

# **Farmer knowledge sharing and social networks in agricultural extension**

– farmer perceptions from six Indonesian villages

*Louise Ramberg*



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## Abstract

This thesis is an empirical exploration of knowledge sharing and social networks among farmers in a context of agricultural extension. The exploration takes off from the development of the field of extension, examined in a literature review. The literature review shows that “traditional” agricultural extension, which implies a transfer of agricultural knowledge and information from governments and organizations to farmers, has developed and to some extent turned into more pluralistic approaches like Farmer Field Schools. Such pluralistic approaches to a higher extent consider and acknowledges other aspects of farmers’ livelihoods than the knowledge and information being transferred to farmers by “traditional” extension. Given this development, knowledge sharing and social networks among farmers has been investigated as an aspect that is important for understanding the development of the extension discourse. The study has been carried out in six villages located in the province of Yogyakarta on the island Java in Indonesia, where five of the villages have Village Learning Centers (VLCs) as part of pluralistic extension services. The thesis explores how knowledge sharing and social networks between smallholder farmers is taking place and function in relation to extension in this context. In addition, the study also explores how knowledge sharing and social networks between smallholder farmers is taking place in the village Semin, which do not yet have a Village Learning Center (VLC). Interviews have been carried out with farmers in the six villages and the theoretical field of social networks has been used to discuss the empirical material from a perspective of knowledge sharing. The findings show how social networks, in terms of groups and in terms of the social network that surrounds a person, enables knowledge sharing between farmers. Different forms of farmer groups, social events, collaborations and social relations are in different ways and for different villages important for knowledge sharing between farmers. Knowledge sharing between generations also plays a role. The findings show that some VLCs, together with farmers’ perception of their own and others capacity, are affecting the knowledge sharing. Attitudes among farmers to some extent also influence the knowledge sharing. Also, lacking resources and organization in the village Semin constitutes a problem for knowledge sharing. The findings from the villages are used in the thesis to discuss an establishment of a VLC in Semin from the perspective of knowledge sharing and social networks among farmers. The local farmer groups in Semin, together with improved organization and coordination, is emphasized as potential factors for future knowledge sharing between farmers in a context of extension in Semin.

**Keywords:** *agricultural extension, Village Learning Centers, knowledge sharing, social networks, farmers, Yogyakarta, Indonesia.*

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## Preface

My thesis is based on a *Minor Field Study* (MFS) scholarship for carrying out fieldwork in a less industrialized country. When applying for an MFS, I got in contact with the organization The World Agroforestry Center (ICRAF) and their country office in Indonesia. ICRAF is a research and information organization for agroforestry. Agroforestry means farming systems where trees, crops and animals are combined and managed on the same land area for increased sustainability and benefits for the farmer (FAO 2017-10-03). Since agroforestry is one of my interests, I took the opportunity to collaborate with ICRAF and their Indonesian country office for my thesis.

Through ICRAF I was introduced to five Village Learning Centers (VLCs) in the province of Yogyakarta on the island Java in Indonesia. VLCs is what ICRAF call these arenas where farmers can discuss and get training and advise on topics such as agroforestry, agriculture, animal husbandry and forestry. These five VLCs are not established nor maintained by ICRAF but are part of one of their projects called Kanoppi2. Within Kanoppi2, ICRAF works with the five VLCs in order to build farmers capacity assets and needs in agroforestry practice. Through assessments and other interventions within the project, Kanoppi2 aims to scale up the adoption of improved production practices and value chains in agroforestry and improve smallholder farmers livelihoods.

When I started my fieldwork in Indonesia, the plan for my thesis was to contribute to the aim of Kanoppi2 by carry out an assessment of how farmers perceive the five VLCs as distributors of advice and training in agroforestry. The assessment was also supposed be used by ICRAF as a background when discussing a potential establishment of a VLC in a village called Semin, on ICRAFs initiative, as an intervention to achieve the aim of Kanoppi2. However, during the first days of fieldwork, other aspects than perceptions of the VLCs were revealed, and I decided to rethink my topic:

*After a day in one of the villages, were I had been introduced to one of the VLCs and interviewed some farmers and also the manager of the VLC, I had some information about how the farmers perceived the VLC in their village. When going to bed later that night, a thought came to my mind. During the interviews, the farmers had not only talked about their perceptions of the VLC, but also about other things. For example, they had in different ways talked about the sharing of knowledge between each other. This seemed important and I found it very interesting. I quickly wrote it down as something to follow up and maybe dig deeper into, before I fell asleep.*

This resulted in a topic change for the study. The study started as an investigation of farmers perceptions of VLCs but developed during the fieldwork into a study on knowledge sharing between farmers.

## Introduction

Agricultural extension has traditionally focused on transfer of information and knowledge on agriculture from professional extension workers to farmers. Originally, agricultural extension was developed to extend knowledge and education from universities to farmers through so called extension services. These extension services, in the form of courses, training or information sheets on agriculture etc., were often established, carried out and financed by governments and NGOs. This form of “traditional” extension is still common today and exists both in industrialized and less industrialized countries (Christoplos 1997:7). The purpose of the extension services differs depending on the country. Extension services are often used as policy instrument for governments to implement and fulfill their agricultural politics. In less industrialized parts of the world, the purpose of extension is often to reduce poverty or to improve smallholder farmers’ livelihoods. For example, extension can be used to increase the country’s agricultural production, to promote sustainable agriculture or to increase the welfare of farm families and rural people (Van den Ban & Hawkins 1996). Within “traditional” extension it is often taken for granted that adopted knowledge among farmers will be transferred to other farmers. Many extension organizations today structure their work based on this assumption (Christoplos 1997:7; Duveskog 2013).

Even though the “traditional” extension described above has received a lot of attention and practice in development contexts, it has been criticized among the development community for different reasons. The critique focuses on the simplified practice of extension and the understanding of what extension should be. Aker (2011) writes that “traditional” agricultural extension is limited in its scale, sustainability and impact. Such extension often fails to include and acknowledge the variety of activities that farmers carry out for their livelihood, as well as failing to include the diversity of different actors and interests that are present in the rural context (Christoplos 1997; Aker 2011). Assessments show that the impact of “traditional” extension upon farmers’ livelihoods often is low (Aker 2011). Christoplos (1997) writes about the importance of adopting a more pluralistic extension approach, where all actors, interests and livelihood strategies that are important for farmers can be included and where the extension activities facilitate knowledge creation among farmers rather than a simple transfer of knowledge. Such a pluralistic extension approach acknowledges the complexity of rural areas in terms of addressing a variety of farming systems and livelihoods (Christoplos 1997).

As part of a more pluralistic approach to agricultural extension, social relations and social networks are important for knowledge creation among farmers in many less industrialized countries.

According to Isaac et al. (2007), knowledge sharing between family, friends, neighbors and villagers, together with knowledge sharing through community involvement, contributes to farmers' knowledge creation. When knowledge from formal sources, like extension services, governments or NGOs, are insufficient or unavailable, farmers often rely on their informal sources like social networks and relations (Isaac et al. 2007). Knowledge sharing through social networks and social relations is one of farmers' many livelihood strategies. The acknowledgement and understanding of this can contribute to a more pluralistic approach to agricultural extension.

In addition, the critique of "traditional" extension includes a critique towards the top- down knowledge transfer embedded in the concept of extension. This is based on that extension organizations and governments believe that they know what farmers need, which seldom is the case (Feder et al. 2004b). The assumption that adopted knowledge among farmers automatically is transferred to other farmers has also been criticized for being too simplistic. Communities are diverse and aspects like differences in power, gender, kinship, livelihood and other factors imply that knowledge does not necessarily spread easily through communities (Christoplos 1997).

The critique against traditional extension has resulted in the development of new ways of carrying out knowledge creating activities among farmers. Within the development community, activities or practices like *Farmer Field Schools* have developed, which are acknowledged as a farmer inclusive extension model. Farmer Field Schools do not simply transfer knowledge from academia to farmers but facilitates participatory processes for knowledge creation and increased capabilities among farmers (Aker 2011:633). It implies a method of learning by doing, both during training and at home, and it is common that trained farmers facilitate the learning process (Braun et al. 2000:1). The five Village Learning Centers (VLCs) in the province of Yogyakarta, as mentioned in the preface of this thesis, can be seen as a form of Farmer Field Schools. They build on the same basis as Farmer Field Schools, with a participatory and inclusive knowledge creation process for farmers.

The development of more farmer inclusive extension models like Farmer Field Schools show that the discourse of agricultural extension to some extent has changed and is changing. More emphasis is, within these forms of models, put on the processes of farmers own knowledge creation, rather than on the simple transfer of knowledge to farmers from an extension institution above. However,

the performance of “traditional” agricultural extension still exists and the critiques towards it is still up-to-date and running. As mentioned, “traditional” extension is criticized for being unable to include and acknowledge farmers’ different livelihood activities and the diversity of different actors and interests the in rural context. It is also criticized for having a simplistic understanding of how knowledge is transferred from one farmer to another. Therefore, acknowledging this critique, and to gain a deeper understanding of on the processes of farmers own knowledge creation, this study explores social relations, social networks and knowledge sharing between farmers. The focus is on the understanding of the communication of knowledge between farmers in contexts of Farmer Field Schools, taking the example of five villages with Village Learning Centers (VLCs) in the province of Yogyakarta.

The VLCs are initiated and established in different ways, with more or less contribution from the public sector, NGOs or other institutions. ICRAF has not been involved in the establishment of them and do not contribute to the maintaining of them. However, as an intervention to achieve the aim of the project Kanoppi2, which was mentioned in the preface, ICRAF is thinking about establishing a VLC in the village of Semin in Yogyakarta. The village does not yet have a VLC. From the perspective of ICRAF, a VLC in Semin could be a way to scale up the adoption of improved production practices and values chains in agroforestry and improve smallholder farmers’ livelihoods, as is the aim of Kanoppi2. The VLC in Semin will, as the other five VLCs, also be a form of Farmer Field School based on a pluralistic extension approach.

Since social relations, social networks and knowledge sharing between farmers is an important part of understanding pluralistic extension approaches like Farmer Field Schools, and since it is important for farmers’ knowledge creation, it is also interesting to investigate this in relation to the establishment of a VLC in Semin. This study therefore also explores social relations, social networks and knowledge sharing between farmers in and in relation to the village Semin, where a VLC is planned to be established by ICRAF.

The study draws upon the findings regarding social relations, social networks and farmer knowledge sharing in the villages which already have a VLC, and discuss this in relation to the establishment of the VLC in Semin. By doing this, the study has the potential to be beneficial for ICRAF. Both in their work with the establishment of a pluralistic VLC and in their work with achieving the aim of the project Kanoppi2, which is to scale up the adoption of improved

production practices and values chains in agroforestry and improve smallholder farmers livelihoods. If the aspects of knowledge sharing between farmers and social relations are considered when establishing a VLC in Semin, the author hopes to contribute to the ambition of ICRAF in improving adoption of production practices and values chains in agroforestry that can be beneficial to the livelihoods of smallholder farmers in Semin.

This study on knowledge sharing between farmers, social relations and social networks in contexts of VLCs should be understood as a contribution to the development of the discourse on more pluralistic forms of extension. Farmer knowledge sharing, social relations and social networks constitutes one perspective out of many that complements the discourse of agricultural extension and the development of the discourse. In order to understand this; how farmer knowledge sharing, social relations and social networks can be seen as a complement to the agricultural extension discourse, and how it can be seen as a contribution to the extension development, the thesis presents a literature review. The literature review examines the development of the agricultural extension discourse, Farmer Field Schools and farmer knowledge sharing in literature and, by doing that, gives the background and reason for investigating the thesis topic of farmer knowledge sharing, social relations and social networks in contexts of VLCs. With the literature review as a take-off, the thesis further explores the thesis topic by presenting the findings from the villages regarding knowledge sharing between farmers and social relations and networks.

### Aim and research questions

The aim of the study is to explore how knowledge sharing and social relations between smallholder farmers is taking place, both in the context of the five Village Learning Centers (VLCs) and in the context of the village Semin, which does not yet have a VLC. Farmers' perceptions of the operation of the five VLCs and other knowledge creating institutions is explored, from the perspective of farmer-to-farmer knowledge sharing and social relations. A purpose is to draw experience from the studied villages regarding knowledge sharing and social networks, which may be of use in the establishment of a VLC in Semin.

The following research questions are used:

- How is knowledge shared between smallholder farmers in the studied villages, including Semin, and what is the role of social networks in this context?
- What are the obstacles for knowledge sharing between smallholder farmers in this context?

- How can the findings on knowledge sharing between farmers, social networks and obstacles for knowledge sharing between farmers in the studied villages be useful for the establishment of a VLC in Semin village?

## Disposition

From here will follow some general information on Indonesia and its rural areas. After that, a literature review on the development of the field of extension and a literature review on knowledge sharing between farmers is presented. Then I present the theoretical entry points of the thesis, the research process and methodology. The six villages I visited for the study are then described. After that I present and discuss my empirical findings from the villages in relation to my aim and first two research questions. The findings are divided in two parts; *Knowledge sharing and social networks in the context of the VLCs*, and *Knowledge sharing and social networks in the context of Semin village*. The reason for separating the results in two chapters, one for the villages with VLCs and one for Semin, is to make it easier to compare the results between the villages and utilize the comparison when discussing the third research question, which regards how the findings from the studied villages can be useful for the establishment of a VLC in Semin. Such a discussion on lessons learned is followed after the two chapters of findings. A summary and conclusion closes the thesis by reconnecting to the thesis aim.

## Rural Indonesia

Indonesia is the world's fourth most populated country and consists of an archipelago of 18 000 islands. The equator is running through the middle of the country and the climate is tropical with a high air humidity (The Swedish Institute of International Affairs (UI) without date). About 45 % of the Indonesian population today lives in rural areas (UN 2018) and about one third of the population are farmers (UI without date). In the previous decades, the living standard has improved and the poverty rate has declined (*ibid.*). The country is today classified as a middle-income country according to the World Bank (2018-04-09). In 2016 about 11 % of the Indonesian population lived under the poverty line and about 40 % of the population are at risk to fall under the poverty line (*ibid.*). People in rural areas are poorer than people living in urban areas (IFAD 2016). The inequality in the country is high and the gap between the rising middle class and the poor continues to increase (UNDP Indonesia, without date). Rural Indonesia is on the one hand characterized by large scale extraction of natural resources like forests, but on the other hand also characterized by small scale natural resource management like agriculture, silviculture and fishery carried out by smallholder farmers.

## Extension discourse and Farmer Field Schools

From here follows a literature review on the development of the agricultural extension discourse, not only in Indonesia but in general throughout the world. The chapter goes deeper than the introduction into how the discourse, understanding and performance of agricultural extension has developed, from being a top-down knowledge transfer to farmers with little consideration for rural conditions or aspects, into the rise of new forms of extension where rural issues and participation of farmers to a greater extent is considered. Even though new forms of extension have been created, like Farmer Field Schools mentioned in the introduction, the critique of the agricultural extension discourse however still exist. Among other things, the critique regards how extension often fails to include different aspects and actors of rural life in its operation, like for example the sharing of knowledge between farmers. The literature review is important for the understanding of this critique and why this study explores knowledge sharing, social networks and social relations between farmers in contexts of VLCs. The development of the extension discourse towards more including forms, where not only the extension but other aspects of rural life should be considered, underpin an exploration of farmer knowledge sharing in contexts of extension. In this study, the contexts of extension are the VLCs.

As mentioned in the introduction, the field and operation of “traditional” agricultural extension has been criticized for its simplistic way of understanding of rural conditions and livelihoods. Authors within the research project *Neuchatel Initiative* has stated that governmentally led “traditional” extension is often of poor performance and needs to be improved in order to decrease poverty and vulnerability in rural areas. (Christoplos et al. 2001:5):

“(“Traditional”) Extension has little prospect of making a significant contribution to the reduction of poverty or vulnerability unless agricultural and rural development policies adequately address these changes” (changes that would benefit the reduction of poverty and vulnerability).

Other writers have also elaborated upon and discussed the concept of “traditional” extension. Leeuwis & van den Ban (2004) emphasize a new way of thinking of extension and introduces the concept of ‘communication for rural innovation’ rather than extension. They claim that the concept of extension needs to be redefined to meet the changing reality of extension and farmers. According to them, this implies that extension no longer is an initiative only from the government and emphasize that organizations and the private sector today also play a role in extension (Leeuwis & van den Ban 2004:26). The concept of ‘communication for rural innovation’ emphasizes the importance of new patterns of cooperation and adjustments in relation to context, rather than pre-defined policies and directions. This alternative concept emphasizes the material- technical but also the social- organizational components of rural life and highlights social learning and negotiation, (Leeuwis & van den Ban 2004:26).

Duveskog (2013) investigates Farmer Field Schools, as an extension approach that has developed out of critique towards the “traditional” agricultural extension. The method and approach of Farmer Field Schools were developed in Indonesia in the end of 1980s, through the knowledge of IPM (Integrated Pest Management) as a response to that “traditional” extension was unable to effectively address problems with pests and diseases in rice fields. The knowledge of IPM was during this time commonly seen as the solution to pest problems in rice fields but was problematic to transfer to farmers only through the operation of “traditional” extension. Extension workers instead started to focus on developing and facilitating critical decision-making skills among farmers, in order to contribute to farmers’ knowledge creation on IPM and other complex issues. Through hands-on practical and experiential learning, with the base in adult education and collective learning, farmers were guided to increase their knowledge on IPM, and the method of Farmer Field Schools was

formed (Duveskog 2013:37). In short, the learning process of Farmer Field Schools is characterized by five principles or notions. These are:

“what is relevant and meaningful is decided and discovered by the farmer; learning is a consequence of experience; cooperative approaches are enabling; learning is a process characterized by open communication, confrontation, acceptance, respect and the right to make mistakes; and each farmer’s experience of reality is unique” (Duveskog 2013:38).

Today, Farmer Field Schools not only facilitate knowledge creation on IPM, but also on other topics like organic agriculture, agroforestry, animal husbandry and business skills (Duveskog 2013:37).

Even though the approach of Farmer Field Schools has developed in response to the critique of “traditional” agricultural extension, Farmer Field Schools are not the only source of information for farmers’. Anderson & Feder (2004) argue that extension services are not necessarily the most efficient providers of information and knowledge for farmers. Other sources of information should not be underestimated, such as other formal or informal training or information occasions, like courses, published media or radio. It is also very common that farmers gain information and knowledge from other farmers since the information is accessible and do not require costly inputs. Some sources of information are also initiated or inherited, based on farmers own experience or experimentation. Studies from 1985 and 2000 show that farmers mainly point to other farmers as their main source of agricultural information (Anderson & Feder 2004:42 and Feder et al. 2004a:221).

Even though literature describes Farmer Field Schools as better than “traditional” extension, the approach has been up for discussion and has to some extent been challenged, e.g. questioning its financial sustainability (Duveskog 2013:48). On the other hand, the approach has resulted in several positive achievements, like e.g. increased agricultural production, individual and collective agency and reduced poverty. It has also shown potential to close the gender gap in agriculture, by e.g. directing extension activities to women in ways that empower them (Duveskog 2013:47,48).

Feder et al. (2004b) writes that within “traditional” extension, knowledge is transferred from governments and organizations to farmers without considering the relevance of the knowledge for

the farmers. This is related to the critique of “traditional” extension being top- down in its knowledge transfer from organizations and governments to farmers, as mentioned in the Introduction. Organizations and governments believe that they know what farmers need, but this is seldom the case (Feder et al. 2004b). Duveskog (2013) claim that the critique is based on how decisions are taken, i.e. at a high level of the bureaucracy, resulting in an extension that is inflexible when it comes to modifying the content, in order to adapt to local agro-climatic and socioeconomic conditions (Duveskog 2013:27). The background of this practice within “traditional” extension lies in the history and early meaning and practice of extension. Since 1840 and onward, agricultural extension has been a method for one- way transferring of agricultural knowledge from universities and science to non-students like farmers. Like for many other fields of science, agricultural extension has implied education of farmers by teachers from academia (Leeuwis & van den Ban 2004:22). Going further back, the practice of a top- down knowledge transfer can according to Leeuwis & van den Ban (2004) be traced down and compared to the Age of Enlightenment. During this era, people believed that science was the potential and blessing for modernization and development, and it was commonly understood that highly educated people needed to “shed some light” upon the less educated people who lived in “darkness” (Leeuwis & van den Ban 2004:23). This top- down and one- way practice of knowledge transfer seen in history is still present in “traditional” extension. According to Duveskog (2013), critique against such practice of “traditional” extension has contributed to the development of Farmer Field Schools, which has a more farmer inclusive and farmer decision- making oriented profile.

“Traditional” agricultural extension is also criticized for having a simplified perspective of knowledge transfer and knowledge creation. Within “traditional” extension it is taken for granted that farmers who receive the extension directly will adopt the knowledge transferred to them. This is however not always the case, and different factors, like complexity of the knowledge or incompatibility with other aspects of farming, are influencing the adoption and use of the knowledge (Vanclay & Lawrence 1994). Brix (2017) argue that knowledge is not simply transferred from extension services to farmers like an injection. Instead, knowledge is a process being created inside a person: *“individually or collectively through different social and cognitive processes of action and interaction”* (Brix 2017:115).

As this chapter presents, the discourse of agricultural extension has developed from a “traditional” understanding and practice of the method towards a more pluralistic and farmer including method

through Farmer Field Schools and similar approaches. However, the “traditional” way of understanding and practicing agricultural extension still exists today, and is being criticized by the development community for different reasons, which is presented above. In addition to this, agricultural extension, regardless of whether its “traditional” or more pluralistic, is not necessarily the only or most efficient provider of information and knowledge for farmers. As written already, other farmers can be a source of information or knowledge and according to Anderson & Feder (2004) this should not be underestimated. As a complement to the development of the extension discourse into more pluralistic forms, and as an aspect which is present in rural life, it is therefore interesting to investigate knowledge sharing and social relations between farmers. Both in the villages that has VLCs and in the village Semin that do not have a VLC.

## Farmer knowledge sharing in literature

The following part is a literature review on knowledge sharing between farmers, without consideration for VLCs or other extension services. The purpose of the review is to increase the understanding of knowledge sharing between farmers and how this takes place. In addition, the review aims to increase the understanding of why I explore social relations and social networks as part of the thesis aim.

Knowledge sharing between farmers is in different ways discussed in existing literature. A re-occurring discussion concerns social processes and relations, which enables or hinders knowledge sharing between farmers. Kiptot et al. (2006) builds on this and has investigated what factors influence farmers to share knowledge gained from extension services regarding agroforestry to other farmers. The study, which focuses on western Kenya, shows among other things, that kinship ties and social relations within the family are important for knowledge sharing between farmers. The study also shows that informal social networks are inefficient in facilitating knowledge dissemination and sharing between farmers, but rather better and more efficient for facilitating the sharing of seeds between farmers (Kiptot et al. 2006).

Martini et al. (2017) also build on the perspective of social processes and social relations and discuss the concept of ‘farmer-to-farmer interpersonal communication’ as a medium for dissemination of agroforestry knowledge and innovations between farmers. The study, which is a case study of two villages on Sulawesi in Indonesia, investigates how farmer-to-farmer

interpersonal communication is used and to what extent it is preferred before other channels of knowledge dissemination regarding agroforestry innovations, like extension or other government information. The authors write that farmer- to- farmer interpersonal communication is when farmers get information by communicating with other farmers like their friends and relatives (Martini et al. 2017).

The study by Martini et al. (2017) shows that farmers who don't have access to extension services or support by the government are more dependent on other farmers', like the family's and the friends', dissemination of information on agroforestry innovations. In addition, the study shows that context, in terms of culture and gender, influences how farmer- to- farmer interpersonal communication is used. Male farmers are according to the study important for other male farmers' information dissemination on agroforestry innovations (Martini et al. 2017). The authors also conclude that farmers in the two Sulawesi villages prefer different information dissemination channels due to differences in their language knowledge. If farmers only speak the local language and not the official language Indonesia, they tend to prefer farmer- to- farmer information dissemination rather than e.g. extension- to- farmer dissemination (Martini et al. 2017).

The social processes and relations, which enable and sometimes hinder knowledge sharing between farmers, are in literature also discussed in relation to livelihood strategies and diversification. Ellis (2000) writes that rural households in less industrialized countries often are dependent on a variety of income sources where both economic and social aspects need to be considered. Social relations like kinship, the community, friends, neighbors and shallowly known people are in different ways important contributors to rural peoples' livelihoods and, in addition, contribute to secure and sustain the diversity of livelihood strategies. Social relations and networks are for example important for farmers' access to knowledge and information, which in turn is important for their livelihood (Ellis 2000).

The literature field of knowledge sharing consists of the social perspective exemplified by Kiptot et al. (2006) and Martini et al. (2017) earlier in this chapter. The literature field also consists of a more quantitative perspective. When the social perspective is in focus, the investigation and discussion concern how knowledge is being shared or disseminated between farmers. The quantitative perspective rather focuses on measuring the knowledge sharing. Studies carried out by, among others, Feder et al. (2004a) and Anderson & Feder (2004) investigates the latter. They

elaborate on knowledge diffusion between farmers and the adoption rate of the diffused knowledge, and calculate to what extent knowledge is diffused to other farmers and to what extent the knowledge is adopted by receiving farmers. Their studies measure the efficiency and the adoption rate through knowledge diffusion particularly by using numbers and extent (Feder et al. 2004a; Anderson & Feder 2004).

## Theoretical entry points and guiding concepts

In this thesis I use parts of the scientific field of social networks and the concept of social capital to analyze and discuss my empirical material. The field of social networks has been elaborated by different theorists who with different perspectives contributes to the field. The author Charles Kadushin (2012) has compiled the perspectives and contributions into a book, which covers and explains the field of social networks. This book is mainly used below to explain two perspectives of social networks, which later in the thesis will be used to analyze and discuss my empirical material. The two perspectives are social processes within groups and social processes in relation to individuals, respectively. The perspectives are explained separately below in order to enhance the understanding and clarify the difference between them. I have chosen to mainly use the compilation by Kadushin (2012) and not the texts written by the theorists, since Kadushin puts the different perspectives and parts of social networks in relation to each other and therefore makes them easier to understand and explain. Finally, the concept of social capital from the perspective of individuals' social networks is explained below.

### Groups as social networks

The field of social networks is a merge of different studies of social relations. Among others, it is based on anthropological studies of community relations in less developed societies (Liu et al. 2017:1). It is a tool that can be used for discussing relations and social processes within a social system. A social system, or in other words; a social network, is built up by actors who in different ways stands in relation to each other. Within a social network, social processes are taking place and the processes are interlinked with the relations between the actors. By having a relation to each other, the actors are part of and form the social network (Kadushin 2012). Local communities, villages, groups online, constellations or other formations such as the family, the workplace or the group of friends are examples of social networks. Sometimes, social networks merge and connect into each other, which is called a condition of multiplexity (Kadushin 2012:28).

To analyze my empirical material from the perspective of knowledge sharing, I will use a particular kind and structure of social network applicable on groups, called the *socio- centric* network. A socio- centric network is characterized by being a closed network with defined boundaries, where the actors in the network have relational ties between each other. The word “closed” does not necessarily mean that other people cannot be part of the network. It just means that there is a

difference between being outside and inside the network, for example by a registration or requirement of membership when entering the network. Relational ties basically imply that the actors are formally or informally linked to each other within the social network (Hawe et al. 2004:972). An association with paying members or a school class are examples of socio- centric networks. When carrying out this thesis I also came in contact with farmer groups in the studied villages, and these groups are clear examples of socio- centric networks. Either the farmers are members of the groups or they are not, which implies that the groups have clear boundaries.

### Individuals' social networks

Social networks not only apply for groups but also for individuals. All people have their own individual and personal social network that surrounds them, which consists of people that in different ways are connected to or know the 'owner' of the social network (Kadushin 2012). Family, friends, people at work, old teachers, your neighbors, people that you know just shallowly; they are all part of your social network. The *ego-centric* social network is the definition of your individual social network (Kadushin 2012) and the definition is used in the thesis to analyze the empirical material from the perspective of knowledge sharing.

In addition to this, the thesis briefly touches upon the concept of social capital, related to the individual and ego-centric social network. Social capital implies the human resources available for an individual within the individual's ego-centric social network. For example, you can ask your friends for job tip or they can recommend you to an employer. Taking advantage of your ego-centric social network implies that you have and utilize your social capital (Kadushin 2012:6). The concept contributes to the understanding of how people and social relations in different ways can be beneficial for someone, but is not a main theoretical entry point in this thesis. It is to some extent used to explain and analyze my empirical material, but merge into the main theoretical entry point of social networks.

The theoretical entry points described above; groups as social networks and individual's social networks, are used in the thesis to discuss my empirical material and thereby increase my understanding of how farmers share knowledge with each other and what role social networks play in the context of the studied villages, including Semin. The theoretical entry points thereby contributes to fulfil the aim of the thesis, which is to explore how knowledge sharing and social

relations between smallholder farmers is taking place in the context of the five VLCs and the village Semin.

Finally, as this thesis aims to explore knowledge sharing and social relations between smallholder farmers in the VLC villages and in Semin, it is necessary to explain how I define the word *knowledge sharing* and how the word is used in the thesis. I define knowledge sharing as a possible two-way channel of knowledge exchange between actors, rather than a one-way giving of knowledge often associated with words like knowledge transfer and knowledge dissemination. In addition, I define knowledge sharing as a knowledge exchange that takes place between farmers, not between extension services and farmers. The thesis uses the word knowledge sharing and the definition of it to explore how knowledge is given, taken and exchanged between farmers in their social interaction and social relations.

## Research Methods

In order to try to understand and describe how knowledge is being shared between farmers in the different villages, what role social networks play and if there are any obstacles for knowledge sharing, qualitative research methods have been used, which are described further down.

I spent in total eight weeks in Indonesia during February-March 2018. The preparations, data collection and processing of data was spread out over these eight weeks. The data collection, i.e. the fieldwork, was carried out in six villages divided in two districts.

As part of the research method I also carried out a literature review.

### Preparations

Prior to conducting the data collection in the villages, I spent about one week at ICRAFs office in Bogor on the island of Java. At the office I met with my Indonesian supervisors, Endri and Riyandoko, who work at ICRAF. They suggested the six villages as a focus for my study, since they have contacts there and could help me get in contact with people. I decided to focus my thesis on these villages. Since the VLCs in the villages have different focus, among other things agriculture, bamboo production and bee keeping, my original interest and focus on agroforestry was put aside during the fieldwork, giving way to a broader approach. With the help of Endri and

Riyandoko, I prepared for the data collection by structuring the fieldwork and compiling interview questions. They also arranged an interpreter for me.

#### Selection of informants

During the first phase of my data collection in the villages, I was accompanied by my Indonesian supervisors and staff from the ICRAF office. The staff and my supervisors were carrying out work for the Kanoppi2 project in some of the villages and organized focus group discussions for farmers. I was able benefit from their work since I was introduced to certain key persons in the villages, which the staff had invited to the focus group discussions. The key persons had different important roles in the villages and through our introduction they also became key informants for my data collection. After some days, my supervisors and the staff left for work in other places and I carried out the data collection on my own, together with an interpreter. The introductory meetings with the different key informants were helpful since they gave me valuable contacts and also made it possible for me to return to the village later on in search for more information and additional informants. Using key informants to find or receive other informants in this way is called a snowball method (Bryman 2008:184).

The snowball method that I took advantage of also included to ask the key informants for specific requirements of the other informants. In addition to interviewing the key informant in each village, who often was the leader for the VLC or the leader for a farmer group and a farmer himself, I wanted to interview other farmers who were connected to the VLCs. I also wanted to interview farmers who were not members of the VLCs and not utilized it but lived in the villages. In addition, I had a requirement to interview both men and women.

The specific requirements for the informants were set up for different reasons. First of all, I wanted to get a variety in perspectives regarding how knowledge is shared between farmers in the studied villages, including Semin, and what the obstacles for knowledge sharing between farmers are. Leaders of the VLCs, VLC utilizers, non- VLC utilizers but villagers, women and men respectively might have different perceptions when it comes to how knowledge is being shared. These actors might also have different social relations to each other, which is another reason for why I wanted to interview different groups of informants. The aim of the thesis is not only to explore how knowledge sharing is taking place as part of the VLC context, but also to explore how social relations are taking place in general in the villages. I was afraid that the key informants, who often

were leaders, automatically would direct me mainly to other leaders in the villages if I did not emphasize the requirements. I had an anticipation that leaders often know and have good contact with other leaders and therefore would direct me to them. In addition, leaders are often good in communicating and expressing themselves, which according to Bryman (2008:409) can result in that key informants often have good intentions and want to be helpful, but unconsciously might influence the research to become less objective and less wide in perspectives. If I only got in contact with leaders of the VLCs and leaders of farmer groups, I would have got a narrow exploration of how knowledge sharing and social relations is taking place in the context of the five VLCs and Semin village.

The requirements I had for the informants were however not fully reached. Even though I tried to avoid it, the key informants often put me in contact with other leaders or administrators who in addition also were men. This implied that I had to come back to some of the villages later on during the fieldwork to carry out more interviews, particularly with farmers who were utilizing the VLC but were not leaders or administrators, and with farmers that were not utilizing the VLC at all. The reason for that the key informants often directed me to other leaders and administrators was probably because of a miscommunication between me, my interpreter and the key informants. In addition, I had to work hard to meet women to interview. Since very few women seemed to be involved in the administration of the VLCs, I did not get directed to women unless I specifically asked for it.

In total, 21 interviews were carried out with different farmers spread out on six villages. As shown in the two result chapters of this thesis, the range and distribution of interviews gives perspectives on how knowledge sharing and social relations between farmers is taking place in the different villages, which is the aim of the thesis. The range and distribution of 21 interviews into six villages has also given me an insight in how VLCs works in this area of Indonesia. The actual names of the people I interviewed have been anonymized in the thesis by using made up names. Table 1 below shows the number of interviews in each village and the number of informants with different roles in each village.

Table 1

Village	Number of interviews	Variation in interviews
Katongan	5	Leader/administrator: 3 (men) VLC- utilizer: 1 (man) Non- VLC utilizer/regular villager: 1 (woman)
Bleberan	3	Leader/administrator: 1 (man) VLC- utilizer: 2 (1 man, 1 woman) Non- VLC utilizer/regular villager: 0
Nglangeran	4	Leader/administrator: 2 (men) VLC- utilizer: 1 (man) Non- VLC utilizer/regular villager: 1 (man)
Pengkok	3	Leader/administrator: 1 (man) VLC- utilizer: 2 (men) Non- VLC utilizer/regular villager: 0
Pakem	3	Leader/administrator: 2 (men) VLC- utilizer: 1 (man) Non- VKC utilizer/regular villager: 0
Semin (no VLC only farmer group)	3	Leader/administrator: 2 (men) Member of farmer group: 1 (woman) Non- member of farmer group: 0

#### Data collection

I used open-ended interviews, “walking interviews” and focus group discussions to collect my data. Open- ended interviews is an interview form based on active listening, where the informants get the opportunity to freely talk and ascribe meanings to things (Silverman 2014:166). This interview form has been useful for exploring how knowledge sharing and social relations between smallholder farmers is taking place. The choice of using open- ended interviews is based on that the interview form both enables a wide range of information to be revealed, and also enables the informants to talk about knowledge sharing and social relations in their own way. By gaining much information during the interviews, new and unconsidered perspectives or perceptions regarding knowledge sharing and social relations between farmers in the villages was revealed. Follow- up questions were also asked to make the informants develop their perspectives or perceptions. The open- ended interviews were organized so that I, the informant and my interpreter were sitting down, often in someone’s house or in a VLC office, and sharing a snack and tea provided by the informant or the informants family.

The “walking interviews” were less structured than the regular open- ended interviews described above. During the “walking interviews”, I, the informant and the interpreter was walking around the village or their farm, while I was asking questions. These interviews took place because the informants, who are farmers, often wanted to show me the surroundings, the VLC or their agricultural production. They sometimes also introduced me to other people in the village that they know. The “walking interviews” were less structured since I did not follow my prepared question guide to the same extent as during the regular open- ended interviews. They gave me an understanding of how the VLCs works, how farmers live their lives and what is important to them. In addition, I got valuable information on how knowledge is being shared between farmers and how social networks is constructed in the villages. During the “walking interviews”, I also used follow-up questions to further investigate things that the informants said. By doing that, I was able to get information on how knowledge sharing and social relations is taking place in the context of the five VLCs and Semin.

As mentioned earlier, the ICRAF staff and my two Indonesian supervisors were organizing focus group discussions for farmers in some of the villages I visited, as part of the Kanoppi2 project. I got the opportunity to participate in and collect data from these events. A focus group discussion is a form of group interview to collect qualitative data, with the purpose to encourage an informal group discussion among the participants. The role of the focus group facilitator is not to ask all questions to each participant, but to facilitate a discussion among the participants by asking questions that enhance a discussion (Silverman 2014:206). The focus group discussions I collected data from was carried out in the villages of Katongan and Semin. During these events, held by the ICRAF staff and my supervisors, I was given time to ask questions to the participating farmers that they discussed in the group. Since the focus group discussions in Katongan and Semin took place during the first phase of my data collection, the aim of exploring knowledge sharing and social relations had not been fully formulated. As written in the Preface, the investigated topic of the thesis changed during the fieldwork, due to a revealing of other aspects than how farmers perceive the five VLCs as distributors of advice and training in agroforestry, which was the original topic of the thesis. Therefore, I did not ask questions specifically regarding knowledge sharing or social relations. However, I anyway got information which has been useful for the aim of exploring how knowledge sharing and social relations between smallholder farmers is taking place in the context of the five VLCs and Semin. In addition, I got an increased contextual understanding by listening to the focus group discussions and by asking questions to the groups, which was important for me in that early

phase of data collection. I chose to involve in ICRAFs focus group discussions since it seemed like a good opportunity to get many different perspectives to my questions at the same time. I wanted to see if a group discussion could bring forward or enhance opinions and perceptions which otherwise would not have been revealed.

The different interviews and the focus group discussions were recorded with an audio recorder, where I let the interpreter talk in the recorder. The quality of the recordings varies; some are clear while other are blurrier. Many people and voices in the same room or disturbing noise from outside contributed to the blurriness of some recordings. I also took some written notes in the beginning of my fieldwork and data collection. I however quickly realized that it was too difficult to listen to the informants and write at the same time so I ended up only recording. When taking notes, I was for example not able to follow up on important answers to the same extent. Bryman (2008:451) confirms this issue by writing that it is easy to get distracted by concentrating on taking notes.

#### [The role of the interpreter](#)

During my very first interviews and during the focus group discussions, my Indonesian supervisors were translating for me into English. After a few days in the fieldwork I got a new interpreter, Fitria, not employed by ICRAF and who accompanied me for the rest of my fieldwork. She is from Indonesia and helped me a lot, both to translate but also to explain cultural differences and the situations that sometimes occurred as a result of that.

The dimension of having an interpreter in the research has been very interesting and implied both positive and challenging experiences. First of all, it has been necessary for me to have an interpreter since I don't speak any of the languages spoken in the area I visited. Without an interpreter, I would not have been able to carry out the data collection. Secondly, by having an interpreter by my side it was much easier to approach the informants in a smoother way. Since Fitria is Indonesian, and since she is used to communicating with farmers and people living in rural areas, she knew how to approach the informants. For example, she knew how to greet people and how to behave when we visited the informants' homes for carrying out interviews. This was very convenient for me, and made the contact and relation with the informants feel good. Another positive aspect of having a native interpreter was that the communication with the key informants in the villages were made easier. Fitria communicated with the key informants through telephone and agreed on days and time for us to meet.

The challenging part of having an interpreter is related to the actual translation and the information coming from the translation. My interpreter did her best to translate what the farmers said, but due to the big amount of information from the farmers I sometimes experienced that not all of it reached me. In addition, I experienced that Fitria during the interviews sometimes summarized the information given by the informants instead of translating the information directly to me. This was probably done to rationalize and to make it easier, both for her and for me. However, this implied that I did not get the way in which the informants answered my questions, which to some extent decreased my possibility to analyze their answers and to ask follow-up questions.

On the other hand, what Fitria did can also be understood as an incorporation and interpretation of culture and the interview situation. Hennings et al. (1996; in Wallin & Ahlström 2006:724) claim that interpreters should not only simply transfer what informants say, but go beyond that and include the cultural aspects and the situation in order to make a translation that makes sense. Murray and Wynne (2001; in Wallin & Ahlström 2006:724) in addition claim that an interpreter cannot give exact translations of what is said and instead has to decide what should be translated and how. This might be a reason for why my interpreter sometimes chose to summarize what the informants said. Through the summary, she was able to make sense of the informants' answers in combination with the cultural aspects and the situation.

#### Processing of data

After finishing the data collection in the six villages, I started to transcribe the recordings at ICRAFs office in Bogor. I listened to the recordings and wrote it down in text, i.e. my question and then the informant's answer. Transcribing recorded data is useful for getting the information on paper, which makes the management and use of the data easier (Bryman 2008:451). However, transcribing data is time consuming and can be difficult. Difficulties to hear what is said in the recordings, together with e.g. tiredness, may affect the transcriptions (Bryman 2008:455). During my transcriptions, I sometimes had problems to hear what was said in the recordings and sometimes had problems to understand what actually was said. This was because of a sometimes low voice recording, distance to the interpreter or disturbing noises in the recordings. The English level of Fitria was sufficient, but since we used some words in different ways there were occasions where I had some problems in understanding her in the recordings.

During the transcribing process, and after I finished it, I searched for issues regarding knowledge sharing that stood out from the data. Through coding, categorizing themes and giving labels to different interesting parts of the written transcripts (Bryman 2008:542), I was able to identify a commonly occurring issue regarding the topic of knowledge sharing. This issue, social networks, could later on be used as a main theoretical entry point for further analysis.

### Mapping data

As part of writing the two result chapters of the thesis, I created two maps (see Figure 3 page 46 and Figure 4 page 47). The maps are not geographical but compilations and overviews of the results, and present the farmer knowledge sharing and relational patterns in terms of social relations and networks which was revealed during the fieldwork. One of the maps show the results from the villages with VLCs and the other map show the results from the village Semin. The maps, further described and presented in a separate chapter of the thesis, should be understood as a complement to the result chapters. The maps aims to be helpful in answering the first and second research questions, which regards how knowledge is shared between farmers in the studied villages and what role social networks play in the context, and also what the obstacles are for knowledge sharing between farmers in the context. In addition, the maps are further used in the thesis to discuss the third research question regarding how the findings can be useful for the establishment of a VLC in Semin.

### Villages of study

In total, I have visited six villages in Gunung Kidul and Sleman districts, which are situated in Yogyakarta province on the island of Java (Figure 1 and Figure 2 below). The villages are Katongan, Bleberan, Nglangeran, Pengkok, Pakem and Semin. The number of people living in these villages is unknown to me, but the province of Yogyakarta is according to the interpreter and the staff from ICRAF densely populated in relation to its size. In 2015 the population density of Yogyakarta was 1174 inhabitants/km<sup>2</sup> (Statistics Indonesia without date) and the province were estimated to have about three and a half million inhabitants in 2015 (Statistics Indonesia 2014-02-18). The area of the province is about 3133 km<sup>2</sup>, which is the same size as the Swedish island Gotland.

The six villages are characterized by different small-scale farming and forestry, both for household consumption and for selling. Rice, soybean and corn, different trees like teak and acacia for timber, fruit trees and roots or tubers is common to grow. Running a smaller store or café, called a *warung*, or carrying out other livelihood activities like working for others is also common in the villages. As farming and forestry seems to be the main occupation for people living in the villages, all people that I interviewed were smallholder farmers in different ways.

The VLCs in five of the villages are to a high extent influenced of what is traditionally grown or produced in the villages. In addition to the crops and trees mentioned above, bamboo is traditionally grown in the villages Pengkok and Pakem, while cacao traditionally is grown in Nglangeran. Livestock is an important livelihood in the village Bleberan. Due to local variations in what is grown or produced and different contexts, the VLCs focus on different things. The VLCs are arenas where farmers can discuss and get training, advice and practice in the knowledge specific for their village or geographical area. The different focus of the five VLCs ranges from agriculture, seedling, livestock management and organic fertilizers, to agroforestry, cacao production and processing and bamboo cultivation in terms of seedling, preservation and processing. In addition, bee domestication and post- harvest handling of bee products like honey, propolis and pollen is the focus of one of the VLCs. For the village Katongan, bee keeping has traditionally not been a common livelihood, but an enthusiastic villager who had discovered the advantages of keeping bees for honey and other products wanted to develop and spread his livelihood activity in the village. His passion was implemented in the local VLC.

The village Semin, which is the only village without a VLC, is traditionally growing bamboo for different purposes and the villagers are producing bamboo handicraft. The village has a local farmer group called the bamboo group, which exists for organizing the village bamboo handicraft production and environmental conservation through bamboo. As mentioned earlier in the thesis, ICRAF plans to establish a VLC in Semin.

A more detailed table of all villages and the VLCs can be found in the appendix (Table 2 in appendix).



Figure 1: Map of Indonesia. Map data (Google 2018).

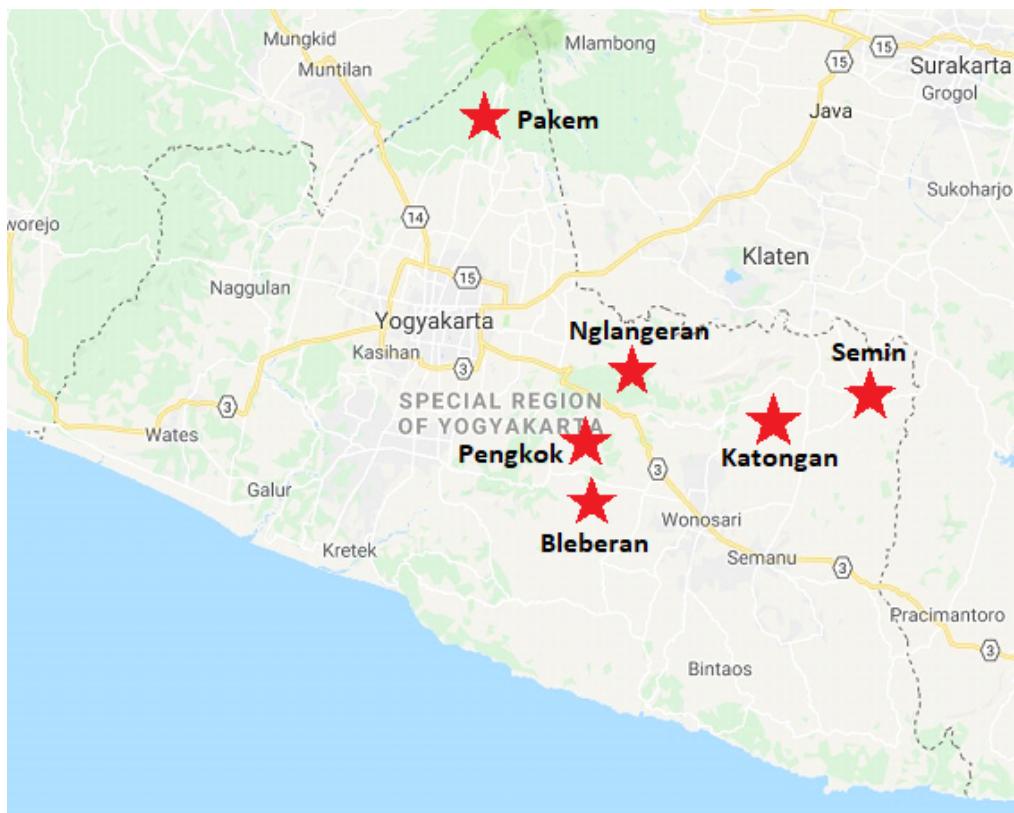


Figure 2: Map of Yogyakarta province. Map data (Google 2018).

## Knowledge sharing and social networks in the context of the VLCs

The following section presents how knowledge is shared between smallholder farmers within the villages that have a VLC. For some cases described below, the knowledge being shared between farmers originates from their VLCs. In other cases, the shared knowledge is based on farmers own experience or gained from somebody else, who in turn have gained the knowledge in the same way. The knowledge being shared concerns different topics, both agricultural practices but to some extent also other topics. I have chosen to include other topics of knowledge from the data collection into the results as they, by their way of being shared, contributes to answering the first research question; How is knowledge shared between smallholder farmers in the studied villages, and what is the role of social networks in this context?. The chapter discusses the role of social networks for the sharing of knowledge, and in addition discusses obstacles for knowledge sharing between farmers in the villages with VLCs. By doing that the chapter contributes to answering he second research question; What are the obstacles for knowledge sharing between smallholder farmers in this context? Not all villages with a VLC will be represented for all issues and headlines below.

### Village farmer groups

During the interviews, the informants often told me that they were members of local village farmer groups in their villages. The village farmer groups usually seem to operate parallel to the VLCs and are often established in the villages long before the VLCs. The farmer groups consist of farmers who have chosen to organize into groups or communities to improve and bring benefits to their agricultural and silvicultural production or skills. The groups have regular meetings and seem to consist mostly of men. There however seems to exist mixed farmer groups in some of the villages but with separate branches for men and women and their production. In some of the villages there also seems to be farmer groups only for women. Membership is often required for being part of the groups. The role of the farmer groups is to facilitate discussion and sharing of experiences and knowledge among the members, and to enable actions for improved income and livelihood among the members, e.g. collaboration for common production.

From a perspective of social networks, the farmer groups can be seen as clear examples of socio-centric networks. The farmers often need to be members in order to utilize and join the groups, which implies that the farmer groups are closed groups with defined boundaries. In addition, the members of the groups are formally linked to each other since their names are on the same member

list. As mentioned in the theory section, these characteristics are typical for socio-centric networks (Hawe et al. 2004:972). Additionally, not only membership but also gender seems to define the boundaries of the groups. Even though there are mixed farmer groups in some of the villages, men and women are always separated in different groups. For the mixed farmer groups, men and women have separate subgroups with only men and only women respectively.

Village farmer groups are also arenas for knowledge sharing between farmers in the villages. As mentioned above, the farmer groups facilitate discussion and sharing of knowledge and experiences among the members. When I carried out the interviews, many informants told me that they were able to learn things from the other farmers in the group. From the perspective of social networks as groups or constellations, farmer groups can be understood as social networks where social processes are taking place due to the social relations in the groups (Kadushin 2012:28). In each farmer group, the members stand in relation to the other members and their social relations are manifested through their communication. The communication is a prerequisite for social processes and discussion, which in turn enables the sharing of knowledge between the members.

In Bleberan village, a women farmer group exists in parallel to the regular village farmer group. This women farmer group not only has internal knowledge sharing among the members, but also seems to share some knowledge to villagers outside of the group, and even to people outside of Bleberan village. Mrs. Susil, a member of the women farmer group, told me that villagers in Bleberan who are not members of the group, and from other farmer groups, sometimes come to her and her group for advice. The advice concerns how the Bleberan women farmer group carry out their production of vegetables and processed food (Mrs. Susil 2018-02-13).

Knowledge is not only shared to villagers outside of the women farmer group, and to farmer groups outside of Bleberan, but is also received by the Bleberan women farmer group. Mrs. Susil told me that her group once collaborated with another farmer group from another village, and that the other group taught her group how to make cornflakes (Mrs. Susil 2018-02-13). In other words, knowledge is exchanged between the two farmer groups and shared mutually between the groups. The collaboration is an example of when social networks merge into each other in a condition of multiplexity, as mentioned and explained with help of Kadushin (2012) in the theoretical entry points of the thesis. For this example, multiplexity is used to describe the physical merging of the two women farmer groups in terms of their meetings and collaboration.

Multiplexity can also be seen in Pengkok village, however from another perspective than in Bleberan. In Pengkok village there are three different farmer groups; one particularly for goat keeping, one for cow keeping and one regular farmer group, which do not have one specific orientation. The three groups collaborate a lot and most members are not only members of one group but of all three groups. This implies that the villagers who are members of all groups will learn from all groups, and in turn share their knowledge and information to the members of the other farmer groups (Mr. Santoso 2018-02-16). The membership in the different groups and the members sharing of knowledge between the groups create a condition of multiplexity, where the groups and their social networks, merge into each other. In relation to Bleberan and the condition of a physical multiplexity between the two women farmer groups, the three farmer groups in Pengkok merge into each other more spatially. Since most members of the farmer groups also are members of the other groups, the groups have a connection to each other and their members overlap to some extent. The members with several memberships are the reason for why the three farmer groups, the social networks, merge into each other. The knowledge being shared between the groups through the members also contribute to the spatial condition of multiplexity.

### Social arrangements and gatherings

Apart from being members of the village farmer groups, farmers participate in other formal and informal social arrangements and gatherings described below. These arrangements and gatherings are more or less important arenas for knowledge sharing between the farmers in the villages.

Many meetings are taking place in the villages. Except meetings for the members of the village farmer groups, there are meetings for members of the sub-village farmer groups. In each village there are sub-villages which has sub-village farmer groups. The purpose of the sub-village farmer groups is to facilitate discussion and sharing of knowledge and experience regarding livelihood strategies, like agriculture and silviculture. Therefore, the sub-village farmer groups, as the village farmer groups, can be understood as social networks. The groups are social systems with actors who stand in relation to each other and where social processes are taking place (Kadushin 2012).

In addition, there are meetings for all villagers living in one sub-village. At those meetings, the administrator of the sub-village informs and discusses with the inhabitants. There are also meetings for people who have some sort of position in the village. For example, it can be the leaders of the different sub-villages who meet, or it can be meetings for religious leaders in the village. Meetings

also occur for members of e.g. the local mosque, local church etc. All the villages I visited seem to have a structure of meetings similar to the above. The manager of Bleberan VLC says that is it quite common that agriculture and silviculture are discussed in many of these meetings (Mr. Agung 2018-02-13). Since most of the villagers are farmers, the participating villagers also talk to each other about their experiences in farming and share some knowledge, also in meetings with other purposes.

There are also other arranged occasions when farmers meet and interact, for example during collaboration in the field. A female farmer in Bleberan village told me that she collaborates with women from other sub-villages in order to more effectively manage the fields. This farmer working system, which according to her is only used by women, works as following: Three women have fields for farming. On the first day the three women work together on one of the women's fields. On the second day they work together on the second woman's fields, and on the third day they work together on the third woman's fields. During the work and in the break, they talk to each other about different things and share their experiences in farming. The working system and the other women are important for the women's production on the field (Mrs. Susil 2018-02-13).

The women's organization described above can be analyzed from the perspective of individuals' social networks and the concept of social capital. As mentioned in the theory section of the thesis, all people have their own social networks surrounding them, which is called the ego-centric network. Your ego-centric network constitutes of people you know or to some extent are familiar with (Hawe et al. 2004:972). For Mrs. Susil, the female farmer in Bleberan, the two other women that she collaborates with are part of her ego- centric network. She is also part of their ego-centric networks. The women's ego- centric networks are also related to their social capital. As mentioned in the theory section, the personal social network can be beneficial for an individual if the individual takes advantage of the human resources available in his or her network. An individual has social capital if he or she has access to other resources through the people in his or her personal social network (Kadushin 2012:6). In the case of the collaborating women, the fact that they take benefit from each other as labor and as sources of knowledge and experiences in farming implies that they have access to other resources through their personal social networks. This in turn implies that they have a certain amount of social capital.

Also during the Muslim celebration of *Eid Al Fitr*, at the end of *Ramadan*, people from different sub-villages meet. In Katongan village, a big prayer is organized in a sub-village and people from different religions are collaborating and helping to organize the event. It seems that people participate not only to help and pray but also to talk and interact with each other. Two women living in Katongan confirmed that discussion and sharing of experiences is taking place when people from different sub-villages and villages meet:

*“There are many issues that are interesting when we meet people from outside of this village. It is a little far away from here, so we rarely meet. But when we meet we have much information and experiences to share”*

(Mrs. Elok & Mrs. Endah 2018-02-14).

The women also emphasized the importance of sharing knowledge with each other:

*“It’s about feedback. If my neighbor has new information, he or she will tell me... We want to share our information, because if we can do something but someone else cannot it’s not fair. There is no benefit for them who don’t know”* (Mrs. Elok & Mrs. Endah 2018-02-15)

Finally, informants mentioned that villagers spontaneously hang out and talk in the evenings under more informal and unorganized forms. For example, in Nglangeran a villager told me that it is very common that people meet in the evening for talking and drinking coffee. Since many villagers in Nglangeran are cacao farmers, sharing of information and experiences on cacao is quite common at those times he said (Mr. Muhammad 2018-02-19).

### **Knowledge sharing between generations**

Knowledge, practices and experiences related to different livelihood strategies are sometimes shared from parents to their children. In Katongan, one of the VLC leaders told me that his children help him with his honey colonies and that his experience is shared to his children through that. He said that he wants his children to carry out bee keeping and honey production when they grow up (Mr. Kabul 2018-02-14). At the same time, two women in the same village said that no children today become farmers. The young people work in other sites or go to study, but they don’t work in the fields (Mrs. Elok & Mrs. Endah 2018-02-14). Whether this is the case or not in the villages I visited is unknown to me. The opinion by the women however corresponds to the general trend in

many less industrialized countries, where young people in rural areas abandon small-scale farming as their main source of livelihood or employment (White 2012).

### Role models

Role models seems to be a source of inspiration for knowledge sharing among farmers, and to some extent seems to contribute to the sharing of knowledge. Mr. Suprapto, a farmer who utilizes the Bleberan VLC, says that he tries to help others in the village by sharing the information and knowledge that he gets from the VLC. He says that he is inspired by the manager of the center, Mr. Agung, who does a lot for the village and the people living there. According to Mr. Suprapto, the manager is like a bridge between governmental institutions and the villagers. Mr. Agung transfers knowledge from district, province and governmental level to the utilizers through the VLC. Mr. Suprapto also wants to be a manager of the center and a so-called voluntary extension agent like Mr. Agung, but says that it's difficult because he doesn't have enough knowledge and skills. A voluntary extension agent is someone who is nominated and supported by the government because of his or her voluntarily knowledge transfer to others. However, Mr. Suprapto says that he tries to help other farmers in the village in his own way and as good as he can, by sharing the information and knowledge that he gets from the VLC:

*"I only do what I can to improve the other farmers lives. The little small things, but I always try to make it better and better. For direct improvements it is difficult to see results, but for the long term it's possible to see improvements"* (Mr. Suprapto 2018-02-13).

### Obstacles for knowledge sharing

Different aspects seem to influence and hinder knowledge sharing between farmers in the VLC villages. These aspects often seem to be linked to how the activity and operation of the VLCs and other educational institutions such as the government and NGOs, are conducted. The obstacles for knowledge sharing between smallholder farmers is, from what was revealed during the fieldwork, based on problems in the knowledge sharing from VLCs and other educational institutions to farmers. Other aspects that influence and hinder knowledge sharing between farmers in the VLC villages is based on how the farmers experience their own capacity.

In some villages, villagers have got training from the government. I talked to two women who had participated in training from the government. They said that they try to share the information they gained there to others in the village. However, they said that the information from the government sometimes is a bit difficult to share. They have troubles in remembering everything that is said to them during the training (Mrs. Elok & Mrs. Endah 2018-02-14). This also seems to be the case for farmers who have been to training at the VLCs. Age is sometimes said to be the reason for the low remembering.

According to the women, people in their village try to share the knowledge and information they have got from educational institutions like VLCs or the government. This is however problematic, the women say, since people themselves do not always understand the information they have got. This in turn influences their knowledge sharing to other farmers, and makes it difficult for other farmers to understand the knowledge these people try to share. Whether it is easy to understand the information and knowledge coming from a farmer is according to the two women dependent on where the knowledge comes from. I am not exactly sure what the women refer to here, but it could be the case that some sources of knowledge are more efficient in making farmers understand the knowledge, which in turn makes it easier for them to explain the knowledge to other farmers in an understandable way. Some educational institutions might be better than others in sharing knowledge and information in a way that farmers will understand. The women also say that whether it is easy to understand the information and knowledge coming from a farmer is dependent on if the farmer just tries to transfer as much of the information as he or she can remember, or if the person actually understands the knowledge (Mrs. Elok & Mrs. Endah 2018-02-14).

In terms of the activity and operation of the VLCs, it is not common that the VLC utilizers get information or training on how to share their gained knowledge to others. In Pakem, an informant involved in the operational work of the VLC said that there is no training on how to share the knowledge to other villagers. He said that the training at the center is only focused on techniques for different bamboo products and how to take care of the bamboo (Mr. Dumadi 2018-02-20). Also in Nglangeran, a VLC utilizer told me that information about how to share the knowledge from the VLC is only available for leaders and not for utilizers (Mr. Muhammad 2018-02-19).

In addition, not all farmers have access to what the VLCs have to offer. This in turn might influence and decrease the knowledge sharing between farmers. An example of this is Katongan VLC, where

female farmers appears to have low access to the center and low access to information sharing activities and training for women. As I understood it, no women are members of Katongan VLC but it is unclear whether women are allowed or not to be members (Mrs. Elok & Mrs. Endah 208-02-14). For example, during the focus group discussion in Katongan, it was revealed that many women did not domesticate Trigona bees since they were afraid of the sting of the bee. However, the Trigona bee is a stingless bee, but nobody had told the women that. The social exclusion of women from the Katongan VLC and from the Trigona bee domestication means that women to a lower extent than men have access to this type of knowledge. The social exclusion might particularly influence the knowledge sharing on bee domestication to women, since women seem to talk and interact more with other women than with men. During the focus groups and during my entire fieldwork, I could see that women often socialize with other women and gather in groups of women.

Lacking confidence seems to influence knowledge sharing between farmers. Especially women farmers, as compared to men, seem to have lower confidence in sharing the knowledge gained at the VLCs to others in their villages. A female farmer utilizer of Bleberan VLC says that she really wants to share her knowledge but that she doesn't have the confidence;

*"the knowledge is only in my mind but it cannot come out"* (Mrs. Susil 2018-02-13).

On the other hand, a male farmer utilizer of Pakem VLC told me that he thinks that he can teach others. He feels that he has enough skills and experience to do that (Mr. Putra 2018-02-20).

At the same time, confidence also seems to be an issue in another way. In Pakem, an informant told me that his neighbors sometimes have too low confidence to fully listen to him when he tries to tell them about bamboo handicraft production. He said that his neighbors don't think that they will be able to produce the handicraft and therefore do not listen fully to his information (Mr. Putra 2018-02-20). Motivation is also a hinder for knowledge sharing, and can be related to lacking confidence. A man who is part of the bamboo preservation group at Pengkok VLC says that his neighbors don't want to know about the bamboo preservation. Since he has got training from the VLC he tries to share his knowledge with the neighbors, but the response from the neighbors is negative. According to him, they lack motivation to learn how to carry out bamboo preservation (Mr. Ajij 2018-02-15). Confidence and motivation can go hand in hand. Without confidence you might not be motivated.

However, there can also be other reasons for why Mr. Ajij's neighbors lack motivation in bamboo preservation. Low confidence does not have to be the only reason.

Age and how the farmers experience their capacity sometimes seems to influence knowledge sharing within the household. One example of this was seen in Pakem, where the VLC teaches men and women within the same household to produce different bamboo products. The men learn to produce bigger items, like furniture, while the women learn to produce smaller more detailed items. Within the household, the production of the different products is to some extent combined, so that the men also produce "women" products and the women produce "men" products. I interviewed an older couple who had participated in the training from the VLC, and they said that they try to share their knowledge to each other and try to teach each other how to produce their "men" and "women" products. However, they said, their age is a hinder for knowledge sharing within the household. Since they are old, they say, they have more problems in absorbing the knowledge from one another.

I asked the couple if they thought it would be better if there were mixed groups where both men and women could learn how to make both products, both the bigger and the smaller products. Both said that they preferred separated groups, men for men and women for women. The reason they say, is that men and women have different ways to think and different focus (Mr. Putra 2018-02-20).

## Knowledge sharing and social networks in the context of Semin

The following section presents and increases the understanding of how knowledge is shared between smallholder farmers in the context of the village Semin. Since Semin does not have a VLC, the shared knowledge is based on other sources like farmers' own experience or governmental training programs. In addition, the section discusses the role of social networks for knowledge sharing and examines some of the obstacles for knowledge sharing.

### Bamboo group

As in many other villages, Semin has a village farmer group. A branch of the village farmer group is called the bamboo group, which among other things focuses on environmental conservation through bamboo and bamboo handicraft. The bamboo group facilitates discussion and the sharing of knowledge and experience among farmers. The group also offers some training in bamboo conservation and handicraft. The group has contact with ICRAF and together they plan to develop the operation and activity of the bamboo group into a VLC in the village, with the focus on bamboo conservation and bamboo handicraft. A VLC in Semin is not only demanded from the farmers of the bamboo group, but also from farmers in surrounding villages and farmers in other districts, who want a more organized and official place for gaining knowledge in bamboo conservation and handicraft (Mr. Ismaya 2018-02-10).

In parallel to the bamboo group, there is a bamboo group for women. The group works in a similar way as the male bamboo group and has training within bamboo handicraft. From my interviews and from a focus group discussion in Semin I got different information regarding gender and the production of bamboo handicraft. From the focus group discussion, I got the information that mainly women were producing bamboo handicraft, while I got the information from one of the interviews that it is mainly men. It is unclear whether women or men in Semin are the main producers of the handicraft, or if they both are big producers.

According to the leader of the bamboo group, Mr. Ismaya, farmers from other villages come to Semin to get advice and information regarding bamboo from him and the group. Knowledge sharing is then taking place, however mostly from one actor to another; Mr. Ismaya and the bamboo group are sharing their knowledge in bamboo conservation and handicraft to the farmers coming there. Whether the bamboo group also gets some knowledge or not from the meeting and

communication is unclear to me. At the same time, a neighboring village to Semin are not interested in bamboo conservation or bamboo handicraft at all. The village do not grow or manage bamboo and don't have knowledge in it. According to Mr. Ismaya, the reason for the weak interest in bamboo is the low awareness among the farmers about the benefits of bamboo. The low interest probably implies that very little knowledge sharing regarding bamboo is taking place between the neighboring village and the bamboo group in Semin.

### Households and villagers

I met with a woman who is a bamboo handicraft producer in Semin. The woman and her family are producing different kinds of bamboo handicraft products and are one of the biggest household producers in the area. The woman told me that villagers and also people from outside the village come to her, both to help and to get information about the products. Sometimes villagers come to her house, where the family has their production, to help her with the handicraft. This is particularly when she has big orders and have to produce many products. The helping villager will then be put to clean up or similar things. According to the women, the work is like a practice for the villager (Mrs. Utama 2018-02-16). The practice can also be seen as a type of knowledge sharing, since knowledge is shared to the villager in a more hands-on way.

Knowledge sharing is also taking place when people from outside of Semin are coming to the woman for information and learning on bamboo handicraft. The knowledge sharing is more concrete at those times. The visitors come from other provinces, districts, cities or even islands and can be non-farmers, bamboo interested farmers, students etc. The visitors who come to learn about the local bamboo handicraft first meets up with the leader of the bamboo group, Mr. Ismaya, who sends the visitors to the woman and her household. In their house, the visitors get practical training on how to produce handicraft from the woman's husband (Mrs. Utama 2018-02-16).

Whether the training on how to produce bamboo handicraft is for free or not is unknown to me. However, when in the house, the visitors have the opportunity to buy some of the woman's handicraft products. The woman also welcomes large-scale traders of bamboo handicraft who are interested in buying her handicraft (Mrs. Utama 2018-02-16). This welcoming and learning approach that the woman has for her house and production might enhance her ability to sell products to visitors and traders. I thus do not know to what extent her products are sold.

In addition, the woman said that visitors help her to create a market. She imitated a visitor that had been to her house, and how that person can recommend her handicraft to others:

*“If my friend asks me “where can I buy bamboo handicraft”, I can say “in Mrs. Utama’s house in Semin””* (Mrs. Utama 2018-02-16).

Selling products to visitors and being able to create a market through them can be understood as the family utilizing their social capital. As mentioned in the theory chapter of the thesis, to have social capital implies to take advantage of the human resources available in your social network and get beneficial outcomes from it (Kadushin 2012:6). In this case, the visitors constitute the family’s social capital since they contribute to the family’s income.

### Knowledge sharing between generations

Like for the other villages I visited during my fieldwork, knowledge sharing between generations is also common in Semin. Farmers who produce bamboo handicraft share their knowledge to their children, so that the children also will be able to produce the handicraft when they grow up. The techniques for doing handicraft are old but still used today. According to the participants of the focus group discussion, there are no improvements or development of the techniques. This is however wished for by the handicraft producers and to some extent they also want to increase their different kinds of handicraft.

### Obstacles for knowledge sharing

Not only single farmers come to Semin and the bamboo group to get information on conservation through bamboo and bamboo handicraft. Big groups also come to Semin to learn about these things. However, the big groups do not fit in the bamboo group’s meeting house, which also is Mr. Ismaya’s private house, nor in the bamboo field sites. Nor do the groups have anywhere to stay when they are in Semin. The knowledge sharing from the bamboo group to these bigger groups are troublesome and problematic due to the lacking facilities (Mr. Ismaya 2018-02-10). The bamboo group also lacks more people that have the right knowledge in bamboo and that can work with the bigger groups. Sharing of knowledge to these big groups would be easier if there were more staff with the right knowledge available for the bamboo group (Focus group discussion in Semin 2018-02-12).

Another obstacle for knowledge sharing between farmers is related to the bamboo group and its members. The sub-village of Semin where the bamboo group is located consists of 130 households of which about 60 are producing bamboo handicraft. However, only 10-15 farmers are members of the bamboo group. The reason for the low interest in the group and the small number of members is, according to the leader Mr. Ismaya, the bad organization and coordination within the group. In addition, he thinks that the insufficient support from the government plays a role. Mr. Ismaya said that the bamboo group needs more control within the group to coordinate themselves better. He also said that the group needs support from outside, from the government, to organize themselves. From a perspective of knowledge sharing, bad coordination within the group and low support from the government might influence the members' ability and motivation to share knowledge with each other. If the organization and coordination within the group is bad, or if the support from the government is low, meetings or opportunities for sharing of knowledge or experiences might get lost.

## Relational maps on knowledge sharing

The following two pages present two figures (Figure 3 and Figure 4). The figures are compilations and overviews of the results presented in the previous two chapters and takes the shape of two relational maps, one for the villages with VLCs and one for the village Semin. The maps are not geographical but relational and partly show how knowledge is shared between smallholder farmers in the different villages and also how social relations and networks are part of the villages and contributes to the knowledge sharing. The maps also show the obstacles for knowledge sharing between smallholder farmers in the villages.

The purpose of constructing the two maps is also to easily be able to compare the results from the villages with VLCs with the results from the village Semin, in order to enhance a discussion on the third research question regarding how the findings can be useful for the establishment of a VLC in Semin. By comparing the results on knowledge sharing between farmers, social networks and obstacles for knowledge sharing in the villages, it is possible to get “lessons learned” and helpful experiences which might be useful for the establishment of a VLC in Semin from a perspective of farmer knowledge sharing. Such a comparison and discussion takes place in the next chapter.

Figure 3

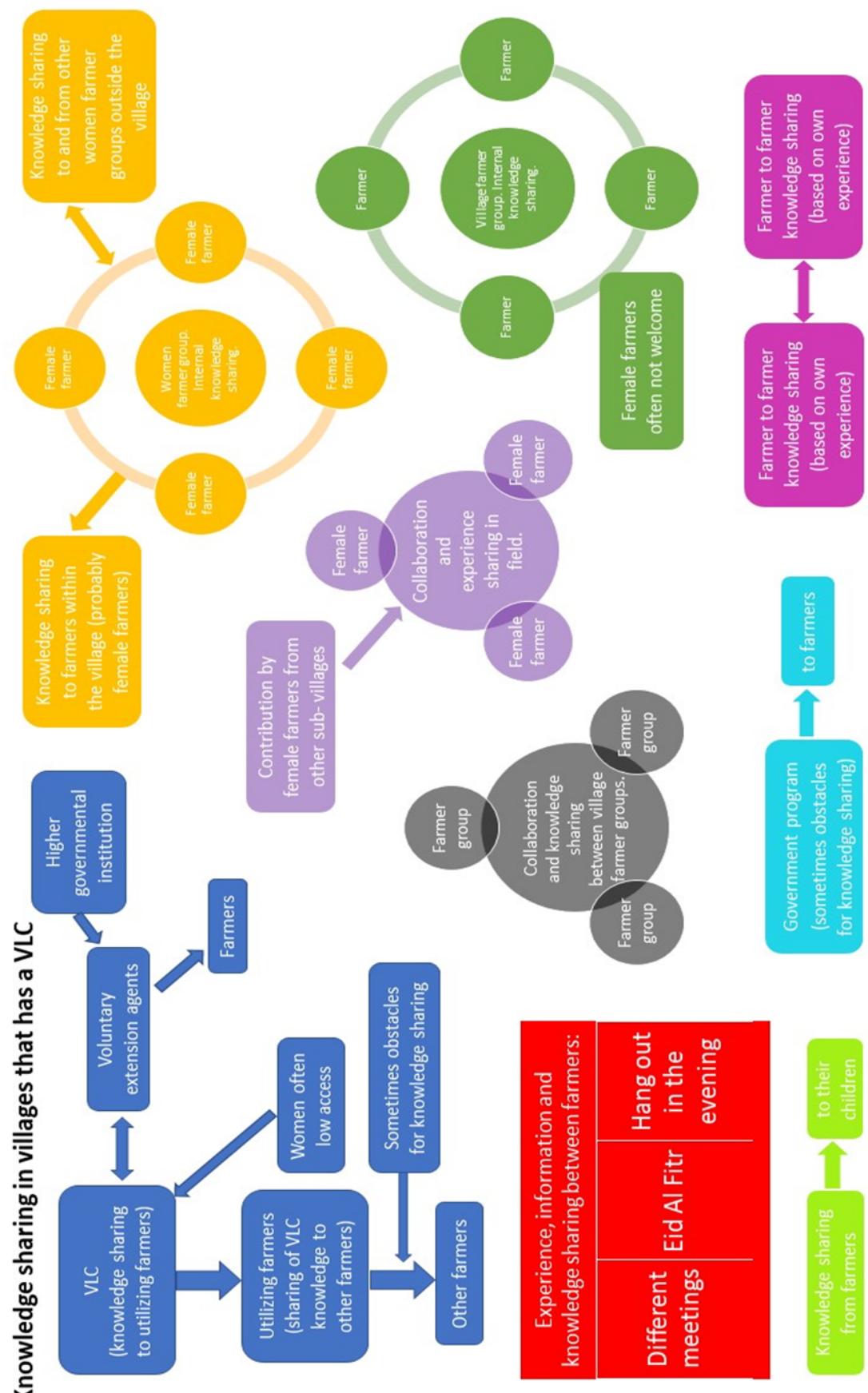
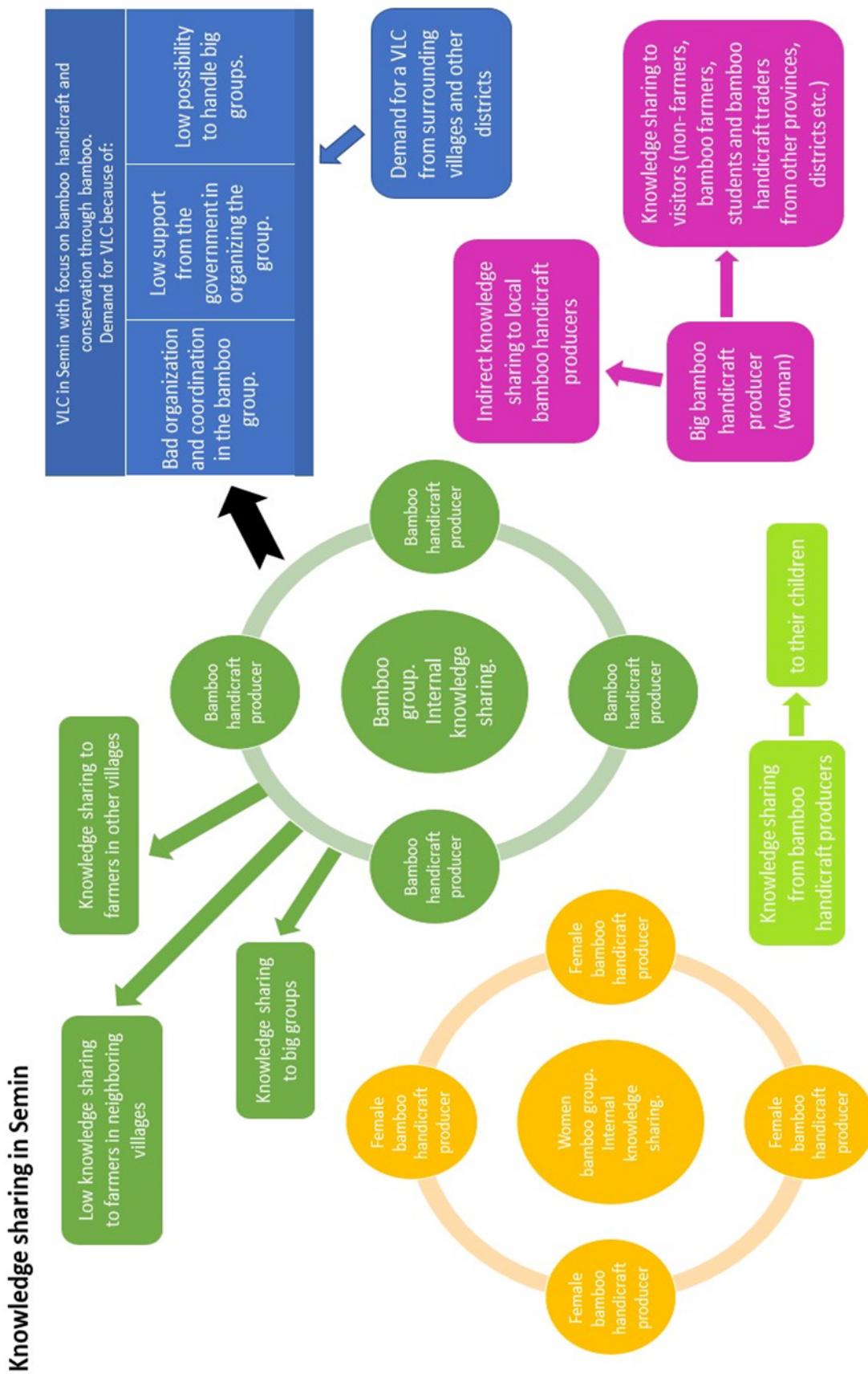


Figure 4



## Discussion

As mentioned just before the relational maps, this chapter is a discussion with the purpose to compare the maps and the findings in order to get “lessons learned” and helpful experiences from the villages, which might come in handy for the establishment of a VLC in the village Semin. The discussion takes off from the third research question regarding how the findings on knowledge sharing between farmers, social networks and obstacles for knowledge sharing in the different villages can be useful for the establishment of a VLC in Semin. I focus on the two most interesting aspects of the findings and the maps, which are brought up and discussed in this chapter. The aspects regard knowledge sharing within village farmer groups and knowledge sharing within and in relation to women farmer groups.

The importance of considering knowledge sharing between farmers in the establishment of a VLC in Semin is based on the current extension discourse in literature and the call for a more pluralistic extension approach. As examined earlier in the thesis, “traditional” extension often fails to include the different interests and actors present in rural areas. It fails to include and acknowledge the variety of activities that farmers carry out for their livelihoods (Christoplos 1997). The sharing of knowledge with other people, through social relations and social networks, contributes to knowledge creation among farmers and is one of farmers many livelihood strategies (Isaac et al. 2007). This is shown in the findings and especially in the villages that have a VLC, e.g. through the village farmer groups and social arrangements and gatherings in the villages. If social relations and social networks are considered in the establishment of a VLC in Semin, the VLC would get a more pluralistic approach of extension compared to the more “traditional” extension where aspects such as knowledge sharing might not be taken into account. In conformity with the already established VLCs in the other villages, the VLC in Semin would get the approach and structure of a *Farmer Field School*. As mentioned earlier, Farmer Field Schools are to a higher extent able to include different aspects of farmers’ lives and livelihoods through participatory processes for knowledge creation and increased capabilities among farmers (Aker 2011:633).

### Knowledge sharing within village farmer groups

From the maps (Figure 3 and Figure 4) and the findings it is possible to distinguish the importance of village farmer groups for knowledge sharing between farmers, particularly for those farmers who are members of the farmer groups, and live in the villages that have a VLC. This can be compared

to the situation in Semin, where the local bamboo group have troubles in organizing and coordinating itself, which might imply that the members of the group to some extent cannot or do not want to share their knowledge with each other. Improved organization and coordination within the group, together with increased support from the government, could be helpful for increasing the internal knowledge sharing between the members. Increased knowledge sharing within the bamboo group can hopefully contribute to the members' livelihoods and living standard, since the members might get access to more or different knowledge that they can take advantage of. This is related to what Ellis (2000) writes about in his book on livelihoods and diversification. The author writes that access to knowledge and information from other people, though social relations and social networks, is important for peoples' livelihoods. In addition, the author emphasizes the importance of social relations and social networks for the diversity of peoples' livelihood strategies (Ellis 2000).

In the change for a more organized and coordinated bamboo group, ICRAF could play a role. As already mentioned, ICRAF and the bamboo group want to collaborate for developing the bamboo group, its activities and operation into an official and more organized VLC. This might imply that ICRAF assists with knowledge or training regarding e.g. how to organize a group in a good and efficient way and how to carry out a good leadership that support and maintain the organization. The support from ICRAF could then be a substitute or complement to the lacking support from the government regarding this.

In addition, the facilitation by ICRAF might contribute to that more villagers of Semin become members of the VLC. The reason for the currently low number of members in the bamboo group is, as mentioned earlier, that villagers find the bamboo group too unorganized and uncoordinated. If the organization and coordination in the group improved, more villagers might want to become members in the established VLC. What impact this might have on the bamboo handicraft production in Semin, or on villagers' livelihoods or living standard, is difficult to say. More empirical research is needed to further investigate the interest among the villagers to involve and become members in an improved VLC. More empirical research is also needed to investigate the potential results of such involvement.

### Knowledge sharing within and in relation to women farmer groups

The knowledge sharing taking place within and in relation to the different women farmer groups could be considered in the establishment of a VLC in Semin. In the villages that have a VLC, the women farmer group work as an arena for internal knowledge sharing among the members and sometimes also as a source of knowledge for people in the same village and for other women farmer groups in other villages. These social relations within and in relation to the women farmer groups are mainly built up by women- to- women communication, where the knowledge is being shared more or less exclusively between women. A study by Martini et al. (2017) show that female farmers in a region on the island of Sulawesi, Indonesia, are reluctant to engage in activities where they get information and knowledge on agroforestry from men, e.g. in different types of extension. In addition, female farmers to a lower extent seek information on agroforestry innovations from other farmers, since knowledgeable farmers within the field of agroforestry often are men, which women are reluctant to engage with (Martini et al. 2017). This implies that women, at least in the case of the Sulawesi region, probably prefer to engage in activities where they can get information and knowledge from other women. Whether this is the case or not for the villages I visited for my fieldwork is unknown to me. However, my findings show that knowledge is being shared between women farmer groups, which implies that women maybe prefer other women as sources of knowledge before men, and that women farmer groups are important for women's knowledge sharing. In the establishment of a VLC in Semin, the role and importance of the women bamboo group therefore might need to be considered in order for the VLC to share knowledge not only to men, but also to women in Semin and surrounding villages. The VLC could in different ways include women and topics related to women's tasks in the operation. A merger or collaboration of the women bamboo group and the 'main' bamboo group in Semin could constitute the base for such VLC development.

In addition, the women bamboo group and the 'main' bamboo group are focused on different products in the bamboo handicraft production. With an inclusion of the women bamboo group and their specific bamboo handicraft products in the development and operation of the VLC, the usefulness of the center might increase for women living in Semin and other villages. The usefulness of the center might also be higher compared to the usefulness of other VLCs for women in other villages. Katongan VLC is such an example, where women are not members nor involved in the VLC and therefore do not have knowledge in Trigona bee keeping.

As also mentioned, there are single villagers who sometimes come to the women farmer groups in the VLC villages to get information and knowledge from the groups. However, whether these villagers are women or not is not clear from my fieldwork, but the possibility that they are women is high. This is because the findings show that the women farmer groups tend to have a different focus than the ‘main’ farmer groups in the villages. For example, the women farmer group in Bleberan is focusing on the production of vegetables and processed food, while the ‘main’ village farmer group in the same village among other things have a livestock management-, fertilizer- and feed approach. The different village farmer groups, both the ones for women and the ones for men, are probably discussing topics and production that is relevant for their members, i.e. men and women respectively. In addition, as mentioned earlier, women might prefer to get information and knowledge from other women before men. The inclusion of the women bamboo group in the development and establishment of the Semin VLC could therefore be relevant, since it might contribute and ease knowledge sharing from the VLC to women living in Semin village.

Finally, to conclude the discussion regarding inclusion of the women bamboo group in the development and establishment of a VLC in Semin, a parallel to the study by Martini et al. (2017) can be drawn. The study shows that women in a region of Sulawesi prefers NGOs and extension institutions that consider gender equity issues. The authors claim that women’s willingness and interest to participate in information activities increases if this is the case. For the establishment of a VLC in Semin, this issue might be taken into consideration.

### For further investigation

As seen, this chapter emphasizes and discusses two aspects of knowledge sharing which could be useful for the establishment of a VLC in Semin. The thesis and the relational maps (Figure 3 and Figure 4) can however be useful for identifying other aspects of knowledge sharing and social networks that might be of importance for the establishment. The role of voluntary extension agents or role models can, for example, be further discussed and maybe also useful in the establishment.

## Summary and conclusion

This study is an exploration of knowledge sharing between smallholder farmers in a context of five VLCs and in a village without a VLC. The study uses the theoretical field of social networks to analyze the findings and fulfill the aim of the thesis, which is to explore how knowledge sharing and social relations between smallholder farmers is taking place in the villages. The theoretical field of social networks distinguishes between groups as social networks and individuals' social networks. Groups as social networks implies relations and social processes between actors in a group. Individuals' social networks refers to the social network that surrounds an individual, consisting of people that in different ways are connected to the individual. This thesis finds that both types of social networks are important and play a role for knowledge sharing between farmers in the six villages of Yogyakarta, Indonesia. The findings of the thesis are summarized below, structured by the research questions and by the distinction of social networks as groups and as individuals' social networks.

Through my empirical material I have been able to answer the first research question, which regards how knowledge is shared between farmers in the villages and what role social networks has in the context. The findings show that village farmer groups, sub-village farmer groups and women farmer groups in the villages that have a VLC, are social networks where knowledge is shared internally between the members. This is also the case for the bamboo group and the women bamboo group in Semin. Social relations and the process of communication contributes to the knowledge sharing between the farmer group members. In addition, the women farmer group in Bleberan is sharing its knowledge to other farmers in the village and to another women farmer group outside of Bleberan. The bamboo group in Semin shares its knowledge to farmers and groups outside of Semin. Finally, three village farmer groups, which all are located in the same village collaborate with each other, resulting in knowledge sharing between the members of the groups.

Apart from being shared through different groups, knowledge is also shared through individuals' social networks where communication contributes to the knowledge sharing. Social arrangements and gatherings in the villages like meetings, female collaborations in the field, Eid Al Fitri and spontaneous and informal 'hang outs' in the evening are arenas for knowledge sharing between farmers. Meeting and sharing knowledge and experiences at these occasions imply that farmers are part of each other's individual social network. Knowledge and experiences are to some extent also shared between generations, from parents to their children, who are part of each other's individual

social network. In Semin village, knowledge is also shared from one of the biggest bamboo handicraft producers to visitors. The individual social network of the handicraft producer constitutes the base for the knowledge sharing and in addition generates income for the producer, as she is utilizing the people that come to her for knowledge in an economical way. She gets economic benefit as a side effect of the social relations with the people coming to her, which means she is utilizing her social capital.

Through my empirical material I have also been able to answer the second research question, which concerns what the obstacles are for knowledge sharing between smallholder farmers in the studied villages. Two women in Katongan indicated that they sometimes find it difficult to share the knowledge they have got from governmental training opportunities to other farmers. Difficulties in remembering everything that is told during the trainings is an important reason according to the women, who referred to their age. It also seems unusual that VLCs offers utilizing farmers information or training on how to share their knowledge further. Low confidence in addition influences particularly female farmers' ability to share the knowledge gained at VLCs to others. The two women in Katongan also indicated that they sometimes have troubles in understanding the knowledge that is being shared to them by other farmers who have been to a VLC or participated in governmental training. According to the women, the reason is that the farmers who have participated in training not always seem to fully understand the information they have got, which makes it more difficult for them to share the knowledge to other farmers.

In addition, the following factors are further obstacles for knowledge sharing between farmers and constitutes the reason for why knowledge sharing between farmers in the villages sometimes is difficult. Two farmers in Pakem and Pengkok, who tries to share their knowledge gained at VLCs or through governmental training opportunities, experience a low confidence and motivation among the receiving farmers which hinders the knowledge sharing. In Semin, an informant claims that a neighboring village to Semin is not at all motivated to learn about bamboo production or bamboo handicraft from the bamboo group. As indicated by the informant, the reason seems to be a low awareness in the neighboring village about the benefits of bamboo. Another obstacle for knowledge sharing in Semin is, as indicated by the same informant, the lacking facilities for visiting groups who comes to learn about bamboo handicraft from the bamboo group. Lack of people with the right and sufficient knowledge is also an obstacle for the bamboo group's knowledge sharing to visiting groups. Finally, bad organization and coordination within the bamboo group, together with low

support from the government, is expressed as a problem by one of the farmers in the bamboo group. The latter is discussed in relation to what effect it might have for the internal knowledge sharing within the group. Bad organization and coordination together with low support from the government might imply fewer meetings or organized opportunities for knowledge sharing between the members. This was however not confirmed during the fieldwork but contributes as a potential obstacle for knowledge sharing.

To compile and get an overview of the findings, but also to easily discuss and answer the third research question regarding how the findings can be useful for the establishment of a VLC in Semin, the thesis presents two relational maps (Figure 3 and Figure 4). The maps are related to the first and second research questions and show, based on the findings, how knowledge is being shared between farmers in the villages and what the obstacles are for knowledge sharing. The maps are used as a tool in the thesis for discussing how the findings on knowledge sharing, social networks and obstacles in the villages can be useful for the establishment of a VLC in Semin. Knowledge sharing within village farmer groups and knowledge sharing within and in relation to women farmer groups are the two main issues, and these findings are discussed to answer the third research question. Since the bamboo group in Semin and its activities will constitute the base for a VLC in Semin, the thesis discusses an improved organization and coordination within the bamboo group as a tool for enhancing the internal knowledge sharing between the members. ICRAF could contribute to an enhanced internal knowledge sharing by facilitating the bamboo group. Improved organization and coordination might in addition result in an increased number of members in the bamboo group.

In line with the third research question, the thesis also discusses the role of the women bamboo group and the importance of considering and including the group in the development of a VLC in Semin. As indicated in the findings, at least one of the women farmer groups in the villages tend to share and exchange its knowledge with mainly women, both within the village and with women farmer groups in other villages. With other words, women are important for women's knowledge sharing. In order for the Semin VLC to reach and share knowledge not only to men but also to women in Semin and surrounding villages, the women bamboo group could be considered in the establishment. The particular bamboo handicraft products that the women bamboo group is producing could also be included in order to make the VLC useful for women.

Finally, the findings and discussion presented in this thesis is a contribution to the current extension discourse, since it investigates knowledge sharing and social networks between farmers in relation to VLCs. As described in the literature review, “traditional” agricultural extension has been criticized and to some extent replaced by a more pluralistic approach. This approach, which can take the shape of Farmer Field Schools or VLCs, strives to include more aspects of farmers rural lives and livelihoods. In relation to the six villages and the five VLCs I visited, this investigation of knowledge sharing and social networks between farmers constitutes an example of one aspect that can be present in farmers’ rural lives and livelihoods. Particularly, the thesis provides an example of the importance of exploring how knowledge sharing and social networks function in relation to extension in this rural context. The thesis also contributes to an increased understanding of what can and in addition might be included when carrying out or developing a pluralistic agricultural extension.

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## Appendix

Table 2

<u>Village</u>	<u>District</u>	<u>VLC</u>	<u>Focus of VLC</u>	<u>Establishment</u>	<u>Management (support= temporary) (funding= continuously)</u>
<b>Katongan</b>	Gunung Kidul	Yes	Bee domestication and post-harvest handling of bee products like honey, propolis, pollen etc.	2016. By local farmer group and engaged local farmer called Mr. Setiawan.	Managed by local farmer group and Mr. Setiawan. Non- financial support from Forestry Agency at provincial level.
<b>Bleberan</b>	Gunung Kidul	Yes	Agriculture: Seedling of crops, livestock management, organic fertilizers, alternative feed for livestock.	1978. By local farmer group and engaged local farmer called Mr. Agung.	Managed by local farmer group and Mr. Agung. Financial and non- financial support from government.
<b>Nglangeran</b>	Gunung Kidul	Yes	Agriculture: Cacao, durian, livestock management, post- harvest techniques.	2009. By engaged local farmer called Mr. Baskoro, village government of Nglangeran and district government of Gunung Kidul.	Managed by Mr. Baskoro. Financial funding and non- financial support from district government of Gunung Kidul. Non- financial support from private sector.
<b>Pengkok</b>	Gunung Kidul	Yes	Bamboo cultivation and preservation.	Around 2010. By local farmer group as a result of German governmental training program in the village.	Managed by a local preservation group and a local seedling group. Non- financial support from private sector

					(company Bambubos).
<b>Pakem</b>	Sleman	Yes	Bamboo cultivation, preservation and processing.	2016. By local farmers on initiative from Universitas Islam Indonesia.	Managed by local farmers. Support from district government, Universitas Islam Indonesia, and private sector (company Bambubos).
<b>Semin</b>	Gunung Kidul	No	No VLC in the village. Instead there is a bamboo group/local farmer group who focus on environmental conservation through bamboo and bamboo handicraft. But also on forestry and agriculture.	Unknown	Local farmer Mr. Ismaya and members of the bamboo group/local farmer group. Non-financial support from Forestry Agency and Agricultural Agency.