.1 Network map of financial flows

During interviews, the interviewees were asked to drawn the financial flows for landscape management that, according to them, exist in Berg en Dal. The interviews were aggregated into one network map (Annex B, table 24). A visualization of these linkages can be found in figure 16. Most financial flows towards private parties represent the payments for GBD.

For the aggregated net-maps, the betweenness- and degree centralities are calculated. Table 6 shows the betweenness centrality of all stakeholders which represents the strategically useful position of one stakeholder between other stakeholders. Parties that are sitting in between stakeholders and / or connecting unconnected actors have a high centrality and are important for the network. The degree centrality is shown in column 2 and 3 of table 7 and represents the amount of relations every stakeholder has with respect to financial flows. From every column, the four highest numbers are marked.

When comparing the results of the betweenness and degree centrality, it can be noticed that the *Municipality of*

Table 6: Betweenness centrality of stakeholders with respect to financial flows

STAKEHOLDERS	BETWEENNESS CENTRALITY
Municipality B&D	28.250
Via Natura	23.833
VNC	17.583
Staatsbosbeheer	12.500
The Ploegdriever	6.750
Farmers	6.000
Water Authority	3.750
SLOG	0.333
Province Gelderland	0
Geldersch landsch.	0
Natuurmonumenten	0
IVN	0
LBG	0
Flora- en Faunaw.	0
Municipality Nijm.	0
Private landowners	0
Zwanenbroekje	0
Entrepreneurs	0
Rijkswaterstaat	0
WMG	0
ZLTO	0

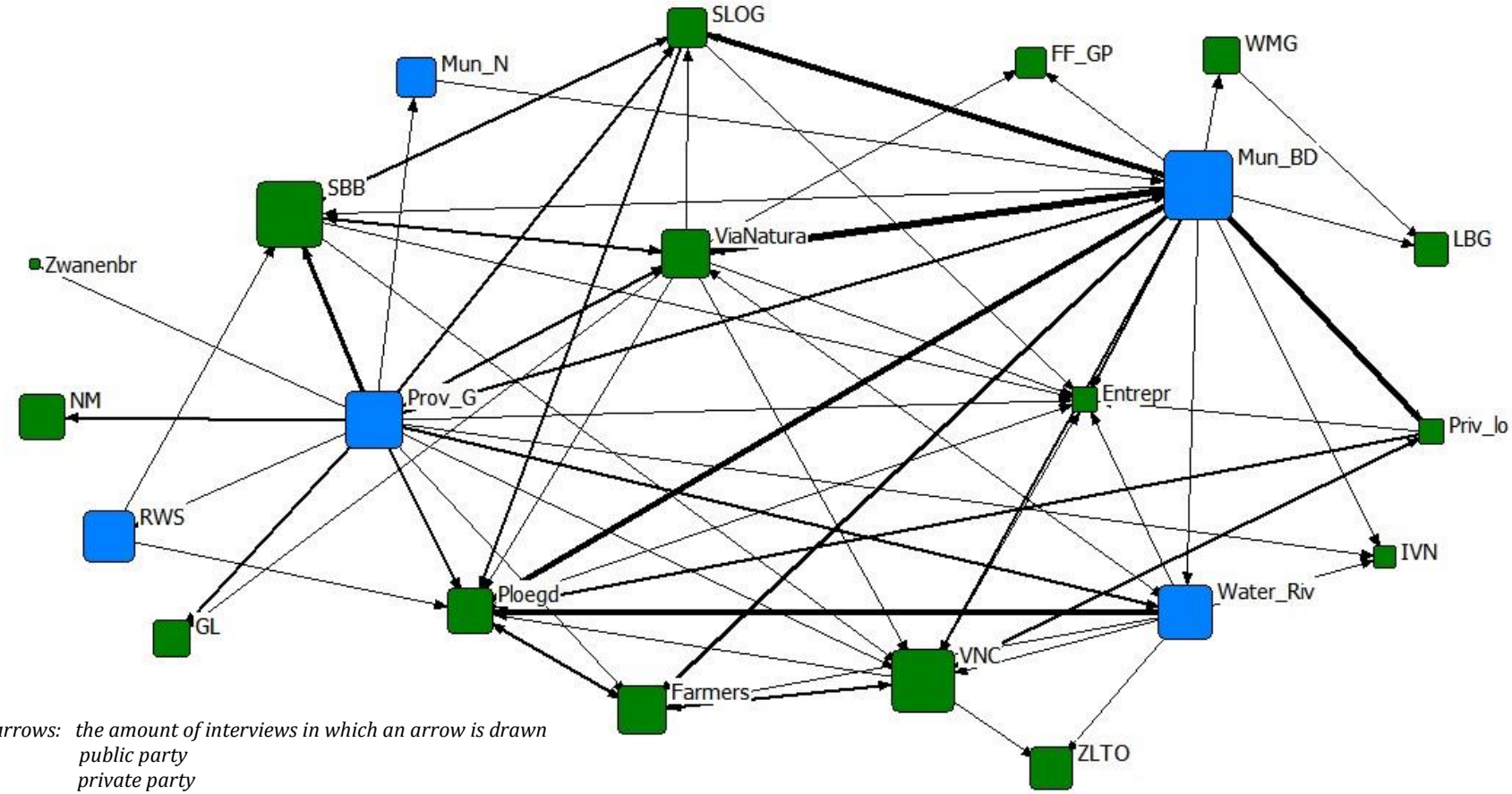
Berg en Dal, Via Natura, and *VNC* are in the top of both centralities, followed by *The Ploegdriever, farmers,* and the *Water Authority Rivierenland. Staatsbosbeheer* who is second on betweenness centrality, does not belong to the stakeholders with highest degree centrality.

During the interviews, also the perceived influence of every stakeholder was asked on a scale of 0-5, in which 5 represents the stakeholders with the most influence (Annex B, table 27). In figure 16, the perceived influence of stakeholders is visualized by the size of the nodes. Most stakeholders that have a high betweenness centrality are also perceived to have the most influence with respect to landscape management in Berg en Dal (*Municipality of Berg en Dal*, *Staatsbosbeheer*, and *VNC*). The *Province of Gelderland* is perceived to have large influence, but has a betweenness centrality of zero. This is because the *Province* only subsidizes other parties and does not receive any financial earnings. Via Natura has a high betweenness centrality, but is perceived to have average influence (rank 7).

When looking at the parties with the highest degree centrality, all marked stakeholders are perceived to have high influence. *Staatsbosbeheer* and *Rijkswaterstaat* are perceived to have high influence, but are not in the top of degree centralities.

Table 7: Degree centrality of stakeholders with respect to financial flows
Column 2 shows the amount of financial flows drawn from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of financial flows drawn from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders who receive money for landscape management a stakeholder of column 1.
Column 5 shows the amount of stakeholders that provide money for landscape management to a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn**	**Incoming: # of total arrows drawn**	**Outgoing: # of linked stake-holders**	**Incoming: # of stakeholders linked to this stakeholder**
Entrepreneurs	0	10	0	9
Farmers	5	11	2	5
Flora- en Faunawerkgroep Gelderse Poort	0	2	0	2
Geldersch Landschap & Kasteelen	0	4	0	2
IVN Rijk van Nijmegen	0	3	0	3
LBG	0	2	0	2
Municipality of Berg en Dal	38	5	13	3
Municipality of Nijmegen	1	1	1	1
Natuurmonumenten	0	2	0	1
Private landowners	6	8	3	2
Province of Gelderland	27	0	15	0
Rijkswaterstaat	2	1	2	1
Staatsbosbeheer	5	8	4	4
SLOG	3	10	2	4
The Ploegdriever	3	25	2	9
Via Natura	10	11	9	4
VNC	9	11	5	7
Water Authority Rivierenland	12	4	7	3
WMG	1	1	1	1
ZLTO	0	2	0	2
't Zwanenbroekje	0	1	0	1



Width of the arrows: *the amount of interviews in which an arrow is drawn*
Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*

Figure 16: Net-map of financial flows

Abbreviations:

Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The Province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje

6.3.2 Financing parties

The financing parties are the stakeholders that currently provide the money for landscape development and management in Berg en Dal. These parties can be divided into private and public.

There are three ways through which private parties are financing. First of all, some parties (individuals, companies, and institutes) are financing through the *Streekfonds Stichting Landschapskapitaal* (part of the *VNC*). Second, private parties can donate money directly to the developing and/or managing party. *Staatsbosbeheer*, *Geldersch Landschap & Kasteelen*, and *Natuurmonumenten* often receive such donations. Third, private parties manage their own property mainly with own private sources of financing (*Staatsbosbeheer*, *Geldersch Landschap & Kasteelen*, and *Natuurmonumenten)*.

Although the governmental funding is decreasing, public parties are still financing in three ways. First, they finance the development and management of areas they own themselves, although this might also be from assessments and levies for public services. Second, still some subsidies are present that flow from the *Province of Gelderland* and the *Berg en Dal Municipality* to other parties for development and management of the landscape. From the *Province,* subsidies flow towards the *Collective Rivierenland.* The members of *The Ploegdriever* receive this money when they have a management package for target species of birds. Although the money goes via the *Collective Rivierenland*, this party is taken together with *the Ploegdriever*.

't Zwanenbroekje also receives a subsidy from the *Province of Gelderland* for landscape management. From the *Berg en Dal Municipality,* subsidies flow, among others, towards the *VNC*. *Staatsbosbeheer, Geldersch Landschap & Kasteelen,* and *Natuurmonumenten* receive management subsidies from the *Province of Gelderland.* Next to these subsidies, the *Province of Gelderland* also co-finances one-off projects (for 50-75%) and the *Berg en Dal Municipality* pays the *farmers* and *entrepreneurs* who provide GBD for their investing and managing activities. The *Municipality of Berg en Dal* also pays *The Ploegdriever* who manages some sandy roads and *SLOG* for the management of four plots with GBD. *Via Natura* contributes indirectly to the development and management of the landscape and receives money from the *Berg en Dal Municipality* in order to function. Third, public parties invest through the Streekfonds of *Stichting Landschapskapitaal* (*Municipality of Berg en Dal* and the *Water Authority Rivierenland)*. Money thus also flows through the intermediary funds towards developers and managers of the landscape (see §5.1.1).

6.3.3 Investing parties

The provided money has also to be invested by parties for the development and management of the landscape in Berg en Dal. For this research, these parties are called investing parties. The benefits of these investments can be both: financial or 'social' (health, recreation, biodiversity, etc.). Investing parties can be divided into two categories: (1) financing parties who invest themselves and (2) others who invest for the financing parties (see figure 15).

For the first category, several examples exist in Berg en Dal. Focussing on private parties, *SLOG* invests money for the development of landscape features at the plots that they own themselves. Also *Staatsbosbeheer*, *Geldersch Landschap & Kasteelen*, and *Natuurmonumenten* invest their private resources in developments and management of their own area. The public parties invest in their own area to develop and manage the landscape. The *Province of Gelderland* and *Berg en Dal Municipality* not only finance for example the provincial and municipal road sides, but are

also responsible for the investment of these financial resources in the development and management of these areas. The same is the case for the *Water Authority Rivierenland* and *Rijkswaterstaat,* but here on the field of water streams, water quality, and dikes.

For the second category, public and private money flows from the financing parties to *farmers* and *private landowners* who provide GBD. These providers invest the money in the development of landscape elements. Providers of GBD are paid for the provision of land and work. The payments are part of GBD contracts that have a length of 30 years. Every 6 years, these contracts are monitored and extended. The municipality of Berg en Dal has made the organization Via Natura responsible for the demand and supply of GBD in the area (Via Natura, 2015). The municipality sets a yearly maximum of subsidies and takes care of the payments for the implementation and management of approved landscape plans (Via Natura, 2015).

6.3.4 Managing parties

Next to investors in landscape development and management, it is essential to have managing parties who make sure that the investments will be effective. In Berg en Dal, some public and many private parties are involved in this management. The management parties can be divided into two categories: (1) investing parties who manage the landscape and (2) other parties who manage the landscape for investing parties (see figure 15).

For the first category, public parties manage the areas that they own, finance and invest in. The *Province of Gelderland* manages the provincial roadsides, while the *Berg en Dal Municipality* is responsible for the municipal roads. The *Water Authority Rivierenland* manages the water flows in Berg en Dal. The *Nijmegen Municipality* is responsible for the management of a nature area they own near Groesbeek. Next to physical involvement, the *Berg en Dal Municipality* is also responsible for the management of contracts on landscape management. Private parties manage their owned landscapes mostly for economic purposes: *farmers* and *entrepreneurs* provide *GBD* to receive income and *Staatsbosbeheer*, *Geldersch Landschap & Kasteelen*, and *Natuurmonumenten* gain their income from the selling of products, tourism, recreation, education, etc.

The second category mainly consists of private parties who work for other private parties or public parties. Voluntary parties such as *Landschapsbeheer Groesbeek* and *IVN Rijk van Nijmegen* are willing to manage the landscape for others because of their intrinsic motivation. These volunteers manage parts of the landscape for, among others, *'t Zwanenbroekje*. Next, there are parties who receive income from managing landscapes for others. The commissioners are public and private parties. The public party *Water Authority Rivierenland* shifts for example some dike management in Berg en Dal to *the Ploegdriever*. *The Ploegdriever* also manages some areas for the *Berg en Dal Municipality.* Also *SLOG* manages, based on a six-year contract, some hectares of land for the *Berg en Dal Municipality*. Last for the public parties, *Rijkswaterstaat* hires *Staatsbosbeheer* for the management of some nature areas. The private party *SLOG* hires *The Ploegdriever* for some work. Next, *VNC* and *SLOG* have contracts with *farmers* and *private landowners* for the provision of GBD and yearly pays them for this provision. More, *Staatsbosbeheer* hires *SLOG* for the management of some areas they own. Last, *farmers* and *private landowners* sometimes hire *the Ploegdriever* to do some work.

6.3.5 Consulting parties

In Berg en Dal, parties are involved in landscape management through consulting. To make optimal use of the provided money, information is provided on financing and investing. *Via Natura* is a private party that is characterized by such a role. This organization aims to increase the amount of *providers of GBD* and to educate actors in the area about the importance of landscape management with respect to tourism, recreation, health, and the economy. Often, this organization is working for the *Berg en Dal Municipality.* Another consulting party is *Werkgroep Milieubeheer Groesbeek.* This group is critical to developments in the area with respect to nature and landscape. Also *The Ploegdriever* has a consulting role. This association constructs the plans for farmers to provide GBD and advices on the management of these GBD. Next, the *Flora- and Faunawerkgroep Gelderse Poort* are consulting through the provision of reports on observations and monitoring. Last, the *ZLTO* is the party that informs and consults entrepreneurs in the rural areas. The aim of the *ZLTO* is realize for every entrepreneur a sustainable position in the market and society (ZLTO, 2012).

6.3.6 Context determining parties

In Berg en Dal, the context determining parties are public parties. The *Province of Gelderland* develops an environmental vision and the *Berg en Dal Municipality* translates this, with input from a consultative group in which several parties are represented, into a LOP and implementation plan. These plans involve the main focus for the landscape in the area and determine for which investments governmental subsidies will be provided.

6.3.7 Affected stakeholders

Landscape management does not affect many stakeholders in Berg en Dal. Sometimes farmers are affected because of some problem herbs at the boundaries of their agricultural land. More, when the duration of a financial compensation for the management of landscape features has ended, landowners are sometimes still stuck in the management of these features because of biodiversity regulations (VNC, 2008).

6.3.8 Others that may be interested

For this category, a distinction can be made between famers and private landowners. Some farmers and private landowners already contribute to sustainable landscape management and may be interested in future projects. Next, there are also individuals that do not yet contribute to sustainable projects. They may be potential new clients for future projects. Further, with new / other financial mechanisms, individuals and companies may get motivated to finance landscape management.

Table 8: Identified stakeholders in Berg en Dal per category

CATEGORY	SUB-CATEGORY		STAKEHOLDERS BERG EN DAL	ROLE DESCRIPTION
Those involved in the landscape management	Financing parties	Private	*Entrepreneurs*	○ Finance through the Streekfonds ○ Finance through direct donations to parties.
			Staatsbosbeheer *Geldersch Landschap & Kasteelen* *Natuurmonumenten*	○ Finance their own property ○ Hire sometimes other parties to do their work and pay them for the effort
			SLOG *Farmers* *Private landowners*	○ Hire sometimes other parties to do their work and pay them for the effort.
			Vereniging Nederlandse Cultuurlandschappen	○ The *SLK* (part of the VNC) pays providers of GBD for their investments and management
		Public	*Province of Gelderland* *Berg en Dal Municipality* *Water Authority Rivierenland*	○ Finance their own property ○ Subsidize other parties ○ Hire sometimes other parties to do their work and pay them for the effort. ○ Finance through the Streekfonds
	Investing parties	Private	*Farmers* *Private landowners*	○ Invest in GBD
			SLOG *Staatsbosbeheer* *Geldersch Landschap & Kasteelen* *Natuurmonumenten* *The Ploegdriever*	○ Invest in own property
		Public	*Province of Gelderland* *Berg en Dal Municipality* *Water Authority Rivierenland* *Rijkswaterstaat*	○ Invest in own property
	Consulting parties	Private	*Via Natura*	○ Advice on GBD ○ Educate about importance of landscape management
			Flora-& Faunawerkgroep Gelderse Poort	○ Consults based on observations and monitoring
			The Ploegdriever	○ Consults upon agricultural plans for provision of GBD
			Werkgroep Milieubeheer Groesbeek	○ Consults on landscape development
			ZLTO	○ Consults entrepreneurs in rural areas
		Public		

	Managing parties	Private	*Farmers* *Private landowners*	○ Manage own land for economic purposes
			Entrepreneurs	○ Are hired and receive income from managing
			The Ploegdriever *SLOG*	○ Are hired and receive income from managing
			Geldersch Landschap & Kasteelen *Natuurmonumenten* *Staatsbosbeheer*	○ Manage own properties for economic and ecological purposes
			't Zwanenbroekje	○ Manage own area for ecological purposes
			Landschapsbeheer Groesbeek *IVN Rijk van Nijmegen*	○ Voluntary landscape managers
		Public	*Berg en Dal Municipality* *Nijmegen Municipality* *Water Authority Rivierenland* *Province of Gelderland*	○ Manage the landscape and / or water they own ○ Berg en Dal Municipality manages contracts for GBD
Those who determine the context of the landscape	Governmental levels		*Province of Gelderland*	○ Develops environmental vision
			Berg en Dal Municipality	○ Develops LOP ○ Develops municipal implementation program
Those who may be affected	Directly		*Farmers*	○ Problem herbs ○ Regulations
	Indirectly			
Others who may be interested			Potential *Farmers* and *Private landowners* for sustainable landscape management	○ Can be potential candidates to contribute to sustainable landscape management in the area
			Individuals and companies	○ Can be potential candidates to finance through new / other financial mechanisms

7 Landscape management and ecosystem services

In the previous chapter, the stakeholders were identified and their roles in landscape management are described. However it should also be investigated if the roles of public and private parties need to change and how these roles can be optimized. This chapter is about (1) the potential role of public and private parties in landscape management, (2) the awareness of stakeholders on ecosystem services, (3) identified ecosystem services by stakeholders, and (4) the motivations of stakeholders for landscape management.

7.1 Potential roles of public and private parties in landscape management

To review the collaborative governance model in Berg en Dal, it is necessary to first describe the opinion of actors in the area on the existing and potential roles of public and private parties in landscape management.

When asking about the role of the government, the interviewees focused most of the time on the *Municipality of Berg en Dal.* The most important role of the *Municipality* is at the policy level. The *Municipality* has developed a LOP and is thus responsible for the quality of the landscape, not only in terms of maintenance but also of development. Next, the *Municipality* has a role in getting everyone on the move for landscape management and in helping new initiatives to gain foothold. Together with all parties in Berg en Dal that care about the landscape, an implementation plan based on the LOP is made. This LOP focusses on multifunctional landscapes: landscapes are of everybody and should be managed by everybody. In a multifunctional landscape, municipalities are not responsible anymore for the whole landscape. Several overlaying landscape functions are combined from which the ownership is not at the municipal level.

The *Municipality of Berg en Dal* is passive with respect to landscape management. It was agreed upon that, under condition of education and communication about the landscape, the people living and working in the landscape are the best parties to manage the landscape because of their direct interests. It was also agreed some action of the *Municipality of Berg en Dal* is essential to motivate private parties for landscape management: if the *Municipality* does not act, others will not be willing to put much effort into landscape management. In the last decade, investments in Berg en Dal with private or public money have stimulated municipal management of for example road sides. The municipality often does not want to stay behind and becomes an example towards landowners and citizens for landscape management.

The financial role of the *Municipality of Berg en Dal* with respect to landscape development is decreasing. Private parties need to look for own financial resources for projects that do not take place on municipal land. There are only some subsidies for the provision of GBD, however these cannot be extended because of lacking financial resources. The *Province of Gelderland* still finances landscape development. One of the aims of the *Province* is to connect nature areas through ecological corridors. Subsidies are provided to farmers and private landowners to realize such corridors.

According to the interviewees, privatization of the landscape in Berg en Dal is happening in the sense that much land is owned by private parties. However, the public parties have the instruments to control the spatial and landscape quality. The government should seduce (compensation in land or money), force (through instruments), and facilitate more. Moreover,

private parties, including many volunteers, should be more supported by professionals in their initiatives.

7.2 Awareness of stakeholders on ecosystem services

As described in §2.3.3, ecosystem services are almost unnoticed by the vast majority of people, especially when they are public, non-excludable, and never enter the market for private (i.e. excludable) goods. Here the awareness of stakeholders in Berg en Dal on ecosystem services is described to see if the theory is also true for this case. Next, the motivations for managing landscapes, including its ecosystem services, are presented.

7.2.1 Knowledge on ecosystem services

In the interviews, it was noticed that 'ecosystem services' is not a well-known term among stakeholders in Berg en Dal. A concept often used in the management of the agricultural landscape in Berg en Dal is 'Groene en Blauwe Diensten' (GBD, see §2.1.3). For GBD, the initial idea was that it would be expanded to more municipalities in the Netherlands. However, the existing projects will be concluded without sequel: with new projects, parties are enthusiastic and enough money is available, but collecting money for management and maintenance of such projects is much more difficult.

'Ecosystem services' is a different concept than GBD. Ecosystem services are provided by ecosystems which may or may not be influenced by human action, while GBD are the result of paid human actions through which services are provided. When asking the interviewees about ecosystem services, most of the time an explanation was asked. After explaining, interviewees came up with their interpretation of several ecosystem services and how stakeholders in the area contribute to these services. These are the following:

- **The Waal River**

When the river overflows its banks, sand is deposited which results in dune formation where new plants can grow and new layers of vegetation develop.

- **Erosion resistant dikes**

Dikes play an important role in flood protection. Berg en Dal includes many planted dikes which makes the dikes less sensitive to erosion. As a result, dikes could be lower and smaller and money could be saved.

- **Buffering of aquifer locks**

Aquifer locks are very important for water quality. However, depositions are often too high for filtering. Buffering of aquifer locks improves the water quality to a large extent by decreasing the amount of depositions reaching the aquifer locks.

- **Recreation**

An important ecosystem service of the landscape in Berg en Dal is recreation. Nature and landscape are a main reason why people come to the area. Hiking, biking and fishing are often performed. To provide recreation possibilities, accessibility of the landscape is very important. Many farmland paths have already been constructed through the concept of GBD, which has already increased this accessibility.

Next to the activities, also the aesthetics of the area are important. These are strengthened through flowering: several land borders and dikes are rich in herbs. To extend the flowering time, some herb-rich areas are skipped at the first mowing.

Nature and landscape should be maintained to ensure long-term recreation. For entrepreneurs in the recreational sector, excursions are organized to let them experience the landscape and stimulate them to develop nature packages.

❖ **Health**

The landscape in Berg en Dal provides health effects for society, close and easily. The health effects are both physical and mental. The fact itself that people are living in this beautiful area provides them already certain happiness. Also the activities as already described in the service of recreation provide health benefits. Next, patients from psychiatric institutes and hospitals walk through the area and experience some relaxing and possibly positive health effects.

❖ **Air quality**

In Berg en Dal are not many tree species specifically planted for the catch of particulate matter, but there are some other initiatives that contribute to the air quality in the area. As an example, some lands are managed by sheep grazing. This example reduces the emissions by diesel tractors at the land (energy neutral).

❖ **Biodiversity**

Another ecosystem service that is mentioned is biodiversity. In Berg en Dal, this is mostly stimulated through the provision of GBD and the development of ecological corridors between landscape elements and nature areas. These are often developed together with farmland paths.

❖ **Pollination & pest control by bees**

The provision of sufficient habitat possibilities for bees is very important. Bees pollinate fields and have a function in pest control. Bees are especially important for the maintenance of vineyards and other fruit trees. Recently, there was an initiative from 'Stichting Bijen Dichterbij' (Foundation Bees Closer) to provide municipal roadsides with flowering or ascending plants to increase the habitat for bees.

❖ **Services from soils**

Soils provide several services. To stimulate these services, good soil management is necessary. By growing more wooden crops and crops that are deeply rooted, minerals are extracted more deeply from the soil and more carbon dioxide is retained. This results into more vital and resistant land. It could be realized in the form of landscape features. As an extra advantages, nuts and fruits could be grown here that provide revenues.

❖ **Year-round grazing**

Herds contribute to ecosystem services because they graze the area year-round in a natural way. More, through the pelts of the animals, seeds are also spread over the area.

❖ **Food provision**

In Berg en Dal are many agriculture entrepreneurs holding livestock, growing crops, or having vineyards. Therefore, food provision is an important service in the area.

7.2.2 Conflicts and problems with respect to ecosystem services

During the interviews, stakeholders were also asked to describe conflicts and/or problems that, according to them, exist with respect to the provision of ecosystem services. Since most stakeholders were not aware of ecosystem services, they could not always come up with conflicts and problems. Frequently, mentioned issues were related to the provision of GBD. The following issues were mentioned:

- **Space for water vs flood protection**

For the Waal River, there is a conflict between the available space for water and the necessary flood protection. As long as the safety of people and animals is safeguarded, the river will receive space to flow. However, dikes should not break through and water streams should thus be bounded.

- **Lack of interest towards GBD**

Not all farmers are willing to contribute to the provision of GBD. Sometimes there are potential ecological corridors that cannot be realized because of farmers' unwillingness to participate. Although farmers receive income from GBD, they have to leave their own production behind to provide services to society. This is often a large barrier.

- **Funding for GBD**

The implementation and management of GBD is expensive and there is a lack of funding. It is impossible to offer GBD contracts in the whole municipality because of financial shortcomings. At this moment, there are only 30 farmers who receive funding and can contribute to the provision of GBD.

- **Management of GBD**

Another problem for GBD is in the management. The provision of GBD is in agricultural areas. Some GBD are provided by other parties than farmers or private landowners. When for example landscape elements border farmland, some farmers start to complain. This is especially directly after the development of GBD. Most of the time, farmers complain less when the GBD exist for several years. Still, some management practices are essential for safeguarding agricultural production: trees may not get too high because of an increase in shadow and unwanted herbs.

7.3 Motivations of stakeholders for landscape management

Through Network Mapping, some interviewees were asked to give their perception about the motivations for landscape management of the categorized stakeholders. In Berg en Dal, three main motivations for landscape management are present, namely economic interest, contribution to biodiversity, and social/recreational interest. An overview of these perceived motivations can be found in annex B (table 28). Because the interviews consisted of two parts, time management was difficult and in only 3 out of 7 interviews the motivations were investigated. In these interviews, not every stakeholder was mentioned. As a result, the motivations were not assigned to every stakeholder. However, from each interview it became obvious through which motivations every stakeholder is involved in landscape management. It appeared that the economic motivation could be divided into two components: the increase of income and general economic interest. The recreation and social interest are divided into recreation and education. The motivations are shown in table 9.

Many stakeholders have biodiversity as motivation for landscape management. However, with the exception of the associations, this always comes together with another motivation. When the

main motivation for landscape management is income, biodiversity often comes in second place. This is also true for public, non-excludable ecosystem services: the provision of these services do not generate any income and will not be the primary motivation for landscape management. The *Municipality of Berg en Dal*, and *Province of Gelderland* are involved in landscape management because of their general economic interest and strive towards a valuable landscape that provides benefits for all people living in the area.

Table 9: Motivations of stakeholders for landscape management
In which X stands for first motivation(s) and x for second motivation(s)

	MOTIVATIONS FOR LANDSCAPE MANAGEMENT				
STAKEHOLDERS	**ECONOMIC**		**BIODIVERSITY**	**RECREATION**	**EDUCATION**
	INCOME	**GENERAL ECONOMIC INTEREST**			
Via Natura			**X**	**X**	**X**
VNC		**X**	**X**	**x**	
Water Authority Rivierenland	**X**		**x**		**x**
The Ploegdriever	**X**		**x**		
Municipality of Nijmegen				**X**	
SLOG			**X**	**x**	**x**
Municipality of Berg en Dal		**X**	**X**	**X**	
Province of Gelderland		**X**	**X**	**x**	
Natuurmonumenten	**X**		**X**	**x**	
Geldersch Landschap & Kasteelen	**X**		**X**	**x**	
Staatsbosbeheer	**X**		**x**	**X**	**X**
IVN			**X**		**x**
Landschapsbeheer Groesbeek			**X**		
Flora- en Faunawerkgroep Gelderse Poort			**X**		**x**
Farmers	**X**		**x**		
Private landowners	**X**		**x**		
Zwanenbroekje			**X**		
Entrepreneurs	**X**		**x**		
Rijkswaterstaat	**X**		**x**	**x**	
WMG			**X**	**x**	
ZLTO	**X**				

8 Collaborative governance in Berg en Dal

This chapter involves an analysis about the collaborative governance model in Berg en Dal. The current relationships between stakeholders are described, followed by a resilience analysis in which several drawn relationships or included stakeholders are taken out of the collected data.

8.1 Current relationships between stakeholders

To review the collaborative governance model of Berg en Dal, it is first necessary to know the current structure of landscape management and the relationships between the stakeholders that are contributing to this landscape management. In chapter 6, the stakeholders were already introduced and their main roles were described. In this paragraph, it will be more elaborated on relationships between stakeholder with respect to knowledge exchange and conflicts. During network-mapping, stakeholders were asked to draw arrows between stakeholders on these aspects and as in §6.3.1, the interviews were aggregated into one network map for every arrow (annex B, table 24 and 26).

8.1.1 Exchange of knowledge

The exchange of knowledge means that there must be a 'deeper' relationship between stakeholders instead of only knowing each other and having regularly contact. It consists of an exchange of knowledge about landscape management, including contracts. Figure 17 includes an overview of all drawn knowledge exchanges between stakeholders.

As for the financial flows, the importance of stakeholders is investigated by analysing the betweenness centrality and degree centrality. Table 10 shows the betweenness centrality, while the degree centrality is shown in column 2 and 3 of table 11. Again, in column 4 and 5 of this table, it is shown to how many others a stakeholder is linked. When comparing the betweenness with the degree centrality, it can be noticed that the *Municipality of Berg en Dal, the Ploegdriever, SLOG,* and *Via Natura* have high values of both centralities. *Staatsbosbeheer* has the highest value for betweenness centrality, but comes on rank 5 with respect to the degree centrality.

Table 10: Betweenness centrality of stakeholders with respect to knowledge exchange

STAKEHOLDERS	BETWEENNESS CENTRALITY
Staatsbosbeheer	50.080
Municipality B&D	33.316
The Ploegdriever	23.469
SLOG	17.574
Via Natura	15.596
Province of Gelderl.	15.588
Water Authority	12.579
IVN	11.154
WMG	7.930
VNC	5.004
Municipality Nijm.	4.748
Flora – en Faunaw..	3.357
ZLTO	2.048
Farmers	2.042
Private landowners	0.734
Rijkswaterstaat	0.594
Entrepreneurs	0.424
Geldersch Landsch.	0.365
Zwanenbroekje	0.200
LBG	0.200
Natuurmonumenten	0.000

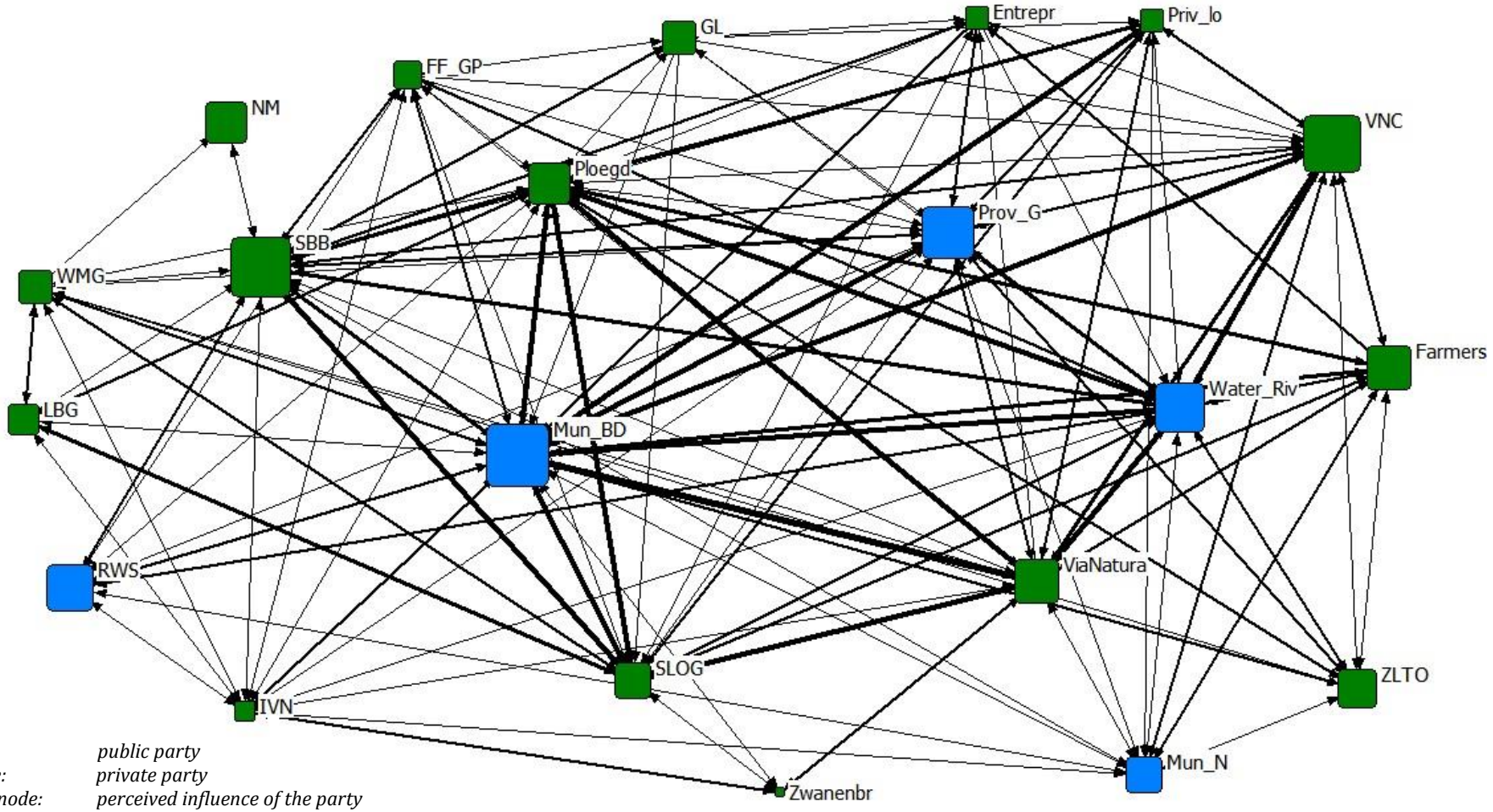
According to table 27 (annex B) and figure 17, most of these parties have also large influence in the area. However, *SLOG* and *the Ploegdriever* are in the top 4 of both centralities, while having only average ranks of influence. The *VNC* and *Rijkswaterstaat,* who come with perceived influence in third and fifth place, are not sited in the top rankings of the centralities. Private parties as *Natuurmonumenten* and *Geldersch Landschap & Kasteelen* do not own large areas in Berg en Dal and are mostly functioning on their own. Therefore, their levels of centralities are lower. The small private parties have low values of centralities and are also perceived to have little influence.

Figure 17 includes several limitations. First, it is difficult to see if *farmers* exchange knowledge with *private landowners* since providers of GBD are, in a few cases, separated in these two categories. Related to this, it is also difficult to see if *farmers* and *private landowners* both exchange knowledge with the parties connected to the providers of GBD.

Table 11: Degree centrality of stakeholders with respect to knowledge exchange

Column 2 shows the amount of knowledge provision arrows from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of knowledge provision arrows from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders who receive knowledge from a stakeholder of column 1.
Column 5 shows the amount of stakeholders that provide knowledge to a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn**	**Incoming: # of total arrows drawn**	**Outgoing: # of linked stake-holders**	**Incoming: # of stakeholders linked to this stakeholder**
Entrepreneurs	7	12	5	8
Farmers	22	17	9	8
Flora- en Faunawerkgroep Gelderse Poort	14	10	11	9
Geldersch Landschap & Kasteelen	11	5	10	4
IVN Rijk van Nijmegen	14	14	12	12
LBG	12	11	6	6
Municipality of Berg en Dal	52	63	17	19
Municipality of Nijmegen	11	13	10	11
Natuurmonumenten	1	2	1	2
Private landowners	15	22	10	9
Province of Gelderland	27	30	14	16
Rijkswaterstaat	10	11	8	8
Staatsbosbeheer	37	35	17	16
SLOG	35	36	13	14
The Ploegdriever	44	44	17	16
Via Natura	46	34	15	14
VNC	31	29	11	12
Water Authority Rivierenland	40	45	14	16
WMG	13	11	10	8
ZLTO	12	9	8	8
't Zwanenbroekje	5	6	4	4



Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*
Width of the arrows: *the amount of interviews in which an arrow is drawn*

Figure 17: Net-map of knowledge exchange

Abbreviations:
Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The Province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje

8.1.2 Conflicts between stakeholders

Next to the exchange of knowledge, also the conflicts between stakeholders are investigated. In Berg en Dal, these conflicts do not include large fights, but is about disagreements and contradictions. During the network mapping, stakeholders were asked to draw the main conflicts in the area that are according to them present in the area. The results can be found in table 26 of Annex B and are visualized in figure 18.

Also for the conflicts, the betweenness (table 12) and degree centralities (column 2 and 3 of table 13) are calculated. The stakeholders with the highest betweenness centrality are more or less the same as the parties with the highest degree centrality. Only *Staatsbosbeheer* has a high rank on betweenness centrality, but is not in the top of degree centrality. When comparing the centralities with the perceived influence of the stakeholders (annex B, table 27; figure 18), it is remarkable that the stakeholders in the top 4 ranking of centralities are also perceived to have high influence in landscape management in Berg en Dal (*VNC, Water Authority Rivierenland, Municipality of Berg en Dal,* and *Staatsbosbeheer*). Thus, stakeholders that are most involved in conflicts also seem to have the most influence in the area. However, the drawn arrows do not include large fights. To show the intensity of the arrows, the main conflicts are described here.

Table 12: Betweenness centrality of stakeholders with respect to conflicts

STAKEHOLDERS	BETWEENNESS CENTRALITY
VNC	46.833
Water Authority	46.333
Municipality B&D	42.833
Staatsbosbeheer	23.000
Farmers	14.833
WMG	14.167
Via Natura	1.000
The Ploegdriever	0.000
Natuurmonumenten	0.000
Province of Gelderl.	0.000
SLOG	0.000
IVN	0.000
LBG	0.000
Flora- en Faunaw.	0.000
Municipality Nijm.	0.000
Private landowners	0.000
Zwanenbroekje	0.000
Entrepreneurs	0.000
Rijkswaterstaat	0.000
GL	0.000
ZLTO	0.000

In table 13, the *Municipality of Berg en Dal*, *VNC*, and *Water Authority Rivierenland* have in all columns the highest degree centralities and will be explained first. The *Municipality of Berg en Dal* often brings up conflicts because it is the municipality's role to weigh up the various interests of all stakeholders in Berg en Dal. Not all interests can be followed at the same time which can result in some conflicts. The *VNC* is straightforward and their vision sometimes conflicts with the interests of other parties in the area. The arrow between *VNC* and *The Ploegdriever* is often drawn because the parties are competitors of each other. In the past, there has been some friction between the two, but at this moment it only shows their business relation. The *Water Authority Rivierenland* doesn't aim at first place towards landscape management. The *Authority's* job is to manage the water systems and water quality. This intersects sometimes with other parties on a subject as mowing.

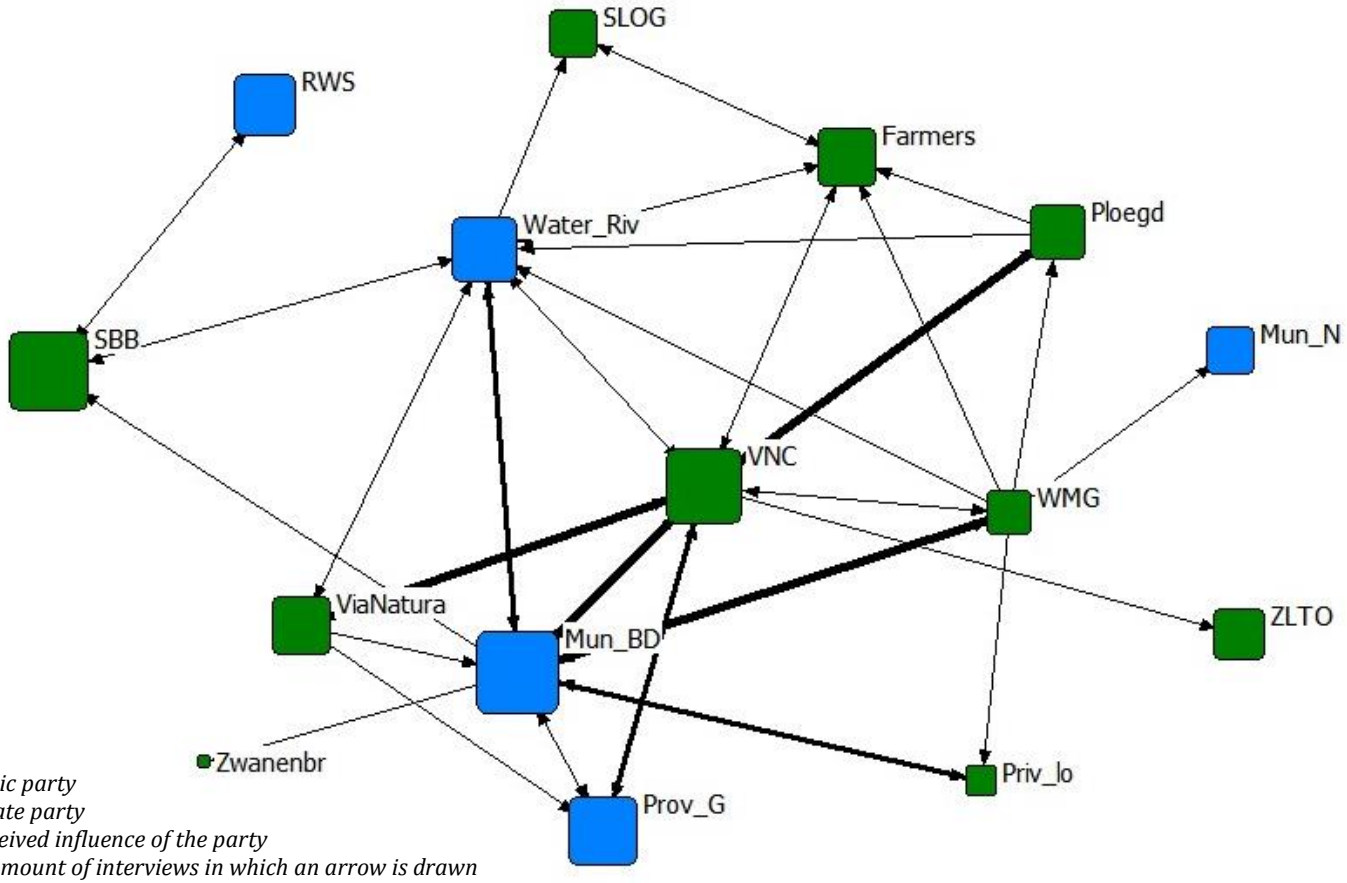
As can be seen in the table, farmers also have some outgoing and incoming arrows. In this research, these arrows include both non-providers and providers of GBD. Sometimes, misunderstandings between farmers and other parties arise due to a different language. However, there are often intermediate parties trying to overcome this language barrier. Next, the non-providers of GBD sometimes have problems with unwanted herbs coming from landscape features.

The *WMG* has many outgoing arrows. This is in accordance to their critical role with respect to landscape management. The arrows do not reflect specific conflicts, but more the field in which the working group is active.

Table 13: Degree centrality of stakeholders with respect to conflicts

Column 2 shows the amount of conflict arrows from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of conflict arrows from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders with who a stakeholder of column 1 is conflicting.
Column 5 shows the amount of stakeholders who are in conflict with a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn**	**Incoming: # of total arrows drawn**	**Outgoing: # of linked stake-holders**	**Incoming: # of stakeholders linked to this stakeholder**
Entrepreneurs	0	0	0	0
Farmers	3	5	3	5
Flora- en Faunawerkgroep Gelderse Poort	0	0	0	0
Geldersch Landschap & Kasteelen	0	0	0	0
IVN Rijk van Nijmegen	0	0	0	0
LBG	0	0	0	0
Municipality of Berg en Dal	10	10	7	6
Municipality of Nijmegen	0	1	0	1
Natuurmonumenten	0	0	0	0
Private landowners	2	2	1	2
Province of Gelderland	2	4	2	3
Rijkswaterstaat	1	1	1	1
Staatsbosbeheer	2	3	2	3
SLOG	1	2	1	2
The Ploegdriever	5	4	3	2
Via Natura	6	4	4	2
VNC	14	13	8	7
Water Authority Rivierenland	6	8	6	7
WMG	9	2	7	2
ZLTO	0	1	0	1
‘t Zwanenbroekje	0	1	0	1



Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*
Width of the arrows: *the amount of interviews in which an arrow is drawn*

Figure 18: Net-map of conflicts

Abbreviations:

Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The Province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje

8.2 Resilience analysis

This paragraph involves a resilience analysis of the results shown in §6.3.1 and §8.1.1 to review the collaborative governance model in Berg en Dal. Three changes in the network map are analysed: (1) knowledge arrows that were only drawn once are excluded from the data, (2) financial flows that were only drawn once are excluded from the data, and (3) Via Natura is excluded from the net-maps with respect to knowledge exchange and financial flows.

8.2.1 Exclusion of arrows knowledge exchange

In this first resilience analysis, the accumulated network map of knowledge exchange is modified. In many interviews, arrows were drawn under the argumentation that the link might be present. If from all interviews an arrow is only drawn once, it is assumed that the interviewee might have drawn a non-existing line, that the link is very small, or that the link is unimportant. In this analysis, arrows that were only drawn once are excluded from the data.

Table 14: Betweenness centrality stakeholders on knowledge exchange when #=1 is left out

STAKE-HOLDERS	BETWEENNESS CENTRALITY	CHANGE IN RANK COMPARED TO §8.1.1
Mun_BD	101.285	+1
SBB	76.144	-1
Water_Riv	38.882	+4
VNC	34.356	+6
SLOG	30.408	-1
Ploegd	23.574	-3
IVN	20.152	+1
ViaNatura	20.109	-3
Farmers	12.621	+5
Prov_G	8.051	-4
Priv_lo	2.087	+4
WMG	0.998	-3
Entrepr	0.500	+4
Zwanenbr	0.500	+5
LBG	0.333	+5
NM	0.000	-
Mun_N	0.000	-5
FF_GP	0.000	-4
RWS	0.000	-
GL	0.000	-
ZLTO	0.000	-3

Figure 19 shows the result of this modification. The betweenness centrality (table 14) and degree centrality (column 2 & 3 of table 15) are again analysed for all stakeholders. The order of stakeholders with respect to the betweenness centrality has changed. The centralities of *SLOG* and *The Ploegdriever* have decreased, while the centralities of the *Water Authority Rivierenland* and *VNC* have increased. The *VNC* had the largest shift to a rank in the top 4 (+6). For the degree centrality, Staatsbosbeheer has entered the top 4 of highest centralities, while Via Natura has lost its top 4 place with respect to incoming arrows. When comparing the centralities, the only difference in the tops is that the *VNC* is in the top 4 of betweenness centrality, while not in the highest numbers of degree centrality.

Putting the centralities next to the perceived influence of stakeholders with respect to landscape management (Annex B, table 27), it can be noticed that the tops of both centralities, also have high numbers of perceived influence (*Municipality of Berg en Dal, Staatsbosbeheer, Water Authority Rivierenland,* and *VNC).* Next in the rankings of centralities are *SLOG* and *The Ploegdriever* who both have a more average rate of perceived influence.

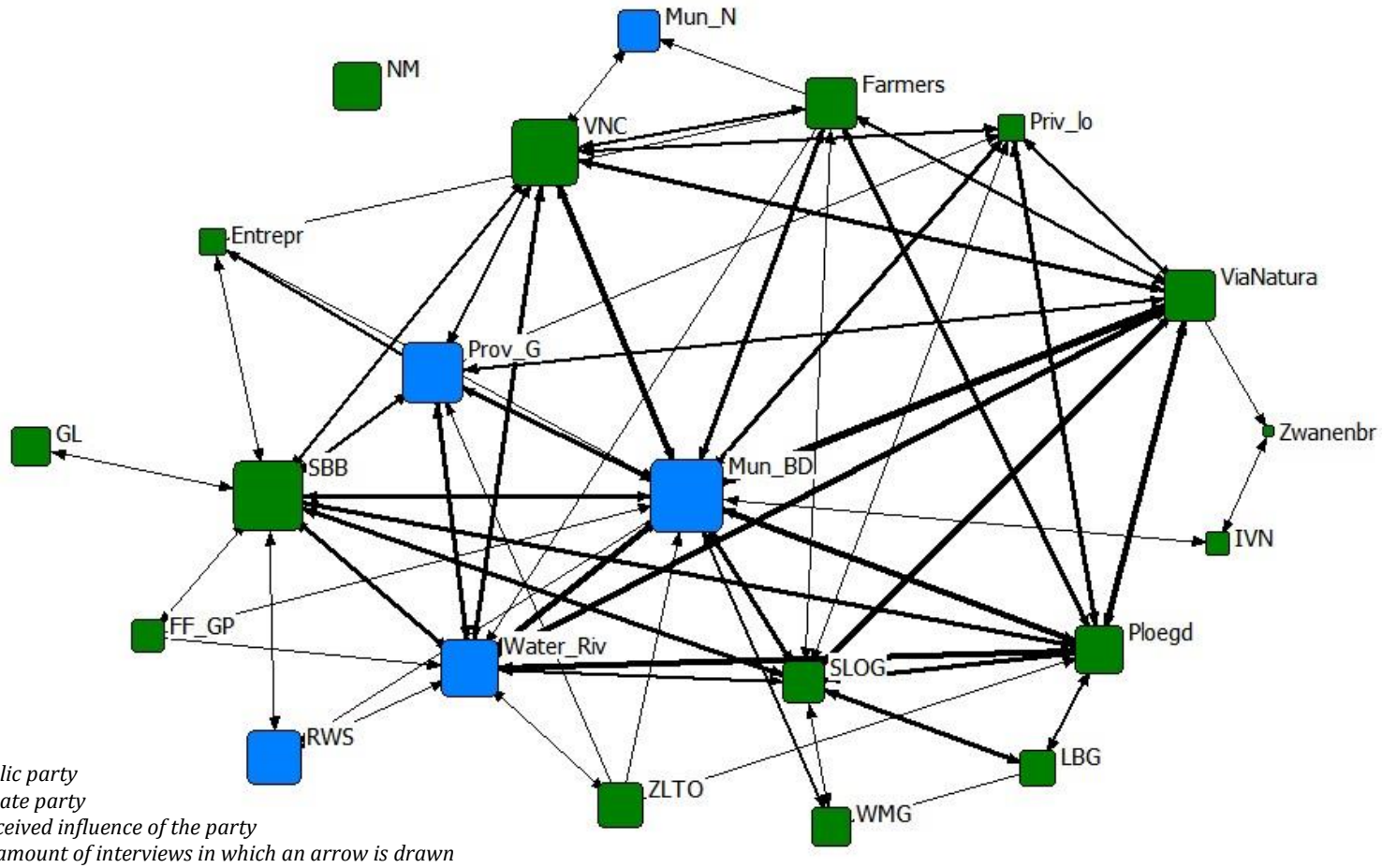
Although arrows are taken out, the system seems still stable. As can be seen in table 14, the *Municipality of Berg en Dal*, *Staatsbosbeheer*, *SLOG*, *The Ploegdriever*, and *Water Authority Rivierenland* are still the parties with the highest centralities. Remarkable is that betweenness centrality of *Via Natura* has decreased with 3 ranks. In figure 19, it can be noticed that some parties are not anymore strong connected to each other. The *IVN, Geldersch Landschap & Kasteelen, Municipality of Nijmegen, Natuurmonumenten,* and *'t Zwanenbroekje* have lost a lot of

arrows. Except for *Natuurmonumenten,* all of these parties are still connected to one or more parties that have high rates of centralities and perceived influence. However, most often the connecting parties are public parties.

Table 15: Degree centrality of stakeholders on knowledge exchange when # = 1 is left out

Column 2 shows the amount of knowledge provision arrows from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of knowledge provision arrows from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders who receive knowledge from a stakeholder of column 1.
Column 5 shows the amount of stakeholders that provide knowledge to a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn when # = 1 is left out**	**Incoming: # of total arrows drawn when # = 1 is left out**	**Outgoing: when # = 1 is left out**	**Incoming: when #=1 is left out**
Entrepreneurs	4	7	2	3
Farmers	21	14	8	5
Flora- en Faunawerkgroep Gelderse Poort	6	2	3	1
Geldersch Landschap & Kasteelen	2	2	1	1
IVN Rijk van Nijmegen	4	4	2	2
LBG	9	7	3	2
Municipality of Berg en Dal	47	58	12	14
Municipality of Nijmegen	2	4	1	2
Natuurmonumenten	0	0	0	0
Private landowners	12	19	5	6
Province of Gelderland	20	20	7	6
Rijkswaterstaat	4	6	2	3
Staatsbosbeheer	30	29	10	10
SLOG	31	31	9	9
The Ploegdriever	35	37	8	9
Via Natura	40	28	9	8
VNC	28	25	9	8
Water Authority Rivierenland	35	40	8	11
WMG	5	6	2	3
ZLTO	8	2	4	1
't Zwanenbroekje	2	4	1	1



Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*
Width of the arrows: *the amount of interviews in which an arrow is drawn*

Figure 19: Net-map of knowledge exchange when #=1 is left out of data

Abbreviations:

Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje

8.2.2 Exclusion of arrows financial flows

For the second resilience analysis, the accumulated network map of financial flows is modified. As for the exchange of knowledge, all arrows that were only drawn once are excluded from the data. This shows the main financial flows that are present in the area with respect to landscape management. The modification is visualized in figure 20. The betweenness and degree centralities are calculated and shown in table 16 and 17.

The network of financial flows seems less stable than the network of knowledge exchange. In figure 20, only 13 out of 21 stakeholders are included in the network. For all other stakeholders, arrows were only drawn once and not thus not perceived to be present or important.

The betweenness centralities are high for *the Ploegdriever*, *farmers, SLOG,* and *VNC.* They play an important role in the financial system. From the degree centralities in table 17, it can be noticed that the *Municipality of Berg en Dal* and the *Province of Gelderland* have high numbers of outgoing arrows. They play an important role in the financing of landscape management. As can be seen in figure 20, these parties are the only financial relationships for *Natuurmonumenten, Geldersch Landschap & Kasteelen,* and *entrepreneurs.* The two parties are also in the top 4 of stakeholders with the highest perceived influence (Annex B, table 27). The *Ploegdriever* has already the highest betweenness centrality, but is in table 17 also the party with the most incoming arrows. As figure 20 shows, *The Ploegdriever* is also the private party that has financially the most linkages with other private parties.

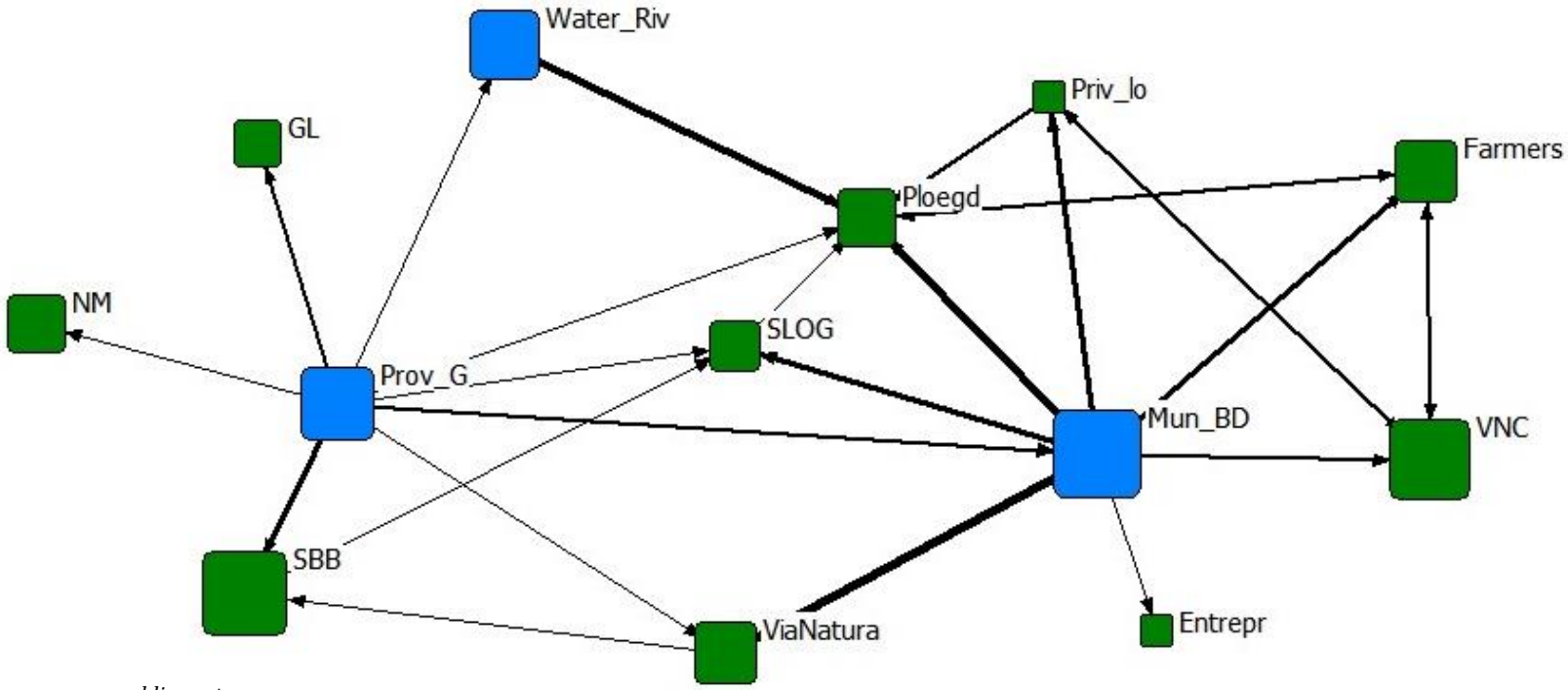
Table 16: Betweenness centrality stakeholders on knowledge exchange when #=1 is left out

STAKEHOLDER	BETWEENNESS CENTRALITY	CHANGE IN RANK COMPARED TO 6.3.1.
The Ploegdriever	13.000	+4
Farmers	10.500	+4
SLOG	8.000	+5
VNC	6.500	-1
Staatsbosbeheer	5.000	-1
Municipality B&D	3.500	-5
Via Natura	1.000	-5
Private landowners	0.500	+8
Water Authority	0.000	-
Province of Gelderl.	0.000	-
Natuurmonumenten	0.000	-
Geldersch Landsch.	0.000	-
LBG	0.000	-
IVN	0.000	-
Municipality Nijm.	0.000	-
Flora- en Faunaw.	0.000	-
Zwanenbroekje	0.000	-
Entrepreneurs	0.000	-
Rijkswaterstaat	0.000	-
WMG	0.000	-
ZLTO	0.000	-

Table 17: Degree centrality of stakeholders on financial flows when #=1 is excluded

Column 2 shows the amount of financial flows drawn from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of financial flows drawn from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders who receive money for landscape management a stakeholder of column 1.
Column 5 shows the amount of stakeholders that provide money for landscape management to a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn when # = 1 is left out**	**Incoming: # of total arrows drawn when # = 1 is left out**	**Outgoing: when # = 1 is left out**	**Incoming: when #=1 is left out**
Entrepreneurs	0	2	0	1
Farmers	5	9	2	3
Flora- en Faunawerkgroep Gelderse Poort	0	0	0	0
Geldersch Landschap & Kasteelen	0	3	0	1
IVN Rijk van Nijmegen	0	0	0	0
LBG	0	0	0	0
Municipality of Berg en Dal	32	3	7	1
Municipality of Nijmegen	0	0	0	0
Natuurmonumenten	0	2	0	1
Private landowners	5	8	2	2
Province of Gelderland	20	0	8	0
Rijkswaterstaat	0	0	0	0
Staatsbosbeheer	2	6	1	2
SLOG	2	9	1	3
The Ploegdriever	2	22	1	6
Via Natura	2	9	1	2
VNC	6	7	2	3
Water Authority Rivierenland	6	2	1	1
WMG	0	0	0	0
ZLTO	0	0	0	0
't Zwanenbroekje	0	0	0	0



Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*
Width of the arrows: *the amount of interviews in which an arrow is drawn*

Figure 20: Net-map of financial flows when #=1 is left out of data

Abbreviations:

Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje

8.2.3 Exclusion of Via Natura

Via Natura is seen as an important organization for landscape management of Berg en Dal. During interviews it was said that the initially idea was to temporary found the party and that the *Municipality of Berg en Dal* would take over the party's role. It was also stated that if *Via Natura* would be lifted, more conflicts will arise with respect to landscape management in the area. At this moment, the *Municipality of Berg en Dal* has extended their cooperation agreement with *Via Natura* for two years. Nevertheless, a resilience analysis is performed to see what happens if *Via Natura* is excluded from two networks: (1) the knowledge exchange network (§8.1.1), and (2) the financial flows network (§6.3.1).

The knowledge exchange network

In the net-map of knowledge exchange, *Via Natura* has high centralities and a more than average perceived influence. More in table 21 (Annex B) it can be found that the only knowledge exchange drawn in every interview is between *Via Natura* and the *Municipality of Berg en Dal.* Here a resilience analysis is performed to see what happens if Via Natura is excluded from the knowledge exchange network of §8.1.1. This is visualized in figure 21. As can be seen, the network still seems stable. All parties are connected to at least two other parties. Table 18 and 19 include the degree and betweenness centralities. The ranking of betweenness centrality is the same as in the start situation. For the degree centralities, *Staatsbosbeheer* has taken over the top 4 position of *Via Natura.*

Table 18: Degree centrality stakeholders on knowledge exchange when Via Natura is left out
Column 2 shows the amount of knowledge provision arrows from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of knowledge provision arrows from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders who receive knowledge from a stakeholder of column 1.
Column 5 shows the amount of stakeholders that provide knowledge to a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn when Via Natura is left out**	**Incoming: # of total arrows drawn when Via Natura is left out**	**Outgoing: when Via Natura is left out**	**Incoming: when Via Natura is left out**
Entrepreneurs	7	11	5	7
Farmers	20	14	8	7
Flora- en Faunawerkgroep GP	13	9	10	7
Geldersch Landschap & Kasteelen	11	5	10	4
IVN Rijk van Nijmegen	13	13	11	11
LBG	12	11	6	6
Municipality of Berg en Dal	46	56	16	18
Municipality of Nijmegen	10	12	9	10
Natuurmonumenten	1	2	1	2
Private landowners	13	19	7	8
Province of Gelderland	25	27	13	15
Rijkswaterstaat	10	11	8	8
Staatsbosbeheer	36	34	16	15
SLOG	32	30	12	13
The Ploegdriever	40	38	16	15
Via Natura	-	-	-	-
VNC	28	25	10	11
Water Authority Rivierenland	34	39	13	15
WMG	12	10	9	7
ZLTO	12	9	8	8
't Zwanenbroekje	4	4	3	3

The financial network

In the financial network, *Via Natura* also has a high betweenness and degree centrality. Here, *Via Natura* is excluded from the financial network, see figure 22. The new centralities are shown in table 20 and 21. It can be seen that the betweenness centralities have decreased and that for both centralities, the *VNC* has become more important. Next, *SLOG* has entered the top 4 ranking of degree centralities. As can also be seen in figure 22, the *Municipality of Berg en Dal* and the *Province of Gelderland* still play an important role in the financial network. They are both connected to parties that have only one or few financial relation and are perceived to have large influence. Although small parties are less connected in the network, the core of the system is still stable.

Even though the analyses of both networks show that the system doesn't change, *Via Natura* is important for the network because of three reasons. The first reason is with respect to logistics. The *Municipality of Berg en Dal* for example puts money in the landscape fund for projects in which multiple municipal departments are involved under the condition that the money is spent within several years. The second reason is that *Via Natura* is responsible for the GBD desk. The *Municipality of Berg en* Dal has many arrows because of its role in the contracts and payments of GBD, but *Via Natura* is most often responsible for the exchange of knowledge towards the providers of GBD. Third, in case of problems, the distance to *Via Natura* is perceived to be smaller than the distance to the *Municipality of Berg en Dal*.

Table 20: Betweenness centrality stakeholders on knowledge exchange when Via Natura is left out

STAKEHOLDER	BETWEENESS
Staatsbosbeheer	48.441
Municipality B&D	36.802
The Ploegdriever	23.665
SLOG	20.262
Province of Gelderl.	15.285
Water Authority	12.602
IVN	12.455
WMG	6.814
VNC	5.135
Municipality Nijm.	4.592
Flora- en Faunaw.	2.800
ZLTO	2.446
Farmers	1.994
Private landowners	0.683
Rijkswaterstaat	0.679
Entrepreneurs	0.484
Geldersch Landsch.	0.417
Zwanenbroekje	0.222
LBG	0.222
Natuurmonumenten	0.000

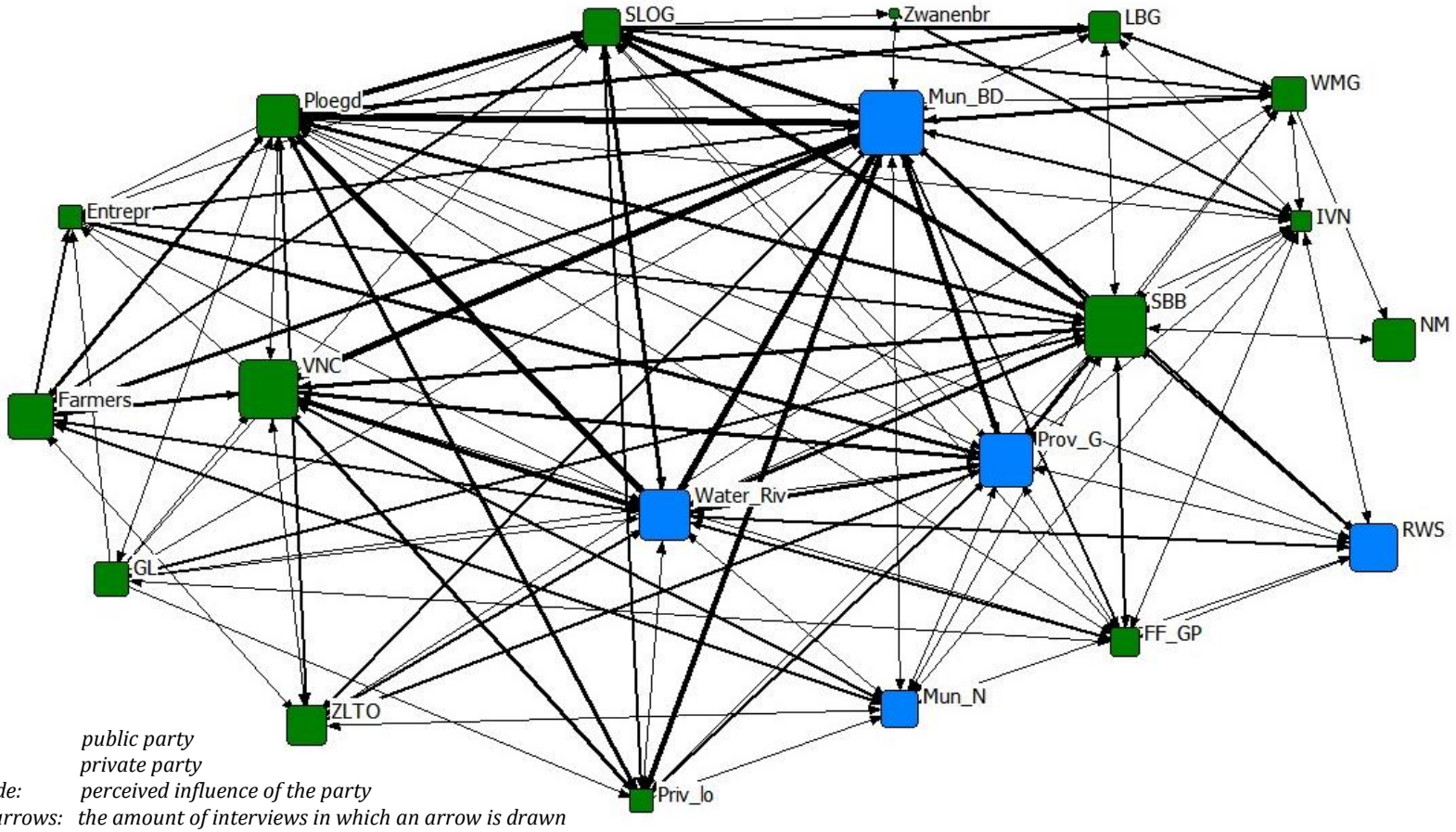
Table 19: Betweenness centrality stakeholders on financial flows when Via Natura is left out

STAKEHOLDER	BETWEENESS
VNC	16.500
Municipality B&D	16.500
The Ploegdriever	6.500
Farmers	6.000
Staatsbosbeheer	4.500
Water Authority	1.500
SLOG	0.500
WMG	0.000
Province of Gelderl.	0.000
Municipality Nijm.	0.000
Flora- en Faunaw.	0.000
ZLTO	0.000
IVN	0.000
Private landowners	0.000
Rijkswaterstaat	0.000
Entrepreneurs	0.000
Geldersch Landsch.	0.000
Zwanenbroekje	0.000
LBG	0.000
Natuurmonumenten	0.000

Table 21: Degree centrality of stakeholders on financial flows when Via Natura is left out

Column 2 shows the amount of financial flows drawn from a stakeholder of column 1 to other stakeholders.
Column 3 shows the amount of financial flows drawn from other stakeholders to a stakeholder of column 1.
Column 4 shows the amount of stakeholders who receive money for landscape management a stakeholder of column 1.
Column 5 shows the amount of stakeholders that provide money for landscape management to a stakeholder of column 1.
Green and blue marked boxes show the top 4 degree centralities of the columns 2-5

1	2	3	4	5
Stakeholders	**Outgoing: # of total arrows drawn when Via Natura is left out**	**Incoming: # of total arrows drawn when Via Natura is left out**	**Outgoing: when Via Natura is left out**	**Incoming: when Via Natura is left out**
Entrepreneurs	0	9	0	8
Farmers	5	11	2	5
Flora- en Faunawerkgroep Gelderse Poort	0	1	0	1
Geldersch Landschap & Kasteelen	0	3	0	1
IVN Rijk van Nijmegen	0	3	0	3
LBG	0	2	0	2
Municipality of Berg en Dal	31	4	12	2
Municipality of Nijmegen	1	1	1	1
Natuurmonumenten	0	2	0	1
Private landowners	6	8	3	2
Province of Gelderland	25	0	14	0
Rijkswaterstaat	2	1	2	1
Staatsbosbeheer	4	6	3	3
SLOG	3	9	2	3
The Ploegdriever	3	24	2	8
Via Natura	-	-	-	-
VNC	9	10	5	6
Water Authority Rivierenland	11	3	6	2
WMG	1	1	1	1
ZLTO	0	2	0	
't Zwanenbroekje	0	1	0	1

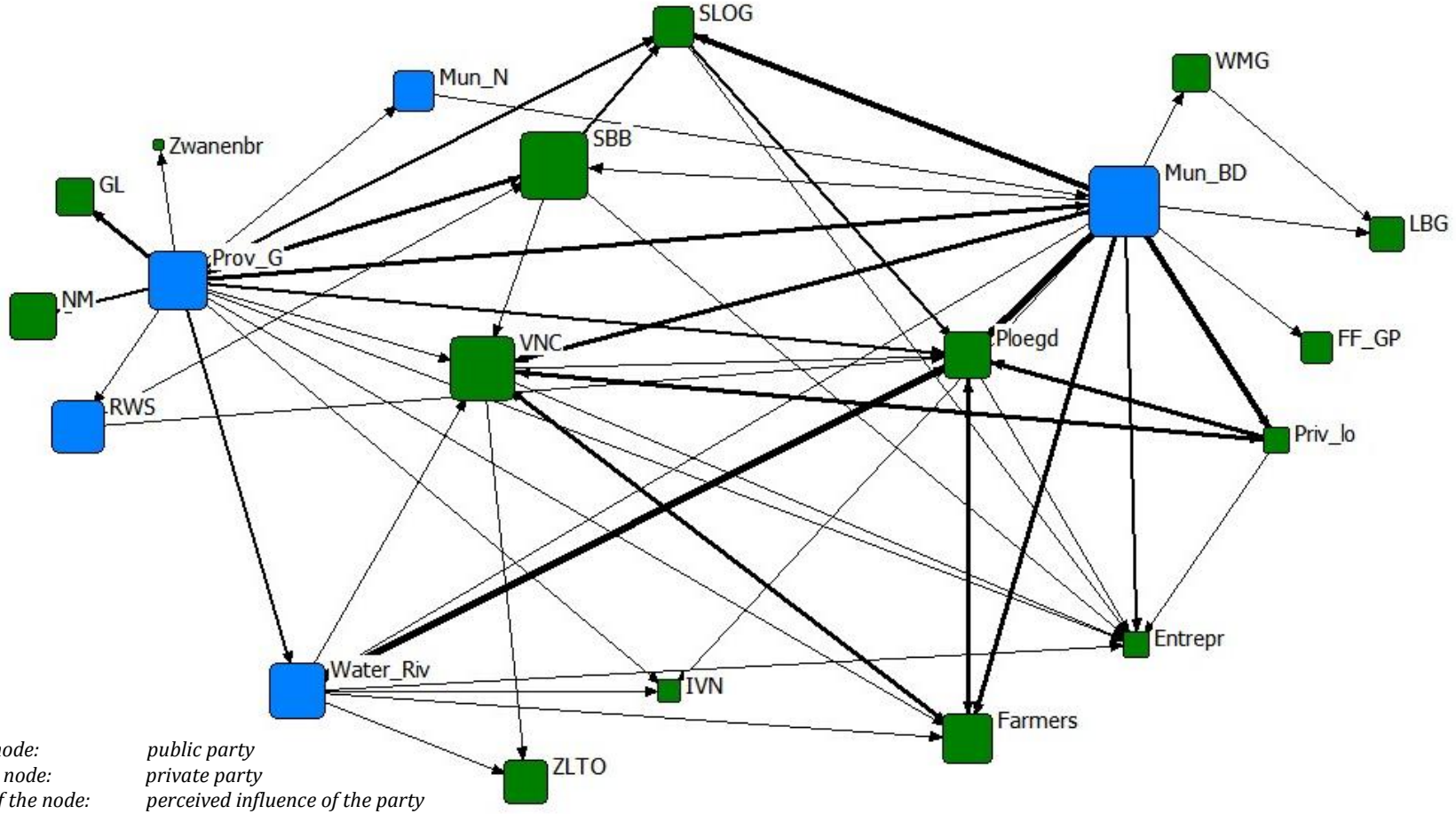


Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*
Width of the arrows: *the amount of interviews in which an arrow is drawn*

Figure 21: Net-map of knowledge exchange in which Via Natura is excluded

Abbreviations:

Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje



Blue node: *public party*
Green node: *private party*
Size of the node: *perceived influence of the party*
Width of the arrows: *the amount of interviews in which an arrow is drawn*

Figure 22: Net-map of financial flows in which Via Natura is excluded

Abbreviations:

Entrepr: Entrepreneurs
Farmers: farmers
FF_GP: Flora- en Faunawerkgroep Gelderse Poort
GL: Geldersch Landschap & Kasteelen
IVN: IVN Rijk van Nijmegen
LBG: Landschapsbeheer Groesbeek
Mun_BD: Municipality of Berg en Dal
Mun_N: Municipality of Nijmegen
NM: Natuurmonumenten
Priv_lo: Private landowners
Ploegd: The Ploegdriever
Prov_G: The province of Gelderland
RWS: Rijkswaterstaat
SBB: Staatsbosbeheer
SLOG: Stichting Landschap Ooijpolder Groesbeek
ViaNatura: Via Natura
VNC: Vereniging Nederlands Cultuurlandschap
Water_Riv: Water Authority Rivierenland
WMG: Werkgroep Milieubeheer Groesbeek
ZLTO: ZLTO
Zwanenbr: 't Zwanenbroekje

9 Potential financial mechanisms

This chapter describes (1) the opinions of stakeholders on current financial mechanisms, (2) conditions for financial mechanisms in Berg en Dal, and (3) potential financial mechanisms in West Europe for Berg en Dal

9.1 Stakeholders' opinion on current financial mechanisms

During interviews, stakeholders have given their opinion on the current financial mechanisms and gave input for new mechanisms. An overview of these opinions is given.

Fund forming loses its enthusiasm since large volumes of 'dead' money are necessary. The funds are only used for its interest. More, it also costs a lot of money to buffer the funds against land prices. Further, an increase of costs exists at the side of the financing parties and investments are under pressure. At the same time, the agricultural sector is facing difficulties. Many farms have low profit margins and need the capital factor of land rather than money.

Maybe there should be a change in trend and a larger focus by the government and private parties to investments in land positions in the agricultural area. Every day five to ten farmers quit their activities and over several years a new land division is necessary. When this land division is based on the strengthening of the agricultural- and landscape structure, the government and private parties that own land positions can lease land in exchange for an agreement on the implementation of landscape elements on the renters own land. In Veen et al. (2009), this construction is called a 'Grondbank'. Here it is described that farmers pay a lower rent when they are willing to maintain the agricultural landscape and/or to increase the value of the landscape. The Grondbank is no owner of land, but only assigns land that is supplied by a land provider to farmers and together with the supplier develops a contract which must be adhered to the farmer (Schuringa, 2006).

The farmers who still have profitable businesses could be motivated for landscape management by bringing in the heritage taxes to zero under condition of several management practices. As a result, the farm and the landscape are safeguarded across generations.

Another idea for a mechanism that could be used is mutual funds for land. For this mechanism, land is leased to farmers that are connected to the certified cooperative association 'Deltaplan Landschap' for agricultural landscape management. This certification for example safeguards the contribution of farmers to biodiversity and / or to biological farming. The land is supplied on the stock market to impact investors. The investors buy participations - the fund has no legal personality and therefore the term participations is used instead of shares - and, in return, receive the rents from land leasing. New land can be bought with the money from investors and the cycle will become larger.

A last mechanism for land could be the implementation of a 'Landschapsschoonwet'. Such law would include that land owners would have to pay lower taxes when they convert for example 30% of their land into nature and manage the landscape for a period of at least 30 years.

9.2 Conditions for financial mechanisms in Berg en Dal

This research started with the fact that the government is decreasing its funding and that private parties have to take over the role of financing landscapes. In Berg en Dal, already some

mechanisms are present in which private parties are motivated to participate. However, most of these mechanisms still lack of sufficient financial sources and there is a demand for other / new financial mechanisms for financing landscape management in Berg en Dal. Several conditions exist to which such mechanisms should meet on the communication level and the technical level.

On the communication level, private parties should have sufficient possibilities to participate in the construction of financial mechanisms. Since they have an intrinsic or economic motivation for landscape management, they may come up with the best ideas for financing the landscape. Next, collaboration between private and public parties is necessary to translate ideas into effective mechanisms. For this aspect, it is also important to bring parties together that have the same or complementing interests. Last, communication about financial mechanisms is important. Before implementation, private and public parties who are essential for the functioning of the mechanism should support the mechanism. Without support, parties will be reserved in participating.

On the technical level, financial mechanisms should also meet some pre-conditions. Since the government is decreasing its funding, there should be a focus on public-private and private mechanisms that stimulate the provision of among others public, non-excludable ecosystem services. Next, there should be looked at financial mechanisms that can be implemented at the regional and, more important, the local level. Moreover, to motivate parties with economic interest to participate in landscape management, payments for the management should be ensured for a longer period of time and be concurring with the current economic activities of the parties. When a financial mechanism is concluded, the contributors to the mechanism should not experience negative consequences

9.3 Potential financial mechanisms from West-European areas

Since the knowledge and awareness of stakeholders on ecosystem services is low, there may be potential financial mechanisms for Berg en Dal at this field. In Europe, an often used financial mechanism is payments for ecosystem services (PES) (Engel, et al., 2008; Vatn, 2010). These payments can be defined as voluntary transactions where well-defined ecosystem services are being 'bought' by an ecosystem services buyer from an ecosystem services provider. The only precondition is that the ecosystem services provider secures the provision of ecosystem services (Vatn, 2010). Ecosystem managers often receive higher benefit from land uses alternative to conservation. Many of these land uses have a negative effect on other people. The ecosystem managers must therefore be paid by others to ensure the provision of ecosystem services. Such payments should compensate the providers of ecosystem services, but be less than the value of the ecosystem services to the buyers (Tacconi, 2012). PES can be funded through taxes, NGOs, voluntary contributions, direct fees, or other mechanisms (Jack et al., 2008).

The provision of GBD is already an example how several ecosystem services can be promoted: they result in an increase in aesthetic values, recreation, connectivity, water regulation, water purification, and habitats (Molenaar, 2013). However there are also other examples how ecosystem services can be promoted. Several examples are described in literature. The ones that fit into the conditions for Berg en Dal (see §9.2) are all coming from other areas in the Netherlands. The mechanisms are described here and summarized in table 22. For every mechanism, some benefits and obstacles are given.

❖ **Adopt a field edge**

This private mechanism helps to safeguard the following ecosystem services: aesthetic value, habitats, pollination, and recreation (Molenaar, 2013). Individuals or other parties adopt a field edge from farmers. In a contract, it is described what the adopter can expect in return, most often management of the field edge and the right for the adopter to visit the area (Oerlemans, 2003; Molenaar, 2013). In the Netherlands, the contracts are signed for time periods of 1 to 3 years (Oerlemans, 2003).

In Berg en Dal, there has already been a 'landschapsveiling', but more initiatives could be set up for the adoptions of field edges, not only on the municipal level, but also by private parties as the *VNC, SLOG,* and *The Ploegdriever* themselves*.* It secures them for a period of time of income and increases the social involvement in landscape management. An obstacle for this mechanism may be the lacking willingness of individuals or other parties to adopt. An intrinsic motivation is needed to pay for the management of the landscape. Next, there are limited results published about the working of the mechanism.

❖ **Pure water in the Bommelerwaard & farmers as water managers**

In the Dutch Bommelerwaard, farmers were paid by local and national water authorities to improve the water quality to such extent that drinking water standards were met. It was contracted that land would be managed in such a way that chemical runoffs to the water system would be reduced (reduce of agrochemical use, recirculate drainage water).

In the area Amstel, Gooi and Vechtstreek, farmers were paid by local water authorities and the national government for direct ditch management. The payments are thus public, but could be implemented on the small scale. Through long term ditch management contracts, ecosystem services as water regulation, habitats, nutrient regulation, and water purification were enhanced (Molenaar, 2013).

In Berg en Dal, such public- and public-private mechanisms could be implemented to increase the quality of the water and if applicable, to meet drinking water standards. The water authority can pay farmers or private land owners that have their land next to important aquifer locks for sustainable use of chemicals or the management of the water. As a result, the water authority has fewer costs to improve the water quality and the quality of habitats for species in and around the water system increase. Obstacles could be that farmers and / or private land owners are not willing to participate in the management, or that they don't have the expertise to for example manage the water.

❖ **Cultivation of cranberries**

Another private financial mechanism is the extensive cultivation of cranberries on Texel in the Netherlands. On land owned by Staatsbosbeheer, cranberries are cultivated by a private party. A part of the revenues from consumers is used to finance landscape management in the area (Meulen et al., 2013).

In Berg en Dal, other fruits than cranberries (or nuts / vegetables) may have potential to bring revenues for landscape management. The locations for cultivation can be plots of land owned by private parties, but also the field edges with landscape features. Preconditions are that the land must be available and suitable for the cultivation of the fruits, nuts, or vegetables.

❖ **Landscape camping**

The landscape camping is another mechanism used in the Netherlands in which agricultural land is converted into new nature and a camping. For this mechanism, agricultural land is converted into a nature area and a camping. The development and management of the nature are paid from the revenues of the camping. Such campings increase the income of the farmer, stimulates tourism in the area because of an increasing aesthetic value, and bring new nature (Vreke et al., 2010).

There is a large potential for the involvement of entrepreneurs from the recreational sector in Berg en Dal. At this moment, they are not much involved in landscape management and a construction of for example a landscape camping may not only bring awareness of the recreational entrepreneurs for landscape management, but also of the tourists and recreants that visit the area. Obstacles could be that investment costs are high and / or that the land owner is not willing to convert agricultural land into nature. More, some expertise is needed to run a camping.

Table 22: Financial mechanisms for landscape management on the local level
In this table, existing financial mechanisms are adapted for the case of Berg en Dal

NAME OF MECHANISM	SOURCE OF FINANCING	BENEFITS	OBSTACLES	LEADING PARTY COULD BE:
Adopt a field edge	Individuals and other private parties	○ Rise in aesthetic value and thereby also in recreation / tourism ○ Quality of habitats increases ○ Awareness of citizens on landscape management increases	○ Willingness of individuals and other private parties to contribute may be low ○ There are limited program results yet ○ Often only adoption for short periods of time	Private land owners, farmers, or other private parties that own land and / or landscape features
Pure water in the Bommeler-waard	Water Authorities, and indirectly users of water	○ Water quality increases ○ Nutrient regulation ○ Reduce in costs for Water Authority	○ Willingness of farmers to contribute to sustainable landscape management may be low ○ In areas with a relatively high rate of intensive agriculture, small scale contracts are ineffective	Water authority Rivierenland
Farmers as water manages	Water Authorities, and indirectly users of water	○ Water regulation ○ Quality of habitats increases ○ Nutrient regulation ○ Reduce in costs for Water Authority	○ Willingness of farmers to act as water managers may be low ○ Farmers may lack expertise to manage water	Water authority Rivierenland
Cultivation of cranberries	Funding needed to start up, consumers	○ Food production ○ Financial source for landscape management	○ Land must be available for cultivation ○ Soil must be suitable for cultivation	Associations, or other private parties
Landscape camping	Tourists and recreants	○ Rise in aesthetic value and thereby also in recreation / tourism ○ Increased awareness on landscape management ○ Increase in income for farmer ○ New nature	○ Large investment costs ○ Land owner has to convert land and value of land will decrease ○ Entrepreneurship of land owners may be lacking	Recreational entrepreneurs, farmers, private landowners

Discussion

The results of this thesis showed that although Berg en Dal is seen as a pilot area with respect to landscape management, other / new financial mechanisms for landscape management are needed to enhance the multifunctional landscape. Based on several preconditions for effective mechanisms, some existing constructions of PES were presented and adapted to the case of Berg en Dal. In addition, interviewees also provided some ideas for mechanisms that could be used in the area. Other mechanisms or ways to implement the presented mechanisms may exist for effective landscape management in Berg en Dal, but the provided information may be a starting point to encourage stakeholders in the area to come together and brainstorm about other ways of financing landscape management.

From the results, it was remarkable that citizens were not perceived as stakeholders for landscape management in Berg en Dal. Although some citizens may be organized in associations, the majority benefits from the landscape without being perceived to have any interest in landscape management.

The validity of this research has increased through the performance of a resilience analysis. The results of the accumulated net-maps were based on the perceptions of interviewees. For some drawn arrows, interviewees indicated that the relation might be present, but that they were not sure. By excluding arrows that were only mentioned once, a more validate result of the perceived linkages could be presented. For the exchange of knowledge, it could for example be seen that some stakeholders went 5 steps up in the ranking list of centralities.

For the gathering of data, not all identified stakeholders were interviewed. Since interviewees know most about the relationships of their own organization, relatively more arrows may be drawn from and towards the interviewed parties. Next, the resilience analysis does not provide sufficient information for the case that Via Natura will be lifted. When a party leaves the network, new relationships will arise to bridge the resulting gaps. These new arrows are not visualized into the networks.

Network mapping is not the optimal method to analyse the contributions of financial mechanisms on collaborative governance. The method was experienced by the interviewees as a good learning experience. Moreover, with the gathered information the current relationships of stakeholders could be explored and the collaborative governance model in Berg en Dal could be reviewed. However, the method does not give direct answers to how financial mechanisms can improve collaborative governance in the area. Since collaboration between public and private parties is necessary to develop financial mechanisms, the construction of financial mechanisms may strengthen relationships between the collaborating parties. Additionally, after the development of financial mechanisms, the parties have to collaborate during the implementation and maintenance phase of these mechanisms. This collaboration for a longer period of time may also improve collaborative governance in Berg en Dal. Still, before the development and implementation of new financial mechanisms, it is necessary to analyse the existing network and find its strengths and weaknesses. In addition, the method is also used in the Spreewald case study of the cp3-project. As a result, the collaborative governance models of both areas can be compared.

Although local measures may be taken to optimize collaborative governance in Berg en Dal, there are still national issues that limit total optimization. In the Netherlands, some European regulations are not one-to-one translated into the Dutch policies. For example, on EU level Good Agricultural Practices (GAP) are introduced. One practice of this GAP is that when farmers receive a subsidy from Brussel, they should contribute to the conservation of landscape features. However, since the surface area requirements of landscape features on the Dutch level do not match with the requirements on the European level, the regulation is in practice not maintained.

Further research is recommended on the presented financial mechanisms. The costs and benefits, including ecosystem services, of these financial mechanisms have to be calculated for the case of Berg en Dal. More, the volumes of available financial resources have to be calculated to see if and how these mechanisms can be implemented.

Conclusion

With the information gathered through interviews, it was possible to provide an overview of relevant and essential stakeholders with respect to landscape management in Berg en Dal. It was remarkable that citizens were not perceived as stakeholders. Although the network of stakeholders is large and complex, it is a stable system. No critical conflicts exist and there are many parties with high betweenness and degree centralities who are also perceived to have the highest influence in the area. However, for the small private parties, no strong relations were drawn: in the accumulated maps of the resilience analysis, these parties were only connected to an average of three other parties. The landschapscommunity is a good way of bringing all stakeholders together, but mutual communication is essential for a stable network.

The interviewees were not familiar with ecosystem services, but use the term 'Groene en Blauwe Diensten' (GBD, Green and Blue services) for the services that farmers and private landowners provide in the management of, among others, landscape features. The most important GBD are here the development of corridors between nature areas and the construction of an aesthetic landscape for tourism and recreation. Land owners in Berg en Dal have a primary economic motivation to manage landscapes, while the associations are motivated to increase the biodiversity in the area. Thus, on the one hand some parties are only willing to manage the landscape when they get paid, while on the other hand some parties are willing to manage the landscape but are lacking of financial sources.

Between the stakeholders in Berg en Dal, there is a demand for new / other financial mechanisms for landscape management. Although governmental parties are decreasing their funding, it could be noticed that governmental parties still play an important role in the financial flows and exchange of knowledge with respect to landscape management. Current financial mechanisms lack sufficient public and private sources and cannot be extended. Focus should be on private- and public-private financial mechanisms that can be implemented on the local level and ensure revenues for a longer period of time. According to interviewees, potential financial mechanisms are (1) Grondbank, (2) reducing heritage taxes. (3) mutual funds for land, and (4) landschapsschoonwet. Potential financial mechanisms from a literature review that need to be adapted to the case of Berg en Dal are (1) adopt a field, (2) pure water in the Bommelerwaard and farmers as water managers, (3) the cultivation of cranberries, and (4) the landscape camping.

On the main question of this research '*how do financial mechanisms for landscape management contribute to collaborative governance and ecosystem services enhancement in Berg en Dal?*' two conclusions can be given. First, ecosystem services and collaborative governance can play an important role in the construction of other / new financial mechanisms for Berg en Dal. The lack of awareness by stakeholders towards ecosystem services may be a starting point of finding new ways of financing the landscape in Berg en Dal. Moreover, participation of and collaboration between public and private parties is essential to translate ideas into effective mechanisms and to safeguard the functioning of these mechanisms. Second, other / new financial mechanisms contribute to ecosystem services enhancement and may improve collaborative governance in Berg en Dal. Constructions such as payments for ecosystem services (PES) secure the provision of ecosystem services, especially those that are public and non-excludable. By developing financial mechanisms that secure landscape management for a longer period of time, ecosystem services enhancement is stimulated. Other / new financial mechanisms can also improve

collaborative governance in Berg en Dal. The collaboration necessary to develop financial mechanisms can strengthen relationships between parties. Moreover, longer term collaboration during the implementation and maintenance phase of these mechanisms may even further improve these relationships.

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Annex A: Interview Protocol

❖ Contents

This annex includes a protocol for interviewing, based on the interactive method of Net-Mapping. The protocol includes the aim of the interviews, followed by, an overview of necessary materials and an item list of relevant topics. With the help of the item lists, interview questions are set up and categorized.

❖ Aim

Interviewing the stakeholders in the case study area has several objectives.

- To get an overview of all stakeholders involved in the management of the landscape in Berg en Dal, including their linkages.
- To investigate stakeholders' interest in ecosystem services
- To investigate stakeholders' perception on privatization
- To investigate stakeholders' interest and influence on financial mechanisms

❖ Materials

- Mapping sheet (one per interview)
- Multi-coloured post its
- Coloured pens
- Recording material
- Noting material

❖ Item list

Here, an overview of relevant topics is provided. During the questions, these topics could be used as examples or to ask about more details.

Table 23 Item list for the interviews

ECOSYSTEM SERVICES	PRIVATIZATION	FINANCIAL MECHANISMS
Awareness of ecosystem services	Landscape management	Streekfonds
Willingness to contribute	Governmental role	Landschapsveiling
Biological Pest Control	Private contributions	Money flows
Waste water treatment	Common-pool resources	Financial sources
Pollination	Responsibility	
Carbon sequestration and storage		
Tourism		
Recreation		
Habitat of species		
Fresh water		
Green-Blue services		

❖ The interview and steps of Net-Mapping

To collect all the necessary information, one model for all interviews is developed. In this paragraph, the interview model can be found: interview questions are presented and integrated in the steps of the Net-Mapping method. As the item list, also the interview questions and steps will be written in Dutch. The interview starts with an introduction, followed by some questions on general topics that are related to landscape management in general. Next, the Net-Mapping

steps are described, including the necessary interview questions to complete these steps. The interview finishes with a summary and some last remarks from the interviewee.

- **Introduction**

The first step is to thank the interviewee for willing to participate in the interview. Next, there has to be asked if recording is allowed and the time schedule has to be confirmed by both the interviewer and interviewee (2 hours). Furthermore, it has to be explained that the information provided by the interviewee will be treated confidential. Second, the aim of the interview is explained through telling the general aim of the research, namely:

"To investigate the stakeholders that are involved in the management of the landscape in Berg en Dal, including their perception on privatization, ecosystem services and financial mechanisms".

Third, the interviewer tells what will be done with the results of the interview and thus with the information of the interviewee. Last, the procedure of the interview will be explained. The interviewer tells that first some general questions will be asked, followed by an interactive part. It is explained that the interactive part starts with an overview of all stakeholders that are, according to the interviewee, included in the management of the landscape in Berg en Dal. Next, it will be elaborated on the linkages between the identified stakeholders and their power in the management of the landscape in Berg en Dal.

Introductionary questions

- What is your position in the organization?
- Do you mind if I record the interview?
- How much time is available fort this interview?

- **Interview questions on general topics**

After the introduction, some general questions on the topics of ecosystem services and privatization will be asked. Ecosystem Services are common-pool resources. It is often expected that stakeholders are supporting the privatization of these services. During the interviews, it will be investigated if that is also the case in Berg en Dal. Also, the general opinion of stakeholders on ecosystem services is investigated here.

Questions on privatization

- Looking at landscape management in Berg en Dal, what role does the government has according to you?
- As possible follow up: Do you think that landscapes should be managed less by the government and thus more by private parties? Why?
- How are you (is your organisation) involved in the management of the landscape in Berg en Dal?
- Do you (does your organization) agree on the current landscape development plan of Berg en Dal or do you have (does your organization has) another vision?
- Are there any problems, deficiencies of conflicts with respect to these services?

Questions on ecosystem services

- Do you know the term ecosystem services?
    - If yes: what services does the landscape of Berg en Dal provide to you (your organization)?
    - If no:
        1. Explanation concept
        2. What services does the landscape of Berg en Dal provide to you (your organization)?
- What services that are provided by the landscape are important to you (your organization)?
- How do you (does your organization) contribute as users and providers to these services?

➢ **Net-Mapping Steps and related questions**

From this point, the interactive part of the interview will start. This paragraph is divided in the different steps of the Net-Mapping method. These steps will be explained, followed by interview questions that are related to that step.

Step 1

This step consists of the presentation and explanation of a mapping sheet to the interviewee. Next, the question which the interviewer wants to have answered through this method will be told, namely: 'who is influencing the management of the landscape in Berg en Dal at this moment?' After that, the interviewee will be asked to mention involved actors which will be written by the interviewer on actor cards and spread orderly over the mapping sheet.

Questions on included stakeholders

- Which stakeholders/organizations are involved in the management of the landscape in Berg en Dal? If necessary: ask why the stakeholders are important.
- To check: are there other stakeholders involved who you didn't mention yet?

Step 2

In this step, linkages between the stakeholders will be drawn. The interviewer first explains the linkages and how these have to be drawn. Before starting with a link, it is important to include the name of the link in the legend. There will be started with the link between stakeholders with respect to the transfer of knowledge. Second, the linkage 'financial flows' will be drawn (red marker).

Questions on stakeholder's linkages

First link: sharing of knowledge (today)

- Start with stakeholder '1': Is there knowledge on landscape management transferred from stakeholder '1'to stakeholder '2'? And vice versa?
  Is there knowledge on landscape management transferred from stakeholder '1'to stakeholder '3'? And vice versa? Etc. until all stakeholders have crossed. If necessary ask for arguments/ which kind of knowledge/examples.
- Continue with stakeholder '2': Is there knowledge on landscape management transferred from stakeholder '2' to stakeholder '1'? And vice versa?
  Is there knowledge on landscape management transferred from stakeholder '2' to stakeholder '3'? And vice versa? Etc. until all stakeholders have crossed. If necessary ask for arguments/ which kind of knowledge/examples.

Continue with stakeholder '3' to stakeholder 'N' with the same procedure.

Second link: financial flows (today)

- Start with stakeholder '1': Is there a money flow from stakeholder '1' to stakeholder '2'? And vice versa?
  Is there a money flow from stakeholder '1'to stakeholder '3'? And vice versa? Etc. until all stakeholders have crossed. If necessary ask for arguments/more details/source of money/formal-informal.
- Continue with stakeholder '2': Is there a money flow from stakeholder '2' to stakeholder '1'? And vice versa?
  Is there a money flow from stakeholder '2' to stakeholder '3'? And vice versa? Etc. until all stakeholders have crossed. If necessary ask for arguments/more details/ source of money/formal-informal.

Continue with stakeholder '3'to stakeholder 'N' with the same procedure.

Third link: conflicts

- Start with stakeholder '1': Is there a conflict with respect to landscape management between stakeholder '1' and stakeholder '2'?
  Is there a conflict between stakeholder '1' and stakeholder '3'? Etc. until all stakeholders have crossed. If necessary ask for arguments/more details.
- Continue with stakeholder '2': Is there a conflict with respect to landscape management between stakeholder '2' and stakeholder '1'?
  Is there a conflict between stakeholder '2' and stakeholder '3'? Etc. until all stakeholders have crossed. If necessary ask for arguments/more details.

Continue with stakeholder '3'to stakeholder 'N' with the same procedure.

Step 3

After having drawn the linkages between stakeholders, the next step is to investigate the motivations of all stakeholders. First, a legend will be made with all possible motivations. Some examples could be: economic, environmental, social, knowledge, etc. Next, the interviewee will be asked for the motivation of every stakeholder to contribute to the management of the landscape in Berg en Dal. The corresponding symbols as in the legend will be written next to each actor card.

Questions on motivation

- What is the motivation of stakeholder '1' to contribute to the management of the landscape In Berg en Dal?
- If necessary: Does this stakeholder have another motivation to contribute?
- What is the motivation of stakeholder '2' to contribute to the management of the landscape in Berg en Dal?
- If necessary: Does this stakeholder have another motivation to contribute?

Continue with stakeholder '3' to stakeholder 'N' with the same procedure.

Step 4

The building of towers, which stand for the stakeholders' influence on the management of the landscape in Berg en Dal, will be done in step 4. The higher the tower, the more influence an actor has. After all towers have been placed, an afterwards discussion will be held which may change the height the towers. The maximum height that the interviewee can build is 5.

Questions with respect to the influence towers

- Which stakeholder(s) is/are perceived to have the most influence in the management of the landscape in Berg en Dal? And why?
- Which stakeholder(s) is/are perceived to have the 'second' most influence in the management of the landscape in Berg en Dal? And why?

Continue until all stakeholders have a tower.

➢ Summary and final remarks

After the interactive part, it is time to finish the interview. The interviewee will be thanked for his/her contribution and asked if he/she has some final remarks/contributions that could be important for the research.

Final questions

- Do you have some additional information that is relevant to this interview?
- Would you like to have a summary of the results (per email)?
- Do you have any questions on this interview?

Annex B: Combined Net-maps

This annex involves the final tables of the network mapping method. The numbers

Table 24: Knowledge exchange between stakeholders
Horizontal: the exchanging parties
Vertical: the parties who receive the knowledge.
Numbers: amount of interviews in which the arrow of knowledge exchange is drawn

	Via Natura	VNC	Water Authority Rivierenland	The Ploegdriver	Municipality of Nijmegen	SLOG	Municipality of Berg en Dal	Province of Gelderland	Natuurmonumenten	Geldersch Landschap	Staatsbosbeheer	IVN Rijk van Nijmegen	LBG	Flora- en faunawerkgroep	Farmers	Private landowners	Zwanenbroekje	Entrepreneurs	Rijkswaterstaat	WMG	ZLTO
Via Natura	0	4	6	6	1	6	7	3	0	0	1	1	0	1	3	3	2	1	0	1	0
VNC	3	0	5	1	2	0	6	3	0	0	3	0	0	0	3	3	0	1	0	0	1
Water Authority Rivierenland	6	4	0	5	1	2	6	4	0	0	4	1	0	1	1	1	0	0	2	0	2
The Ploegdriever	4	1	6	0	0	5	6	1	0	1	4	1	3	1	3	4	0	1	1	1	1
Municipality of Nijmegen	1	2	1	0	0	0	1	1	0	0	1	1	0	0	1	0	0	0	1	0	1
SLOG	3	0	3	5	0	0	5	1	0	0	5	0	4	1	2	2	1	1	0	2	0
Municipality of Berg en Dal	6	4	6	6	1	4	0	5	0	0	2	2	1	1	3	5	1	0	2	2	1
Province of Gelderland	2	3	2	1	1	1	5	0	0	1	3	1	0	0	0	2	0	3	1	0	1
Natuurmonumenten	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Gelders Landschap & Kasteelen	0	1	1	1	0	1	1	1	0	0	2	0	0	1	0	1	0	1	0	0	0
Staatsbosbeheer	1	3	4	4	1	4	4	3	1	2	0	1	1	2	0	1	0	2	2	1	0
IVN Rijk van Nijmegen	1	0	1	1	1	0	2	1	0	0	1	0	1	1	0	0	2	0	1	1	0
LBG	0	0	0	3	0	4	1	0	0	0	1	1	0	0	0	0	0	0	0	2	0
Flora- en Faunawerkgroep Gelderse Poort	1	1	2	1	0	1	2	1	0	1	2	1	0	0	0	0	0	0	1	0	0
Farmers	2	3	2	4	2	2	4	0	0	0	0	0	0	0	0	0	0	2	0	0	1
Private landowners	2	2	1	2	1	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Zwanenbroekje	1	0	0	0	0	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Entrepreneurs	0	0	1	0	0	1	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0
Rijkswaterstaat	0	0	2	1	1	0	1	1	0	0	2	1	0	1	0	0	0	0	0	0	0
WMG	1	0	0	1	0	2	3	1	1	0	1	1	1	0	0	0	0	0	0	0	1
ZLTO	0	1	2	2	1	0	2	2	0	0	0	0	0	0	1	0	0	0	0	1	0

Table 25: Financial flows between stakeholders

Horizontal: the financing parties

Vertical: the parties who receive the money.

Numbers: amount of interviews in which the arrow of financial flows is drawn

	Via Natura	VNC	Water Authority Rivierenland	The Ploegdriever	Municipality of Nijmegen	SLOG	Municipality of Berg en Dal	Province of Gelderland	Natuurmonumenten	Gelders ch Landschap	Staatsbosbeheer	IVN Rijk van Nijmegen	LBG	Flora- en faunawerkgroep	Farmers	Private landowners	Zwanenbroekje	Entrepreneurs	Rijkswaterstaat	WMG	ZLTO
Via Natura	0	1	1	1	0	1	1	0	0	1	2	0	0	1	0	0	0	1	0	0	0
VNC	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	3	0	1	0	0	1
Water Authority Rivierenland	1	1	0	6	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1
The Ploegdriever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0
Municipality of Nijmegen	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SLOG	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Municipality of Berg en Dal	7	3	1	6	0	5	0	0	0	0	1	1	1	1	4	5	0	2	0	1	0
Province of Gelderland	2	1	2	2	1	2	3	0	2	3	4	1	0	0	1	0	1	1	1	0	0
Natuurmonumenten	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geldersch Landschap & Kasteelen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Staatsbosbeheer	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
IVN Rijk van Nijmegen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LBG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flora- en Faunawerkgroep Gelderse Poort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Farmers	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private landowners	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Zwanenbroekje	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Entrepreneurs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rijkswaterstaat	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
WMG	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
ZLTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 26: Conflicts between stakeholders

Horizontal: the source of 'conflict'

Vertical: the parties where the source is 'conflicting' with

Numbers: amount of interviews in which the arrow of conflicts is drawn

	Via Natura	VNC	Water Authority Rivierenland	The Ploegdriever	Municipality of Nijmegen	SLOG	Municipality of Berg en Dal	Province of Gelderland	Natuurmonumenten	Geldersch Landschap	Staatsbosbeheer	IVN Rijk van Nijmegen	LBG	Flora- en faunawerkgroep	Farmers	Private landowners	Zwanenbroekje	Entrepreneurs	Rijkswaterstaat	WMG	ZLTO
Via Natura	0	3	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
VNC	3	0	1	3	0	0	2	2	0	0	0	0	0	0	1	0	0	0	0	1	1
Water Authority Rivierenland	1	1	0	0	0	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0
The Ploegdriever	0	3	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Municipality of Nijmegen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SLOG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Municipality of Berg en Dal	0	3	2	0	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	1	0
Province of Gelderland	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Natuurmonumenten	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geldersch Landschap & Kasteelen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Staatsbosbeheer	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
IVN Rijk van Nijmegen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LBG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flora- en Faunawerkgroep Gelderse Poort	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Farmers	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private landowners	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Zwanenbroekje	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Entrepreneurs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rijkswaterstaat	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
WMG	0	1	1	1	1	0	3	0	0	0	0	0	0	0	1	1	0	0	0	0	0
ZLTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 27: Perceived average influence of the stakeholders

STAKEHOLDER	AVERAGE INFLUENCE
Municipality of Berg en Dal	4,4
Staatsbosbeheer	4,2
VNC	3,9
Province of Gelderland	3,6
Waterschap Rivierenland	3,4
Rijkswaterstaat	3,0
Via Natura	2,9
Farmers	2,8
Natuurmonumenten	2,7
Ploegdriever	2,6
ZLTO	2,5
Municipality of Nijmegen	2,3
Stichting landschap Ooijpolder-Groesbeek	2,2
Geldersch Landschap & Kasteelen	2,0
Werkgroep Milieubeheer Groesbeek	2,0
Landschapsbeheer Groesbeek	1,8
Flora- en Faunawerkgroep Gelderse Poort	1,5
Entrepreneurs	1,0
Private landowners	1,0
IVN	0,8
Zwanenbroekje	0,0

Table 28: Motivations of stakeholders for landscape management

# of interviews in which three categories of motivations (economics, biodiversity, and recreation & social) are assigned to all involved stakeholders.

	MOTIVATIONS FOR LANDSCAPE MANAGEMENT		
STAKEHOLDERS	**ECONOMIC**	**BIODIVERSITY**	**RECREATION & SOCIAL**
Via Natura	1	2	2
VNC	2	2	1
Water Authority Rivierenland	3	2	1
The Ploegdriever	3	2	2
Municipality of Nijmegen	-	-	1
SLOG	-	2	1
Municipality of Berg en Dal	2	3	3
Province of Gelderland	1	3	2
Natuurmonumenten	1	2	1
Geldersch Landschap & Kasteelen	1	2	1
Staatsbosbeheer	2	3	2
IVN	-	2	1
Landschapsbeheer Groesbeek	-	2	1
Flora- en Faunawerkgroep Gelderse Poort	-	1	-
Farmers	1	1	-
Private landowners	-	-	-
Zwanenbroekje	-	-	-
Entrepreneurs	-	-	-
Rijkswaterstaat	1	1	1
WMG	-	1	1
ZLTO	-	-	-