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MSc Programme in Urban Management and Development

Rotterdam, The Netherlands

September 2014

Thesis

Title : The Role of Social Capital for Sustainable Forest Management,
A Case of Community Forest in Karangrejo and Wonotopo Village,
Purworejo Regency, Indonesia

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UMD 10

MASTER'S PROGRAMME IN URBAN MANAGEMENT AND DEVELOPMENT

(October 2013 – September 2014)

The Role of Social Capital for Sustainable Forest Management A Case of Community Forest in Karangrejo and Wonotopo Village, Purworejo Regency, Indonesia

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UMD 10 Report number: 697

Rotterdam, September 2014

Summary

Forest has remarkable role in earth. It has climatic and hydrological function to support human's life as a unity of flora and fauna. Furthermore, it has insurance value to protect human from natural disaster such as drought, flood, landslide etc. as well as support human's life through its natural resource. Therefore, forest conservation is important.

The research explores the dynamics of social capital in community forest and it's influence toward sustainable forest management. The study is focused on two villages in peri urban area of Purworejo regency, Central Java province, Indonesia. The village namely Karangrejo in Loano sub district and Wonotopo in Gebang sub district. The area is prone to landslide and problem of water scarcity. Community forest in this area is located in private land. Additionally, the society develops *tumpang sari* agroforestry system as strategy to benefit the forest from timber and other beneficial plant such as turmeric, cassava, ginger, etc. Furthermore, the two villages are characterized by small plot of land, which is mostly less than 0.3 hectare. Shared land ownership also exists especially in Wonotopo where majority of the forest farmer experience the shared land. Whilst in Karangrejo, although the land parcel is small, mostly it is on private ownership.

The research aims to discover group and network connectedness through social bonding and social bridging and the relation with sustainable community based forest management. Social bonding variables which are used in this study; norms, trust, reciprocity, association, initiative, and decision making. Meanwhile, social bridging variables are; formal and informal institution and linking network.

Data collection methods in this research using field observation, survey, interview, and secondary data. Social bonding is measured through survey by distributing questionnaire to capture the general opinion of forest farmer. Meanwhile, for data analysis, descriptive and regression statistical analysis is utilized to discover the bonding in the society. Information related to social bridging is gathered through interview with Forestry Agency of Purworejo regency (DISHUTBUN), Community Forestry Research Center (PKHR) of Gadjah Mada University, and head of forest farmer group (KTHR). Government report, archives from PKHR, statistical data from Central Statistical Board of Purworejo (BPS), and village profile were used to triangulate information.

The outcomes revealed that the social bonding in the two villages has almost similar high bonding. Although, there are variations in the degree of social cohesion in the community, the perception on social bonding does not correlate with land ownership status and land extent. It revealed that the bonding is influenced by other factors that need further research. This is due to the complex parameters of sustainable forest management that could not be overviewed through social bonding only.

Meanwhile, social bridging explains more on the relationship of forest farmer group with external party. The finding indicates that the two villages have different degree of link with other party. Wonotopo has weaker link with other party compares to Karangrejo. This is due to the reluctant of the people to join the group or participates in government project, lack of awareness and motivation in the community made it difficult to create network. On the contrary, Karangrejo able to develop its community forest and create stronger link with many party. This is due to high awareness of the community to protect the forest, the history, and motivation. Furthermore, the support of PKHR in 2005 through capacity development, also the role of local leader has changed the face of Karangrejo to be more powerful and resilient. Overall, group and network are important elements to obtain sustainable forest management.

They channels information and assistance that furthermore will enhance the capacity and knowledge of the society to protect the forest.

Keywords

Community forest, Sustainable Forest Management, Social Bonding, Social Bridging.

Acknowledgements

- Foremost, my sincere gratitude to my advisor Ir. Harmen Van De Wal for his knowledge, guidance, and support during my research and writing thesis. My gratitude also to second reader of my thesis from graduate program of Urban and Regional Planning, Gadjah Mada University; Prof.Ir.Bakti Setyawan, MA, PhD and Sani Rochansyah,ST, M Eng, PhD.
- I would like to thank to Marijk Huysman and Somesh Sharma for their guidance during specialization period and research workshop that give me better understanding on urban environment as foundation of this research. Also my thanks to all IHS staff for the support during my master study.
- My special thanks for the Netherlands government for giving me a chance to study in this country through STUNED Scholarship.
- I would like to thank to government of the Republic of Indonesia, Pusbindiklatren Bappenas, for the scholarship that enable me to conduct my master study in Gadjah Mada university and giving me a chance to study in IHS Erasmus university. Also my sincere gratitude to Ministry of Forestry, Directorate General of Forestry Planning, Forest Establishment Office Region 1 Medan (BPKH 1),North Sumatera for the permission to study.
- My deep appreciation to all the academic staff of graduate program of Urban and Regional Planning, Gadjah Mada University (MPKD). Special thanks to Ir.Leksono P. Subanu, MURP, PhD for his assistance during pre-research period in Yogyakarta.
- I would like to thank to Forestry Agency of Purworejo regency (DISHUTBUN) for the information and data. Furthermore, my gratitude to forestry community in Karangrejo and Wonotopo for their cooperation. My special thanks to pak Patnani in Karangrejo and pak Wagino in Wonotopo for all the assistance and cooperation during my fieldwork. My sincere thanks to Wahyu Tri Widayati, S Hut, MP. from Community Forestry Research Center (PKHR) Gadjah Mada University for the data and valuable information about community forest.
- My sincere gratitude for the family of pak Ngadino in Mayangan, Yogyakarta and pak Supriyanto in Kutoarjo, Purworejo for the valuable wisdom, lesson and support during my study. Also my gratitude to all my friends in UMD 10 and MPKD for the friendship and happy time together.
- Last but not least, my sincere gratitude to my big family, my mother Nurhayati in heaven, who dedicated all her life to her children. My father, Adi Soewito, for the endless pray. Also my special thanks to my brother Muhammad Fajri Nugrahadi, my sister Probowati Diah Kusumawardhani and Misnanto for the humble support throughout time.
- I would like to thanks my husband Yoghi Budhiyanto and my daughter Jasmine Ayodhya Wardhani for all the love, patience, support, and endless pray to me.
- Above all, I thank God, Allah SWT for the strength and blessings so I can finish my study and complete this research successfully.

Foreword

My dedication to my family:

..place where I belong, place to grow..

Abbreviations

APHR	Asosiasi Petani HutanRakyat *Association of Smallholding Forest Farmer*
BIA	*Bogowonto Indonesia Adventure*
BPD	Badan Pariwisata Desa *Village Tourism Board*
BPS	Badan Pusat Statistik *Central Statistical Board*
BP DAS SOP	Balai Pengelolaan Daerah Aliran Sungai *Serayu-Opak-Progo* *Serayu-Opak-Progo WatershedManagement*
DISHUTBUN	Dinas Kehutanan dan Perkebunan *Forestry and Agriculture Agency*
DISKOPERINDAGPAR	Dinas Koperasi, Perindustrian, Perdagangan, dan Pariwisata *Cooperative, Industry, Commerce, and Tourism Agency*
KTHR	Kelompok Tani Hutan Rakyat *Forest Farmer Group*
KWT	Kelompok Wanita Tani *Woman Farmer Group*
Perhutani	*State Forest Enterprise*
PKHR	Pusat Kajian Hutan Rakyat *Community Forestry Research Centre*
PKL	Penyuluh Kehutanan Lapangan *Forestry Field Officer*
PKK	Pembinaan Kesejahteraan Keluarga *Family Welfare Coaching*
PNPM	Program Nasional Pemberdayaan Masyarakat *National Programme For Community Empowerment*
PAMSIMAS	Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat *Water and Sanitation for Low income Communities Project*
SVLK	System Verifikasi Legal Kayu *Timber Legality Assurance System*
UMY	Universitas Muhammadiyah Yogyakarta *Muhammadiyah Yogyakarta University*

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Chapter 1: Introduction

Forest plays important role in life. It has many crucial functions in economic, social and environmental aspect. Forest provides food, raw material, and timber that support the livelihood. It also has the function of cultural and social identity for indigenous community. Furthermore, forest has vital role for environment in regulating the water balance, the climate, as the insurance value for the city that protect from flood, landslide, and other natural disaster. Forest also has supporting function for biodiversity and wildlife. Meanwhile, the forest conversion to other land use has damage the environment and potentially accelerates the climate change effect. Forest deforestation and degradation has reached an alarming level that should be overcome immediately. Indonesia is one of countries with the largest forest area in the world. Therefore, serious effort is urgent in conservation and forest in order to maintain ecological balance of the earth to protect the possible incoming disaster caused by climate change.

Forest has special relation to the city. It functions as green infrastructure that provides water through ground water recharge, and protects the citizen at the same time. It also improves the quality of life for its inhabitants through maintaining the microclimate of the city and provides fresh air. As a natural capital, the provision and management of forest is government responsibility and less involving the community in the planning, management, maintenance, and monitoring the forest. The centralistic forestry governance in Indonesia has long time neglected the role of indigenous community in the forest (Michon, 2005). However, in Java islands, community forest in private farm-land is well developed. Supported by good infrastructure for the marketing, the community forest grows in the last decades, and evolves in diverse utilization with main goal to live in harmony with environment and economically benefit the community.

Community forest offer different angle in enhancing ecosystem service for the city. It also consider as new strategy to protect the environment. According to Indonesia Ministry of Forestry rule no.24 year 2004, the definition of community forest is a forest that grows outside the state forest which is encumbered proprietary rights nor other rights with minimum extent 0,25 hectares with canopy cover of woody plants and other plants are more than 50%. Long tradition of community forest management has been well established in rural communities, where local community responsible to the management and it is carried out through co-operative or collective efforts by the community members. They have built up a considerable store of wisdom, knowledge and practical skills.

This research aims to analyse the function of social capital in the society and how it affects the forest sustainability in the area through its community based management. Social relationship with the environment is unique, where each area has its own characteristic and interaction pattern. This interaction of people's social networks will effect on how they value the forest. Environmental, social, and economic pressure to the people also contributes to the perception of the community toward the forest. Furthermore, it determines the forest management in the area.

1.1. Background

The research focuses on two villages in the peri urban area of Purworejo, namely Karangrejo and Wonotopo. The two villages are located approximately 5 kilometers in the north of the city centre. Additionally, the accessibility of the area is good, as it is passed by national road that connect Purworejo to Wonosobo, also Purworejo to Magelang/Semarang, the capital city of Central Java province. Purworejo is a medium size city with total area 1.034,81 km2, and

total population 708.483 (Statistical Board of Purworejo Regency/BPS, 2013). The proportion of the land consist of agricultural land (80,59%), and non-agricultural land (19,41%). Geographically, the topography is stretched flat in the south, bordered to Indian ocean, to hilly in the north, with tropical humid climatic temperature range from 19°C to 28°C. Administratively, the regency bordered to Indian oceans in the south, Wonosobo and Magelang regency in the north, Kulonprogo regency (Yogyakarta Special Province) in the east, and Kebumen regency in the west. Purworejo is divided into 16 subdistrict or *'kecamatan'*. The population density is 603 inhabitants per km2. The manpower figure from BPS (2013) shows that 38% of working age population is absorbed in agricultural sector, followed by commercial (24,98%), service (15,85%), and industry (9,54%). The agricultural-based town influences the living of the inhabitants and their interaction with environment

Figure 1. The landscape of research area, Karangrejo (right cirle) and Wonotopo (left cirle). (source: Google Earth imagery, 2013)

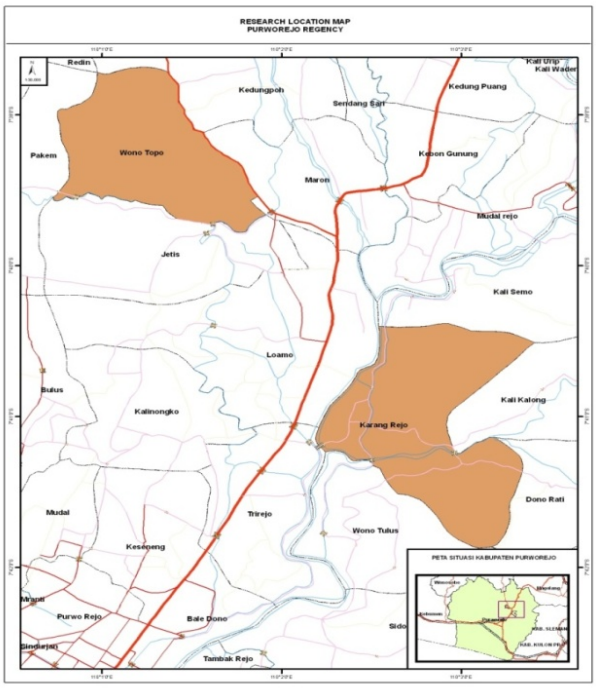
The focus area has similarity in geographical character, livelihood of its inhabitant, and forest management. The villages are catchment area of Bogowonto watershed which is on the primary national priority on land rehabilitation according to Ministry of Forestry decree no. SK.328/Menhut-II/2009. This is due to the vast area of critical land which leads to land degradation. Meanwhile, the livelihood of the two villages is smallholder forest farmer of cultivated forest on private land, with output on timber and non-timber forest product (fruit). The both of villages develop community based forest management through forest farmer association. However, the both village also has its unique character that determine their interaction with forest.

The first village, Karangrejo, is a village in Loano sub district with total area of 286,8 ha. The village is located in the north-eastern part of Purworejo regency, in hilly topography of Menoreh mountain, upper stream of Bogowonto sub watershed. The land use pattern in the area consists of forest, rice field, and residential. The livelihood is mostly as farmer. Karangrejo experienced a transformation from agricultural to agro-ecosystem in the last four decades (Amah, 2009). It develops the agroforestry system to solve the problem of water scarcity, and landslide prevention. Started in 1964 with forest rehabilitation, the practice continued and grew the forest that, furthermore, economically benefits the community. Thus, the community begin to transform their livelihood from pure rice field agriculture into agroforestry. Other research by Heny (2012) in the same area found that training and capacity building from government, non-governmental organization and University together with existing local wisdom have shaped the community's perception toward the forest sustainability.

The participation of the community in managing their community forest was appreciated by government and awarded in 2004, 2005, and 2008. In the last few years, the forest community developed their forest resources combined with its cultural heritage into ecotourism. Developed in 2010 under assistance of Community Forestry Research Centre (PKHR) of Gadjah Mada University continued by Muhammadiyah University Yogyakarta, the village started to utilize its assets. The rationality behind the plan was because the village have spiritual, scenery, and cultural assets for instance, the ancient tomb of prince Dipokusumo from ancient Mataram kingdom, a big rock namely *Watusumurup* that considered as sacred place, and ancient gate house of *'Lurah Glondong'*, a famous local leader in the past. The spiritual assets combine with forest landscapes, natural springs, beautiful scenery and cultural heritage (*Dolalak* dance) have made this village distinctive in Purworejo. Furthermore, the development is expected will sustain and increase the welfare of Karangrejo inhabitants through its economic benefit and at the same time protect the ecology of the forest.

The second village, Wonotopo, has different character although it also has some similarity with Karangrejo. Located in the north-west of Karangrejo on the main road to Wonosobo regency, the village is on higher altitude and steepy topography. The livelihood of the residents is dry land farmer and labour. Furthermore, the land use of the village is community forest with local government supervision because of the uncontrolled timber harvesting in the area. The village is a member of association of smallholding forest farmer namely "*Purwolestari*" which cover six villages. This organization initiated by local government with purpose to empower people in the area in order to get better bargaining position toward middlemen that control the price. The location was also chosen by Ministry of Forestry for Seedling Nursery program from in 2011 with aim to increase the livelihood of the inhabitant with further goal to improve land rehabilitation. Ministry of Forestry also granted 50 million IDR in the form of 50.000 seeds for every farmer association. The organization awarded by Ministry of Forestry in 2012 for its forest rehabilitation program and partnership with timber manufacturer industry PT INDOTAMA (Kedaulatan Rakyat newspaper, 2012).

Figure 2. Map of Karangrejo and Wonotopo village, Purworejo, Indonesia (source : BPS)



1.2. Problem Statement

The area of Karangrejo and Wonotopo is located in hilly area, upstream of Bogowonto watershed which is on the national priority for land rehabilitation because of its vast critical land. The two villages is part of Bogowonto sub watershed in Purworejo regency with total critical land in 2009 is 2.784,81 Ha (Statistic data of BPDAS SOP, 2009). Critical land is an indicator of land degradation. It is characterized by unproductive land, poor nutrient, that resulting in loss of function and prone to natural disaster such as land slide. Assessment of critical land is based on guideline established by Ministry of Forestry of Indonesia (2009) using criteria of land cover, slope, erosion rate, land productivity, geological condition, and land management. The method uses multi criteria analysis and the result will determine the level of critical land in the observed area. Refer to this facts, vegetation cover is extremely important in order to improve soil permeability and increase water infiltration for ground water recharge. Furthermore, retrofitting the watershed function will help the city maintain the water supply and climate change resilient.

This study attempts to discover the social capital of forest community, particularly network and groups connectedness on each village and analyse its impact towards the forest's ecology. The important of this comparative study is to recognize the interaction pattern of forest community to implement sustainable forest management. The rationality behind the selection of the villages is because the first village, Karangrejo, characterised by its autonomous and diverse forest resource management (ecotourism, seedling nursery, timber) with less government intervention. Meanwhile, Wonotopo is influenced by local government on certain extent on its forest management which depends on timber product (*Albacia*).

In the observation, instruments should involve the society, as the owner, in the study of social capital of community forests. In short, this research will give contribution in measuring the social capital and the impact to the forest environment sustainability in two different types of forest management. Furthermore, social capital will offer insight on the elements that contributing in the success or failure of the management, and bring new perspective in community based forest management in Indonesia.

1.3. Research Objectives

In order to explain how social capital influence the forest sustainability, this research focus on one crucial element, groups and network in the society. Therefore, the research has the following objectives:

1. To observe the role of groups and networks as the element of social capital for sustainable community based forest management in two different areas.
2. To explain the role of social bonding and bridging in groups and networks and its impact to forest management in both villages.

1.4. Provisional Research Questions

Main research question :

"What is the contribution of groups and networks as social capital element for sustainable community based forest management in Wonotopo and Karangrejo?"

The sub-research questions:

a. How does social bonding of forest community influence the sustainable forest management in Wonotopo and Karangrejo?
b. How does social bridging of forest community influence the sustainable forest management in Wonotopo and Karangrejo?

1.5. Significance of the Study

The study has significant contribution for knowledge building and policy relevance. Although some researches have been conducted in community based forest management, this research focuses to capture social capital dynamics based on its locality. This will contribute to body of knowledge on how social capital affects the forest sustainability in two different villages with similar practice of community based management.

Moreover, the understanding on local physical and social characteristic will determine the appropriate treatment to achieve the goal of sustainable community based forest management. Community involvement is potential to be mainstreamed in the policy as an effort to reduce environmental degradation by maintaining the natural environment as well as protecting the source of livelihood for the community. Furthermore, the findings will support all the stakeholders to contribute in the development of community forest in sustainable manner.

1.6. Scope and Limitation

The research analyse social dynamics of forestry management on village level in Karangrejo and Wonotopo. It discovers the role of social cohesion and social bridging in forest farmer community and how it brings the forest management in certain level of sustainability. Furthermore, the study attempts draw the pattern of relationship within the community and with external parties in the frame of community forest also to map the linking network.

The limitation of the research was on the time constraint. Limited time on field work has reduced the possibility to get complete data and deep understanding about the area. This was due to the availability of informants and respondents in the field, particularly, the field work was held in Ramadhan, fasting month, where the daily activity is slowed down because people more focused on religious activity. However, pre-field work preparation has been helped the researcher by contacting key person in the village and relevance institution also by starting to collect information from website for the secondary data.

Chapter 2: Literature Review

Understanding theoretical background in a research is fundamental to construct a framework of thinking. Theories and concept in particular issues are essential as a guideline for a research. However, it is necessary to critically analyse the literature and its application in relevant context. Additionally, analysing the previous research is potential to identify gaps of knowledge. Therefore, a contribution to science will be necessary to close the gap and build the knowledge.

This chapter will provide an insight to certain literature that is relevant to the topic. The structure will be divided into four major parts; urban ecosystem service, sustainable forestry management, social manifestation of forest, and geographical perspective of forest.

2.1. Urban Ecosystem Service

According to Millenium Ecosystem Assessment, ecosystem is:

> "a dynamic complex of plant, animal, and microorganism communities and the non-living environment interacting as a functional unit" (2005, p.V).

Additionally, ecosystem service benefit people from its *provisioning service* (food, timber, water), *regulating service* (groundwater recharge, flood prevention, climate regulator), *cultural service* (recreational, education, spiritual), and *supporting service* (nutrient cycling, wildlife habitat, soil formation). Human is part of ecosystem, and has dynamic interaction with it. Furthermore, changes in ecosystem will affect the changes in human well-being (Millennium Ecosystem Assessment, 2005). Therefore, understanding the concept and application of ecosystem service in planning is significant to address urban environmental problem.

There is growing evidence that support the benefit of urban ecosystem service in improve city's quality of life (Gomez and Baggethun, 2013). The economic cost of urban ecosystem loss will be higher in terms of restore, built and maintain infrastructure that has similar function with green infrastructure. The negative of urban ecosystem loss also will impact on social cultural value and insurance value of the ecosystem, furthermore, will make the city vulnerable to natural disaster.

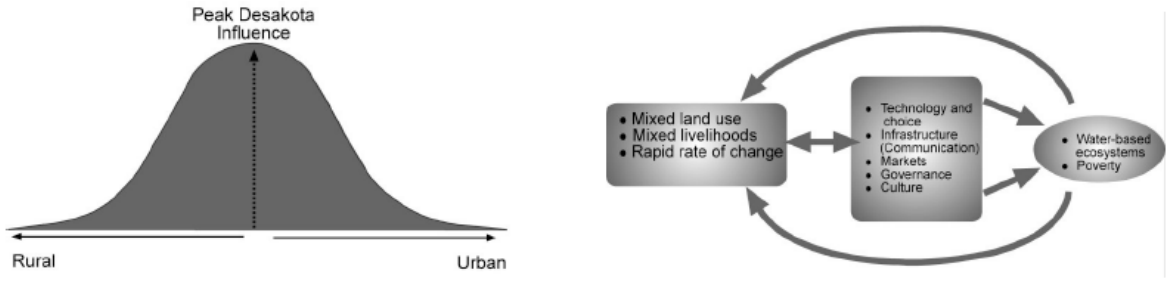
2.1.1. Ecosystem Service and Desakota Concept

In the last decades, the urban pressure to the environment has been augmented. Demographic changes, urbanization, land use change, and consumption pattern are the examples of urban growth effect. This becomes drivers that increase the pressure to the environment and decrease the capacity of ecosystem service to support the city. Furthermore, it will increase the risk to disaster exposure such as flood and drought. Therefore, special attention is necessary for the area that is most affected by urban pressure in order to avoid potential damage for the city in the future.

'Desakota' is a concept taken from Bahasa Indonesia meaning village-town, the transition region where ecosystem stress is best observed. Desakota characterized by cheap transport axes that connect urban centre and rural areas, also intense commercial agricultural and non-agricultural economic activity (McGee, 1991, cited in Moench and Gyawali, 2008). In the system, large population operates mix household economy both in formal and informal sectors. Furthermore, the concept describes the relationships of social, economic, and environment in rural-urban fringe that is broader than peri-urban concept. It views the dynamics interaction in transition zone that undergoing rapid change due to the development of transport system, communication, economics, that interlinked rural-urban livelihood

(figure 3) (Moench and Gyawali, 2008). The mixed of rural-urban potentially change the relationship between ecosystem service and livelihood.

Figure 3. Desakota curve (left) and the influence process (right), (source : Moench and Gyawali, 2008)



Desakota has specific characteristics (Moench and Gyawali, 2008) :

1. Transportation axes connection to major urban centre
2. The availability of daily labour market
3. Good information access
4. Mix livelihood income
5. Under stressed traditional rural groups
6. The use of modern technology, i.e electric pumps to access water
7. Informal economy
8. Poor link of formal institution, i.e. forest reserve, private sector, government
9. Different degree of linkage to local and global economy

The growth of Desakota region has put stress to the ecosystem. The ecosystem service is subject to interlinked and often competing demand of rural and urban. Rapid land use change and population pressure has declined the ecosystem service regulating capacity for instance in regulating water, such as water provision and flood control. Moench and Gyawali (2008) state that the relationship between ecosystem service and Desakota system are site specific. It depends on the relative balance of pressure. For instance, in forestry case, the dependency on economic value of non-forest use and institutional development for forest protection are compatible in Desakota environment. Furthermore, institution plays important role to respond rapid change in order to balance the pressure.

2.2. Sustainable Forestry Management

Bueren and Bloom (1999) define the concept of sustainable forest management in three domains; ecological sustainability, social sustainability, and economic sustainability. Ecological sustainability defined as the development should respect natural process and ecosystem function that able to support healthy organism, whilst maintain production, adaptive capacity, and capability for renewal. Social sustainability means the development activity conforms to social norms and ethical value of the community. Economic sustainability requires the distribution of benefit from the capital today is equal with the benefit for the next generation.

FAO (2006) mention seven thematic elements of sustainable forest management. The elements were compiled from global forest resource assessment year 2005 in FAO member countries from 1990-2005, several international meetings in sub regional and regional level, and acknowledged by United Nation Forum on Forest (UNFF). It was based on criteria and indicators of sustainable forest management in various countries and used as reporting framework in FAO's global forest resource assessment. The seven components are:

1. Extent of forest resources;
2. Biological diversity;
3. Forest health and vitality;
4. Productive functions of forest resources;
5. Protective functions of forest resources;
6. Socio-economic functions;
7. Legal, policy and institutional framework.

In the common perception, forest management is viewed through the origin of forest. Forest is divided into two major typology; primary forest and secondary forest. Primary forest commonly perceived as stable "climax forest type" in a given region, while secondary forest is successional forest after the clearing of original forest that develop again into primary forest (Chokkalingam and Jong, 2001). The management of primary forest is for the aim of forest preservation, while in the secondary forest the management in Indonesia case is for timber concession. However, according to Chokkalingnam and Jong (2001), there are common types of forest that is not included in definition of secondary forest:

1. Forests with low-intensity of selective logging
2. Low-intensity and small-scale extractive activities, for example non timber forest product (e.g., for non-timber forest products)
3. Forests that is affected by small-scale natural disturbance
4. Intensively-managed plantations, for example palm oil plantation
5. Large forest plantation.

Natural forest management is commonly recognized as government responsibility. Forest in many countries mostly under controlled of central government. This impacts on the management that focus on large scale homogenous stand of timber on forest plantation which is managed by private company, and exclude indigenous people. However, in reality, not all forested areas are state forest. For instance, in the case of south East Asia tropical countries, forest has its ecosystem service in provision, regulation, cultural, and support (Millenium Ecosystem Assessment, 2005) although located in the farmland.

2.2.1. Forest Cultivation Practice

The practice of forest cultivation by smallholder farmers in farmland is not a new thing in South East Asia. Michon (2007) mention the terminology of 'domestic forest' based on the domestication of forest and its relationship with households or group of household in the management to fulfil their needs. She state that although there is similarity on biological and ecological in cultivated forest and natural forest, still there are differentiation in socio-cultural value, history, socio-economic foundation, and socio-political circumstance. Therefore, cultivated forest should be look differently.

Michon's research (2005) on cultivated forest raised issue of forest management. The practice is constrained by little acknowledgement from formal institution compared to timber concession and forest reserves. The existence of forest cultivation is not considered by elite forest manager in decision making because of its 'invisible'. This is because the activity is practiced by indigenous people, furthermore, it does not include in what people commonly perceived as cultivated system like in agriculture system. For instance, *Durian* forest cultivation practice in west of Sumatera, *Damar* resin production in southern Sumatera, and *Agathis* plantation for *Damar* resin cultivation in Java island. Furthermore, in the case of Java island, Michon (2006) reveals that lands which is not under forestry regulation have more trees than those in state forest (figure 4). Farmers plant, maintain and cultivate the forest for

its fruit and timber. On the contrary, in the state forest there is problem of forest conversion and illegal logging that is not well respond by government.

Forest cultivation is evolved. Michon (2005) identify the evolution on forest cultivation from subsistence, which aims to fulfil basic food needs, to forest extraction, which cultivate forest for trade and generate income, whilst the latest is evolution from forest extraction to forest culture. Economy is often recognizes as the main driver for forest cultivation as response to the market demand. The literature also underlines the role of socio political driver in the change of forest culture. Additionally, the massive adoption of cultivation is catalysed by many outside factors such social and political condition. This may be within the internal social group, or on its relationships with external actors in terms of policy and activities.

Figure 4. Cultivated forest in West Java. Left picture shows the condition of cultivated forest on private land compare to deforested slope of state forest in the hill, right picture show cultivated forest with fruit trees and timber (source: Michon, 2006)

2.2.2. Community Participation on Forest Management

Community forest management is defined as the situation where local community involved in the forest management and landownership (Barr, Robin et al 2012). Smallholder agroforest group is one example of community forest management. Agroforestry itself is a land use form of growing trees along agricultural area which benefit the economy. The structure of agroforest in Java island is characterized by high diversity of agroforestry products, with plot half to five acres in size able to provide food, firewood, building materials and cash crops, for the families livelihoods. The timber species mainly *Mahogany*, *Teak, Albizia, Sonokeling,* and *Acacia*, that form upper canopy layer. The wood is used for furniture industry in Indonesia. In the lower canopy layer, the vegetation is fruit trees (i.e. *mango, jackfruit, rambutan, durian*) and cash crop trees (i.e. *coffee, nutmeg, clove*). Meanwhile, in the floor of the forest, the vegetation is *ginger, turmeric, cassava, peanuts*.

Local forest management system in Indonesia has been developed for centuries. In pre-colonial era, farmers domesticated fruit and nut species, followed by the development of commercial forest cultivation in colonial era which covered trade commodities such as cinnamon, rubber, and dammar. The system connected with farmlands in by swidden farmers. They plant seeds, raised in nursery, and plant the tree between annual crops such as rice field in an agroforestry system. The agroforest grows to a mature system that resemble to natural forest system (Michon, 2005). The system protects the land from erosion, as a control for water hydrology in watershed, and conserving animal and plant biodiversity.

However, there are some challenges in government side. The practice is unrecognized by state forest management and some tensions exist between local management and state forest management. Centralistic forestry policy tends to ignore local and customary tenure systems

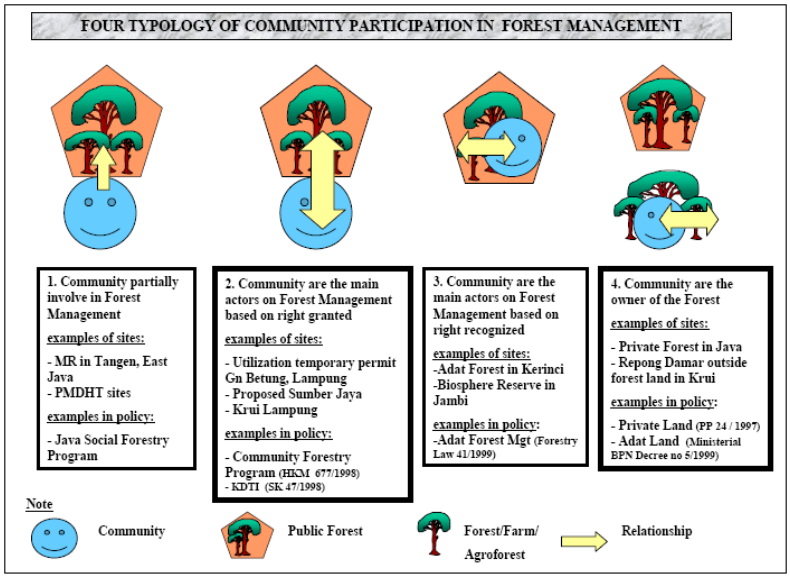
which exist since pre-colonial era. Furthermore, central government prefer to use its own standard of institution that does not match with local forest management institution. This tension affects the local community participation in forest management.

Kusumayanto and Sirait (2000) mention differential factors in participatory forest resource management in Indonesia:

1. Geography: Java versus outer islands. State forest in Java was established in Dutch colonial era in early 1900s, while outside Java was established in 1982.
2. Legal Jurisdiction: unclear boundary setting of state forest. This lead to land tenure and social conflict.
3. Law system: customary rights versus official state law. The law neglect the right of indigenous forest community
4. Program approach: community participatory program versus local community participation. Community participatory program focus on rural development using community forestry approach. Meanwhile, local community participation emphasize on local community involvement in social forestry program (i.e. social forestry program by State Forest Corporation or PERHUTANI).

Kusumayanto and Sirait (2000) mention the typology of community participation on forest management in Indonesia (figure 5). The figure shows four type of community participation; community are partially involved, community as the main actors based on right granted, community as the main actors based on right recognized, and the last one is community as the owner of the forest. Furthermore, the authors also outline the importance of state to switch from blue print centralistic forest management to decentralized management. They also encourage participation and involvement of local community on natural resource management that acknowledge plurality and customary law.

Figure 5. The typology of community participation in forest management in Indonesia (Kusumayanto and Sirait, 2000)



The study above is relevant as knowledge foundation for research in the area. Characteristic of domestic forest and cultivated forest are exists in the research area of Karangrejo and Wonotopo. The community participation in the area is the typology where community owned the forest. Research on anthropology by Amah (2009) that analyses the social process of agro-ecosystem transformation in Karangrejo from purely agricultural to community based

forest proved the community participation in the area exist since long time ago. Key finding of the research mention water scarcity was the underlying motive of the inhabitants to plant trees in the eroded hill, hence, the growing forest has benefit the people economically and environmentally. This leads them to transform from agricultural to community forest.

Another research in the same area conducted by Heny (2012) states that people perception toward the forest is influenced by level of education attainment, inherited local wisdom, and the livelihood as farmer. The research revealed that the dissemination of information from government institution, university, and forest farmer association through training and capacity building significantly contributed to the understanding about the forest and the importance to protect it.

2.2.3. The Challenges of Community Forest

Community forest in Indonesia exists for many centuries. The practice is commonly done by local indigenous people around the country. However, the development of community forest constrained by less attention from central government. The centralistic forestry policy in Soeharto era has abandoned the local community and customary laws that results in land tenure conflicts over years (Safitri, 2006). Central government has its own definition about community forest. Ministry of Forestry set regulation on Community forest in early post Soeharto era before decentralization law. The Ministerial Decree 677/Kpts-II/1998 of *Hutan Kemasyarakatan* or Community Forest was claimed to involve community as main actor on forest management in order to achieve forest land tenure security, but in very limited degree. For instance, it was only applicable for state forests on ex-forest concession area which usually heavily damage after the company left the area. Furthermore, in 2001, Ministry of Forestry established Social Forestry policy (Ministerial Regulation P.01/Menhut-II/2004) with aimed to increase the awareness, capacity, and empower forest community to access the forest. But still, it was only applicable on state forest, and the community has very limited rights to access the forest. Legal reforms on forestry seems has been applied in Indonesia, but nothing has changed in the field. Lack of political will is a major issue in forestry governance in Indonesia (Safitri, 2006).

In agroforestry community forest, Barr (2012) reveals that the practice is unrecognized by forestry governance because of its mixed character of agriculture and forest management. Also, there is a gap on the responsible institutional authority on national level. Therefore, the practice is under the authority of local government or municipality. It also constrained by limited laws regarding the harvesting and selling of timber product. This case particularly happens in post Suharto era, decentralization era, where each municipality have autonomous rights to manage its resource. In facts, not all cities concern to forest management. Furthermore, the supply chain of agroforest timber often only to supply local and regional demand for furniture industry. Moreover, it constrained by seasonal harvesting and the involvement of informal market where middlemen control the price.

Local government after decentralization has various respond to community forest. On the other hand, community forest also has various reactions toward laws that local government attempt to regulate the forest (Safitri, 2006). This situation makes the community forest management is complex in certain area, especially in outer Java island. For instance, head of Lampung Barat district, Sumatera, has set policy (The District Regulation 18/2004) about community forest with aims to ensure community has the right to access the forest as long as they meet the requirement. This legal certainty is helpful for the community to manage the forest.

2.3. Social Manifestation of Forest

Forest presence is manifested in the life of the community and their interaction with nature. It has valuable meaning for local community and implemented in their daily life. Indigenous people value the forest as sacred place, their identity, not only because of the livelihood but also how they are attached as part of the forest. Through this connection, indigenous people set norms and rules in order to protect the forest.

2.3.1. Forest Meaning as Place

Place meaning and social capital has significant connection in forest management. This statement support by Smith et. al (2012). They conduct a research on state of preference of community in the surrounding of Appalachia public forest, United States, in order to obtain information about how social-psychological attachment to the place influence the outcome of forest management (aesthetic, economic, ecology, and recreational). The result shows that individuals bonding and bridging ties of social capital influence the valuation of outcome preference of forest management. Furthermore, individual attachment to place also has positive influence to the outcome, as well as three types of place meanings; self-efficacy, self-expression, and self-identity.

The research concludes that basic understanding on local community's perception to place and its relationship with social capital are considerable in planning. Therefore, forest planner should view this approach to minimize trade-offs. The result is important for forest planner to make a plan that socially acceptable and preferred by local community. However, the research has limitation on the coverage, where only small scale internal community who lives nearby the forest, without assessing the link to external agency.

2.3.2. Social Capital and Environment

Social dimension is one of the three pillars of sustainable development framework: environment, economic and social dimension. Although the three pillars are interrelated, the strong relation is clearly seen in economic and environment. This is because social dimension has different character compare to economic and environment, thus, cannot be addressed with the same analytical tool. Social dimension has the characteristic of bipolar, reflexive, and immaterial (Lehtonen, 2004). Bipolar refer to individual and collective levels, whilst reflexive means that the perception of the objective social condition may change the behaviour of individual and collective action. It also has immaterial character that difficult to be analysed quantitatively.

Lehtonen (2004) uses the capability and social capital approach for structuring thought in order to examine the precondition of institutional change for environmentally sustainable development. He concludes the need to situate the analysis based on its context. This is because the influence of spatial and temporal variations. The study also emphasizes the underlying motives of social action which determine the outcome. Furthermore, the finding identifies the gap exist in social-environmental interface. The problem is in the lack of responsible organization that covers the area, also lack of formal institutional capacity to respond the demand in integration of social and environmental development.

2.3.2.1. Definition and Element of Social Capital

Social capital is critical in assessing socially sustainable development. It generally refers to network characterized by norms, trust, reciprocal act that forms social connection with capability to improve the efficiency in the society by facilitating the coordination and cooperation for mutual benefit (Putnam, 1993, cited in Dahal and Adhikari, 2008). In this context, Putnam relates social capital based on: 1) The level units (i.e, associations, communities, and region), 2) Social capital as solution for dilemma in collective action, 3)

social capital as assessment instrument of institutional performance (i.e. regional government). Meanwhile, Pretty and Ward (2001) on their research on social capital relationship with environment underlined four central aspects of social capital:

1. Relation of trust
   Trust is built in a long time and ease cooperation among individuals. It is benefit in reducing transaction cost by creating social obligation and reciprocity.
2. Reciprocity and exchange
   Simultaneous exchange of equal value and diffuse reciprocity will increase trust. Furthermore, the long term obligation will contribute to development in the society.
3. Common rules, norms, and sanction
   It is a mutual agreement that place group/community interest above individual. It also reflects the degree of individuals to control their behaviour. Norms and rules embedded in the society and conduct on how individuals should act.
4. Connectedness, network and groups
   It is a considerable aspect of social capital. Connectedness is manifested in the forms of groups in local level such as fishery groups, forest management groups, etc. This aspect determines the internal and external relationships which are important for development and natural capital conservation.

2.3.2.2. Social Capital Response to the Changing Environment

Environmental management is an issue need to be addressed. The responsibility for environment planning and management should involve the community, especially around the site. Additionally, social capital and human capital in the community is central factor that determines the success and failure of environmental management. Pretty and Ward (2001) states the fundamental of social capital in local groups participation to solve local development problems. Social capital comprise of natural endowment facilitated with external agency. Local community with desired norms and rule will work better in environment improvement. Furthermore, it will obtain positive feedback on social and human capital.

Social capital evolves and transforms in response to the changing circumstance. Pretty and Ward (2001) develop new typology to assess the human and social capital evolution in groups. They suggest three stages to identify the degree of maturity of social groups; reactive-dependence, realization-independence, and awareness-interdependence. The three stages are viewed according to five major themes of criteria; worldview of group members, internal norms and trusts, external link and network, technology, and lifespan of group.

- Stage 1: Reactive-dependence
  The groups are formed as reactive response to crisis, high dependency on external assistance (government, NGO.). They recognized the group values, but norms and rules are borrowed from external, for instance, the application of new sustainable agriculture technology in farmer group.
- Stage 2 : Realization-independence
  Trust among the member grows, member actively participates and willing to invest in the group. The group develop their own norms and rules, aware to the importance of establishing link with other groups and external agencies for their benefit. The group is stronger and resilient, start to develop their own individual characteristics, and capable to find solution of existing problem.
- Stage 3 : Awareness-interdependence

The group is more dynamic and expecting change. The worldview strongly influences the group, individuals are aware of the technology, able to share with other group even form a new group. The group creates innovation for development and maintain the link with external agencies. The group also resilient to external threat, and together with other groups form a federated group to achieve higher objective.

However, in reality, there is different condition of relationship between group and external actors. There is complexity of relationship in the society where different stages may consist of diverse degree of indicators on each stage. Group on stage three may regress to stage one, which is unstable phase, as the practice is fundamentally changed. The role of external agencies and government should also be emphasized, especially to community with low social capital. Pretty and Ward (2001) states the role of policy to encourage groups programs for environment improvement. Policy reform is necessary to sustain the local groups, hence, policy support is significant in strengthen the institution and programs.

2.3.2.3. Network and Groups Connectedness in Society

Network and group connectedness is a significant aspect of social capital. Social cohesion is the form of connectedness manifested in groups on a society. Pretty and Ward (2001) mentions five elements of connectedness:

1. Local connection: individual connection within groups
2. Local-local connection: connection within and between groups
3. Local-external connection: vertical connection between group and external party such as organization, government, one way or two way
4. External-external connection: connection among external parties with aim for collaborative partnership
5. External connection: connection between individuals in the external agency

However, Pretty and Wards (2001) state that not all of the connections are addressed in a single organization. For instance, government commonly focus on integration of sectors, while development agency may focus on building local association and forget to build the link with external actors. In the context research area, networks and groups connectedness are crucial element to determine the sustainable practice of forest management. Moreover, the urban pressure also affects the social cohesion of the inhabitants. Therefore, attention on this element of social capital is important.

2.3.2.4. Social Bonding and Social Bridging in Community

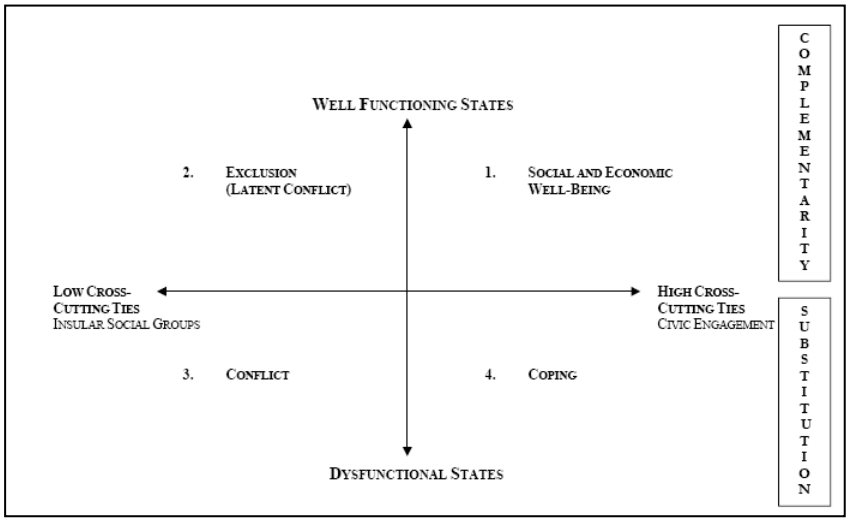
Social aspect of development has been considered as crucial factor in development. Social factor and its dynamic influence the accessibility and distribution of development. Shared norms, rules and institution are glue that sticks the societies together. The concept of social capital expands into network's bonding, bridging and linking (Woolcock and Swetser, 2002 cited in Dahal and Adhikari, 2008). Accordingly, social bonding refers to connection in homogenous group such as family, kinship, relatives, whilst social bridging assigns to relation with people across diverse social divisions. Meanwhile, social linking means the connection with power that influences the positions in the community, for instance political and financial influence.

Larsen (2004) uses the perspective of planning to explore social capital. The research emphasizes the role of social capital as indicator of neighbourhood stability. Additionally, bonding and bridging in social capital capable to stimulate collective action. Larsen (2004) use indicator of trust and association to measure social bonding, whilst social bridging is measured by the indicator of people's action to address the environment problem in the neighbourhood of Phoenix. Larsen also measures the neighbourhood characteristic through

income, and number of years the residents live in the neighbourhood. Individual socio demographic variable is measured through indicator of ethnicity, level of education attainment, and number of years living in present home. Furthermore, the perception of the community is used to explore the function of neighbourhood. The research concludes the importance of existing social bonding before social bridging develops and creates connection beyond neighbourhood. Furthermore, strong social bonding leads to community's action, whilst social bridging is the action to address problem in neighbourhood level.

Narayan (1999) uses the concept of social capital to analyse social forces in development by viewing at "cross-cutting ties" and relation between formal and informal institution. Cross cutting ties able to open economic opportunity of excluded groups and builds social cohesion which is fundamental for social stability and the welfare of the economy. Society and institution also form substitution and complementary relationship which is shown in the diagram below.

Figure 6. The relationship of cross-cutting ties and governance (source: Narayan, 1999)



The framework provides analysis on the connection of state institution and cross cutting ties in countries and community within country. Narayan (1999) develops four quadrants; well-being (good function of government and large cross cutting ties), exclusion (good function of government and low cross cutting ties), conflict (poor state function and low cross cutting ties), and coping (large abundant cross cutting ties and poor government institution). The framework captured the dynamic aspect of the relationship between government and social capital. It describes that when the role of government institution is deteriorated, informal social group is functioned to substitute the state. Meanwhile, in good governance, the state complements the role of informal social groups.

2.3.2.5. Social Capital and Forestry Management

The relationship between social capital and forest management shows positive connection in many regions. Dahal and Adhikari (2008) state that social capital bonding or cohesion among the community and traditional norms are the success factor of collective action in forest management of Kalahan forest reserve, Philipines. Furthermore, the research indicates that the bridging and linking of social capital able to mobilize external resource, at the same time, promote social bonding among the community. This leads to effective forest management.

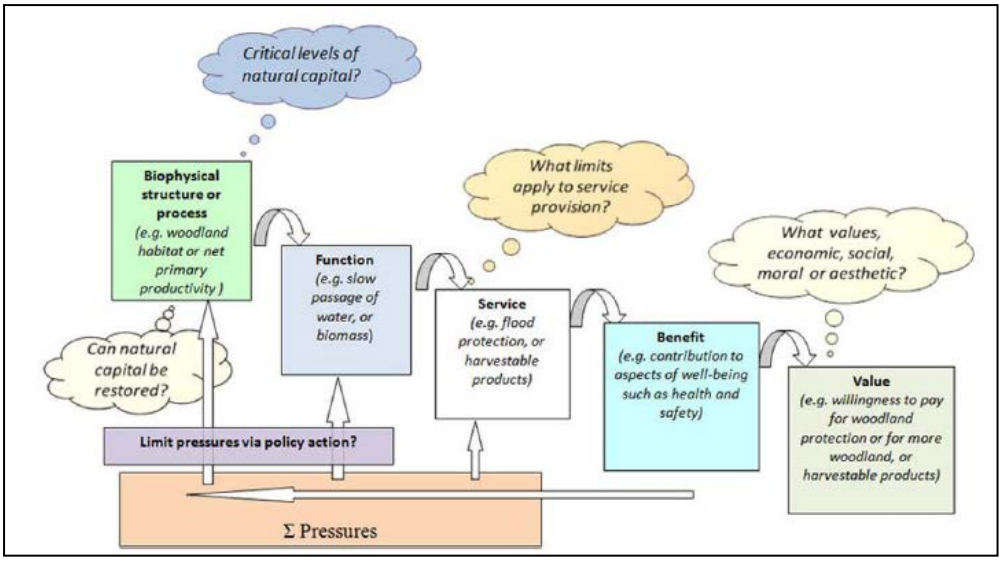
The research found that high level bonding of community forest in the area based on the same ethnic origin, with traditional collective decision making. It also supported by the

establishment of informal institution with participatory in the management process, namely Kalahan Educational Foundation (KEF). The members are treated equally, shared the same resources and benefit, also punished when they violates the rules. Meanwhile, bridging of formal and informal local institution is facilitated by good leadership of the major of Barangay. Furthermore, the KEF expands its link to various market institution, governments, and civil society. The networks strengthened the social capital at different level and ease the coordination and implementation of community forest practice. The research also revealed the role of local leader, pastor Rice, as catalyst in the community that established the link with other stakeholders.

2.4. Geographical Perspective of Forest: Spatial and Human Interconnection

The essential of geographical perspective in viewing forest ecosystem service underlie on the concept of 'space and place'. Potschin and Haines-Young (2011) states the importance of understand physical and social process in the context of place and region. They offer 'service cascade' framework to connect ecosystem function with human wellbeing through biophysical structure and process. The framework consists of stages to indicate the 'production chain' of environment. It also emphasizes on the role of policy to shape the feedback for the environment by limiting pressure in each of structure and process (figure 7). Moreover, this will impact on the sustainability of ecosystem function for human wellbeing.

Figure 7. 'Service Cascade' diagram (source: Potschin and Haines-Young, 2011)



Socio-ecological system is dynamic, complex, non-linear, and gradually change in response to pressure. In the same manner, the benefit distribution of the service, which is different in place and time, will affect people perception on how they value the ecosystem. Correspondingly, what people perceived determines the amount of pressure for the environment. Therefore, the role of policy action is significant to limit the pressure in each stage. Equally important, policy making should view the possible uncertainty related to the non-linearity in maintaining natural capital (Potschin and Haines-Young, 2011). In brief, the framework helps to construct the thinking on how the pressure in economic, environment and social (i.e. pollution, poverty) affect people's perception toward the forest. Moreover, the impact on the forest's value for the inhabitant will determine the planning and management of community forest.

2.5. Conceptual Framework

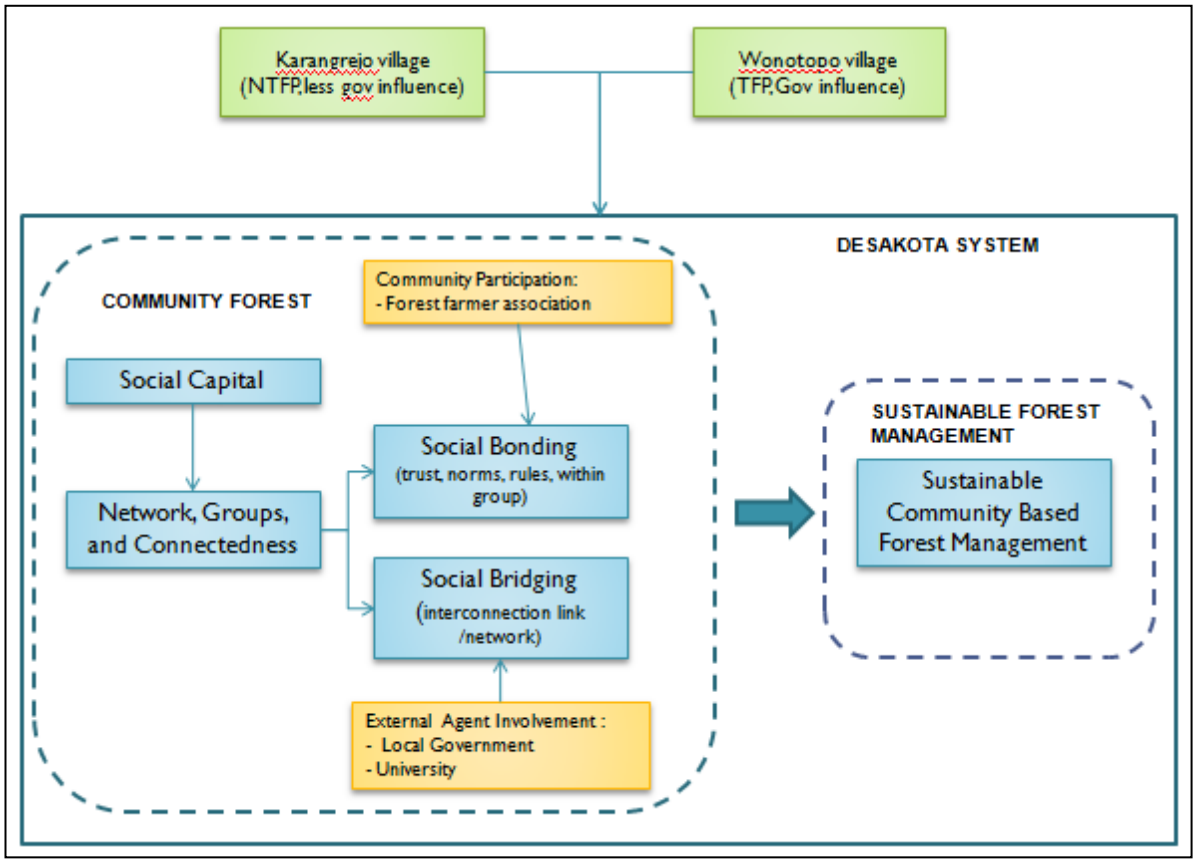
The research aims to analyse the connection of social capital to the sustainable forest management. The social capital aspect that is used in the research is network, groups, and connectedness in terms of social bonding and social bridging in the community. The rationality of the analytical tool is because social capital in the community significant in determining the degree of cohesiveness, furthermore, the willingness of the society to maintain the forest.

The research compares two different villages with similarity on community based forest management of smallholder forest farmer. The area is in the Desakota system, where ecosystem stress occurs as the excess of urban pressure activities. Cheap transportation system connection, communication and information accessibility generate the economic activity in the region where rural-urban mix exist. Furthermore, the activity trigger land use conversion and other negative effects for the environment, thus, decreases the capacity of ecosystem service of community forest. Social approach is the lens of the research to observe the sustainability of forest in the area.

Social acceptability of the community will ease the implementation of a program in the community forest. Particularly, in the research area where the forest is located on private land. Therefore, there is a need of social effort together to manage the forest, in order to share the benefit and minimize trade-offs. In this case, the role of social capital is important to develop common rules and norms that acceptable and sustain the environment.

Network, groups, and connectedness are the entry point to analyse the degree of social bonding and bridging in the community. Narayan (1999) states social group solidarity is the foundation of the society. The cross cutting ties among groups and government provide new insight in policy design. Reflect to the statement, the research will analyse groups of forest farmer to map the social capital on the two villages, for instance, the distribution of power, trust, local leadership, norms, and rules in relation to community forest management. The reason is because each group has unique contribution for the environment. Meanwhile, in order to analyse social bridging with external actor it is important to analyse the connection within the group first. This aims to observe the strength of network, the benefit for the groups and community which further will affects on the sustainability of forest management.

Figure 8. Conceptual Framework (source: author, 2014)



Chapter 3: Research Design and Methods

3.1. Revised Research Questions

The study is purposed to explore the causal relation of social capital in forest community with natural resource management to implement sustainable forest management. The chapter describes research design and data collection methods in order to answer research question.

The research analyse the dynamics of social capital in the context of community forests in the peri-urban region of Purworejo, Indonesia, and how it influences the sustainability of forest management. The study of social capital in community forest is considerable because of its role as a control mechanism. Moreover, community forest in the area is located in land plot which are privately owned by individual forest farmers. Therefore, the collaborative forest management heavily depends on the social mechanism developed in the society in order to achieve sustainability of forest ecology, social, and economic function. A certain research question is developed to obtain information of social dynamics in the area.

The main research question:

"What is the contribution of groups and networks as social capital element for sustainable community based forest management in Wonotopo and Karangrejo?"

The sub-research questions:

a. How does social bonding of forest community influence the sustainable forest management in Wonotopo and Karangrejo?
b. How does social bridging of forest community influence the sustainable forest management in Wonotopo and Karangrejo?

The methods are divided into four stages; operationalization, research design, data collection methods, and data collection instruments.

3.2. Research Approach and Techniques

The research is **single embedded case study** that aims to explain phenomenon in two different villages in one unit analysis of peri-urban region of Purworejo regency. The character of the research is **explanatory** which investigates the interaction of social capital towards forest sustainability. The two villages are chosen because the similarity on geographical characteristics and type of community forest, but different type of forest utilization; timber based and non-timber based forest product. Additionally, according to Yin (2003) investigating two villages as sub unit analysis is considerable to enhance the inquiry.

3.3. Operationalization: Variables and Indicators

The operationalization of the research is explained in the table below. The table consists of concepts, variables, and indicator that explicitly states in research question.

Table 1. Operationalization of research

Concept	Variable	Indicator	Type of Data
Social bonding	1. Norms and sanctions	- Enforcement of traditional norms and sanction (scale)	Quantitative
	2. Relation of trust	- Degree to which inhabitants trust the neighbourhood (scale)	Quantitative
	3. Reciprocity and exchange	- Degree of reciprocal acts (scale)	Quantitative
Community participation	4. Association	- Membership in formal groups or association (description)(scale)	Quantitative
		- The positive advantage of joining the association (scale)	Quantitative
	5. Initiative	- Degree of initiative in addressing problem (yes/no) (description) (scale)	Quantitative
	6. Decision making	- Degree to which member's opinion is used in decision making (scale)	Quantitative
		- Dissemination of information (scale)	Quantitative
Social bridging	7. Formal and informal institution	- Motivation of cooperation with other groups and institution (description)	Qualitative
		- Mutual beneficial mechanism that links people and institution(description)	Qualitative
	8. Linking networks	- Type of and level of cooperation with other groups, university, government (description)	Qualitative
		- Ease of accessibility of information (description)	Qualitative
Sustainable Forest Management	9. Ecological sustainability	- Change on biodiversity of plants and animals in the area (description)	Qualitative
	10. Economic sustainability	- Contribution to an increase in social and economic conditions of local community (description)	Qualitative

Source : the author (2014)

3.4. Sample Size and Selection

There is different sampling method in quantitative and qualitative research approach. According to Sandelowski (1995), commonly quantitative research utilizes probability sampling, whilst qualitative research uses purposive sampling. The research is mixed approach that involves qualitative and quantitative data, thus the sampling method is divided into two parts. The sampling method for quantitative approach is **probability cluster sampling**, which targeted the group of forest farmer association randomly. The cluster sampling is selected sample from cluster of subjects randomly (Black, 1993). In this research, the population is groups of forest farmer association in the two villages. The number of respondent is 30 people, who represent the member of the association that is selected randomly.

In order to get the qualitative data, the sampling method is **purposive sampling**. Purposive sampling uses small sample with respondent represents specific criteria related to certain variable and aim of the information (Black, 1993). However, the limitation of this sampling is prone to individual bias. Therefore, triangulation method is necessary to cross check the information. The sample targets respondent who has knowledge about social bridging process between community forest and stakeholders, also those who knows about ecological sustainable forest management relevant in the area. The number of respondents in this qualitative approach is one for each of institution as the key informants.

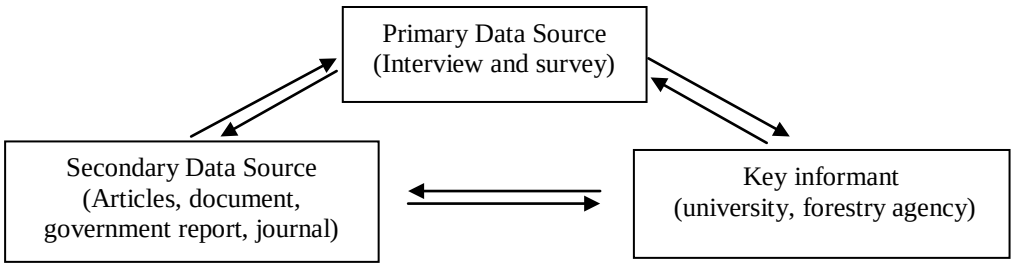
3.5. Validity and Reliability

The challenging part of case study research is in maintaining validity and reliability. In case study research, there are two validity designs that needed to be considered: internal validity and external validity. Internal validity refers to how valid the data to itself. It means that the findings accurately reflect the real situation. Meanwhile, external validity refers to whether the findings can be generalized. In order to maintain the validity and reliability of data, Morse (2012) mentions four verification strategy; methodological coherence, appropriate sample, concurrent data collection and analysis, and the last one is theoretical thinking. Therefore, systematic research design of data collection strategy, methods, and instruments will contribute to the validity. Meanwhile, reliability according to Black (1993) should meet the criteria of stability test and re-test and internal consistency. The possible threats that affect the reliability of research methods are instrumental bias, participant's changes, and environmental changes.

Reflect to the theory above, in this research, validity maintenance start from formulating indicator that widely accepted as measurement in the relevant research. Additionally, it is necessary to select the appropriate strategy and data collection method that coherent with research question. The next stage is determining the sample and data collection instruments. In formulating question, in questionnaire and interview guide, the question should meet the criteria of content validity and construct validity. In the same manner, the questions should capture the essential information/content and consider the frame or the way it is asked to the respondent in order to get the intended information. Additionally, mapping the profile of the respondent will contribute to the validity of obtained information. For instance the respondent should be forest farmer who lives in the neighbourhood for long time will be valid to answer the question on the social bonding.

Creswell (2000) mentions triangulation methods to cross check primary data among multiple and different source of information in a research. This method sorts the data to discover common category or themes by eliminating overlapping. For qualitative research, cross checks with field observation, interviews and documents are necessary to locate minor and major themes. In this research, triangulation is used by checking the result of interview with document, reports, journal or publication of the local government (Forestry and Agriculture Agency/DISHUTBUN) and university (Community Forestry Research Centre/PKHR, Gadjah Mada University).

Figure 9. Triangulation of data source



3.6. Data Collection Methods

The data type in the research is combination of qualitative and quantitative approach to obtain comprehensive analysis about social capital in the area. The data collection method is derived from indicators. The source of information is mainly from primary data (i.e. field observation, interview, questionnaires) and supported by secondary data as background information and to triangulate the information.

1. Primary Data

In primary data collection, field observation is necessary to sketch the area as preliminary survey. Visual observation through maps, pictures, and information from head of village is an entry point to do the research.

The combination of qualitative and quantitative approach is used to obtain information about **social bonding** and **community participation**. The data collection method is **survey** with questionnaire as instrument that targets the member of forest farmer association in two forest communities. The type of question is close ended question. This is in order to capture opinion, behaviour, and attitude toward the forest. The opinion is important to know the willingness and the pattern of social bonding as the foundation to support collective action for forest management. The qualitative type of the question in the questionnaire will be quantified through "*likert scale*", hence, it can be measured quantitatively.

Qualitative data type is also used to capture specific insight about **social bridging** and **forest sustainability** in the area. The instrument of data collection is **semi structured interview** with open ended question. The interview is purposed to dig information about linking network between forest community and other stakeholder. The key informants are head of the village, head of forest farmer association, Forestry and Agriculture Agency of Purworejo regency (DISHUTBUN) and Community Forestry Research Centre (PKHR) Gadjah Mada University. The two institutions (PKHR and DISHUTBUN) are key informants for both social bridging and forest management in the area.

Table 2. Primary data collection methods

Concept	Type of data	Source of information	Data collection methods	Sampling methods
Social bonding	Quantitative	Member of forest farmer association	Survey (questionnaire)	Probability Cluster sampling
Community participation	Quantitative	Member of forest farmer association	Survey (questionnaire)	Probability Cluster sampling
Social bridging	Qualitative	- Head of village Karangrejo and Wonotopo - Head of forest farmer association in Karangrejo and Wonotopo - Forestry and Agriculture Agency of Purworejo regency (DISHUTBUN) - Community Foresty Research Centre (PKHR), Gadjah Mada University	Semi structured interview with key informant	Purposive sampling
Sustainable Forest Management	Qualitative	- Forestry and Agriculture Agency of Purworejo regency (DISHUTBUN) - Community Forest Research Centre (PKHR), Gadjah Mada University	Semi structured interview with key informant	Purposive sampling

Source : the author (2014)

2. Secondary Data

The secondary data is compiled through review of statistic data, documents, articles, journals, and government reports. The secondary data should be from reliable source for its validity. The document review aims to get an overview in demographic and socio-economic of Wonotopo and Karangrejo. Furthermore, the data is utilized to triangulate information from primary source (interview and questionnaires). The data are:

- Statistical data: Purworejo Regency in Figures 2013, published by Central Statistical Board of Purworejo regency (BPS).
- Government reports: Multi stakeholder Forestry Programmes 2, Final report December 2013, Ministry of Forestry.
- Publication of Community Forest Research Centre (PKHR), Gadjah Mada University: Community Forest Management in Karangrejo, Survey Result 2005.
- Village profile of Wonotopo and Village tourism board of Karangrejo village (2013).

Chapter 4: Research Findings

This chapter explains the research finding according to data analysis based on survey, interview, and secondary data. Brief description about physical characteristic, as well as demographic and socio-cultural condition is relevant to understand the situation and sample. Additionally, the explanation on the data analysis reflects to research question and theory that will be further explored in discussion sub chapter.

4.1. Characteristic of the Study Area

- Geographical Characteristic

Karangrejo is located approximately five kilometres in north of Purworejo regency. Situated in peri urban area close to Bogowonto river, the village is traversed by main road that connects Purworejo and Magelang. The topography of the area is hilly mountain, which covers two third of the total area, with altitude 200 to 300 meters above sea level stretched from east to west. Community forest is located in this area. Meanwhile, one third of the village is alluvial plain with altitude 65 to 150 meters above sea level where intensive agriculture exist (village tourism board of Karangrejo, 2013). According to Central Statistical Board of Purworejo (2013), the climatic condition of Karangrejo is wet tropical with temperature ranges from 19 to 32 degree celcius.

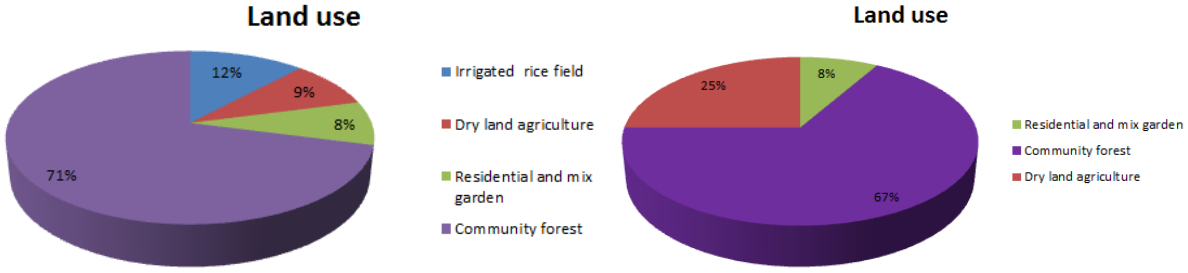
Wonotopo village is located approximately two kilometres in the north-west of Karangrejo village, or seven kilometres from the city centre. The area is passed by main road connecting Purworejo with Wonosobo regency. According to village secretary, the village is located in the altitude of about 400 meters above sea level. The climatic condition is similar to Karangrejo.

- Land use

The total area of Karangrejo is 286.680 Ha, with land use pattern consists of rice field, residential and mix garden, and community forest. The distribution is shown in the chart (figure 10). The main land use is community forest with total area almost 171 hectares, followed by 28.8 Ha irrigated rice field, 21.5 Ha dry land agriculture, and 19.68 Ha residential area and mix garden.

Meanwhile, from the total area of 151.460 hectare in Wonotopo, 100,97 hectares is forest, 37.86 Ha dry land agriculture, and 12.62 Ha residential and mix garden.

Figure 10. Land use distribution in Karangrejo (left) and Wonotopo (right)



- Land status and extent

In community forest of Karangrejo, the average of land extent is shown in the pie chart below (figure 11). The majority land extent is 0,3 to 1 hectare (43%). Less than 17% of the farmer has land more than 1 hectare. Furthermore, 93.3 % is private land owned by the farmer, and only 6.7% is shared with other people (figure 12). Meanwhile, the table indicates the distribution of land status based on the extent of the land. In private land, 40% has total area

of 0 to 0,3 Ha, followed by 0.3 to 1 ha (36%), and only 16.7% of the respondent who has more than 1Ha of private land (table 3).

In Wonotopo, within the forest farmer group of Wonoupoyo I, the majority of land extent is 0 to 0.3 hectare (53%). Furthermore, only 13.3% is privately owned by the forest farmer, while 86.7% or the majority of the farmer shared land with other party (figure 11 and 12). The table shows that the majority of shared land is distributed in small plot which is less than 0.3 hectare (46.7%). Only 10% of shared land located in plots larger than 1 Ha (table 4).

Figure 11. Percentage of land extent in Karangrejo (left) and Wonotopo (right)

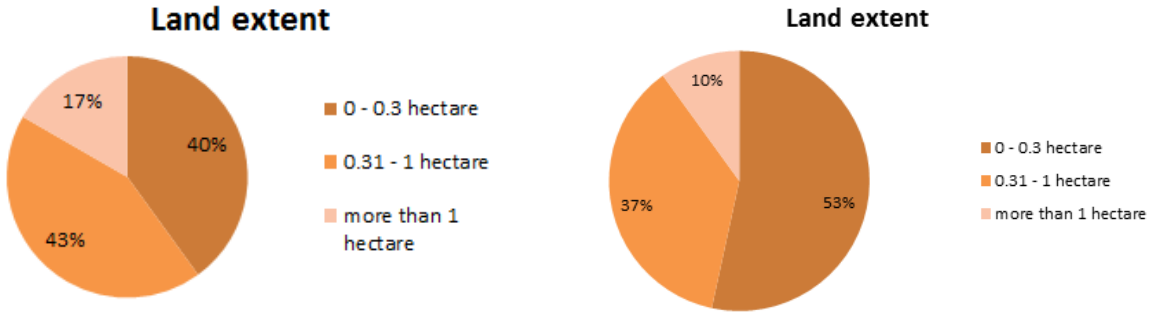


Figure 12. Percentage of land status ownership in Karangrejo (left) and Wonotopo (right)

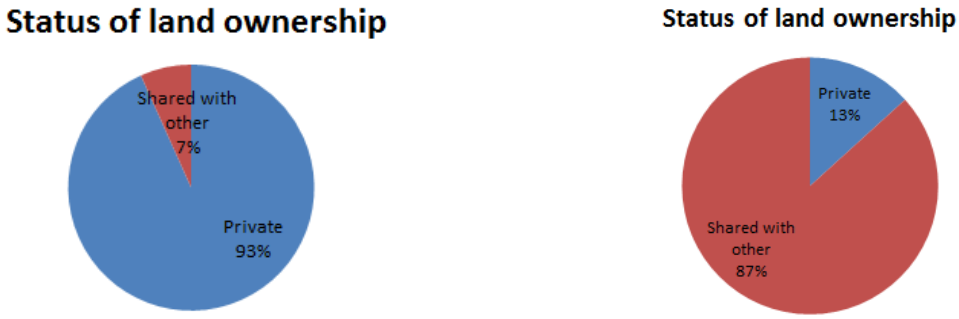


Table 3. Distribution of land ownership based on the land extent in Karangrejo village

		Extent of land							
		0 to 0.3 hectares		0.3 to 1 hectares		more than 1 hectares		Total	
		Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %
Status of land ownership	private land	12	40.0%	11	36.7%	5	16.7%	28	93.3%
	joint with other	0	0.0%	2	6.7%	0	0.0%	2	6.7%
	other	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source : the author (2014)

Table 4. Distribution of land ownership based on the land extent in Wonotopo village

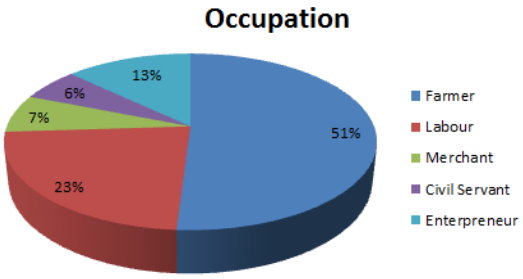
		Extent of land							
		0 to 0.3 hectares		0.3 to 1 hectares		more than 1 hectares		Total	
		Count	Table N %	Count	Table N %	Count	Table N %	Count	Table N %
Status of land ownership	private land	2	6.7%	2	6.7%	0	0.0%	4	13.3%
	joint with other	14	46.7%	9	30.0%	3	10.0%	26	86.7%
	other	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Source : the author (2014)

- Demographic Composition

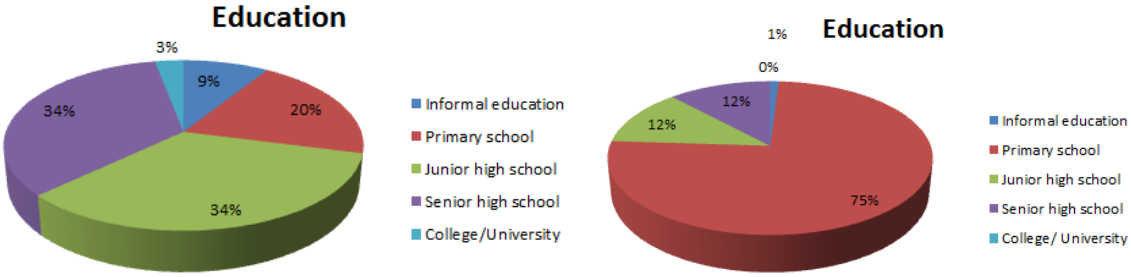
Karangrejo has total population of the 1.781, consists of 894 male, and 897 female. In total, there are 448 households. The level of education in the chart below shows that the majority of inhabitants reach junior high school and senior high school at the same composition (34%). Only 9% reach university, and only 3% with informal education (figure 14). In employment sector, the chart shows that the majority occupation of the inhabitant is farmer, followed by labour, specifically those who work for other people land, work as labour in factory, and as house maid in the city (figure13).

Figure 13. Percentage of population by education attainment in Karangrejo



Wonotopo has total population of 1.234 inhabitants, consists of 589 male and 645 female. In total there are 383 households in the area. The majority of the inhabitants work as farmer and labour, no records or exact number on the information of employment. From the total inhabitant, 75% attain primary school, 24% in junior school and senior high school, whilst only 1% in informal education (figure 14).

Figure 14. Percentage of population by education attainment in Karangrejo (left) andWonotopo (right)



- **Socio-cultural**

Karangrejo

The community is a traditional Javanese ethnic with strong bond to its historic and cultural root. The behaviour of the society put communal interest first in every activity. This comes from the spirit of '*gotongroyong*' that characterized the society, the spirit of working together as a community to overcome a problem, especially in rural area. The people of Karangrejo prefer to work together to achieve their common goal related to their environment. Forest conservation is the main goal of the society with simple motivation to prevent landslide, benefit the fresh air, and provide water throughout the season.

Nowadays, the effort is succeed by the presence of many natural springs, even in top of the hill the springs are easily found with good quality of water, usually the water occurs around *Gayam* tree (figure 13). The water is distributed to households through pipes. Looking at the potential volume of water resource, therefore, in 2014 government included the village into a project of Water and Sanitation Project for The Poor (PAMSIMAS). The project started by installing big tank and pipe in one of the spring, then distributes the water to the neighbouring villages.

Figure 15. Accessibility to Karangrejo village (left), natural spring under *Gayam* tree (right)

Wonotopo

The community lives the same culture as Karangrejo, a Javanese society. However, their livelihood as dry land farmer and forest farmer which are subsistent farmer, also low education attainment create a combination of poverty and low skill human resource (figure 16). Cultural activity is not well developed in the village because people focus on how to fulfil their basic need.

However, government initiated Water and Sanitation Project for The Poor (PAMSIMAS) in this area. The main water resource is the river located down in the valley. The project started in 2014 by constructing water tank and install pipes to flow the water to households with approximate pipe length of 2.750 meters.

Figure 16.*Albacia* forest and land clearing (left), sawmill in Wonotopo (right)

- **Structure of governance**

Governance structure in Karangrejo is divided into four sub villages (*Dusun*); Trirejo, Kalisemo, Kalikalong, and Caok. The village is led by head of village which cover the four sub villages. Furthermore, the village is under the authority of Loano sub district.

Meanwhile, Wonotopo is under the authority of Gebang sub district. The village consists of four sub village (*Dusun*); Krajan,Ceparang, Ngaglik, and Trukan. Similar to Karangrejo, the village is led by head of the village.

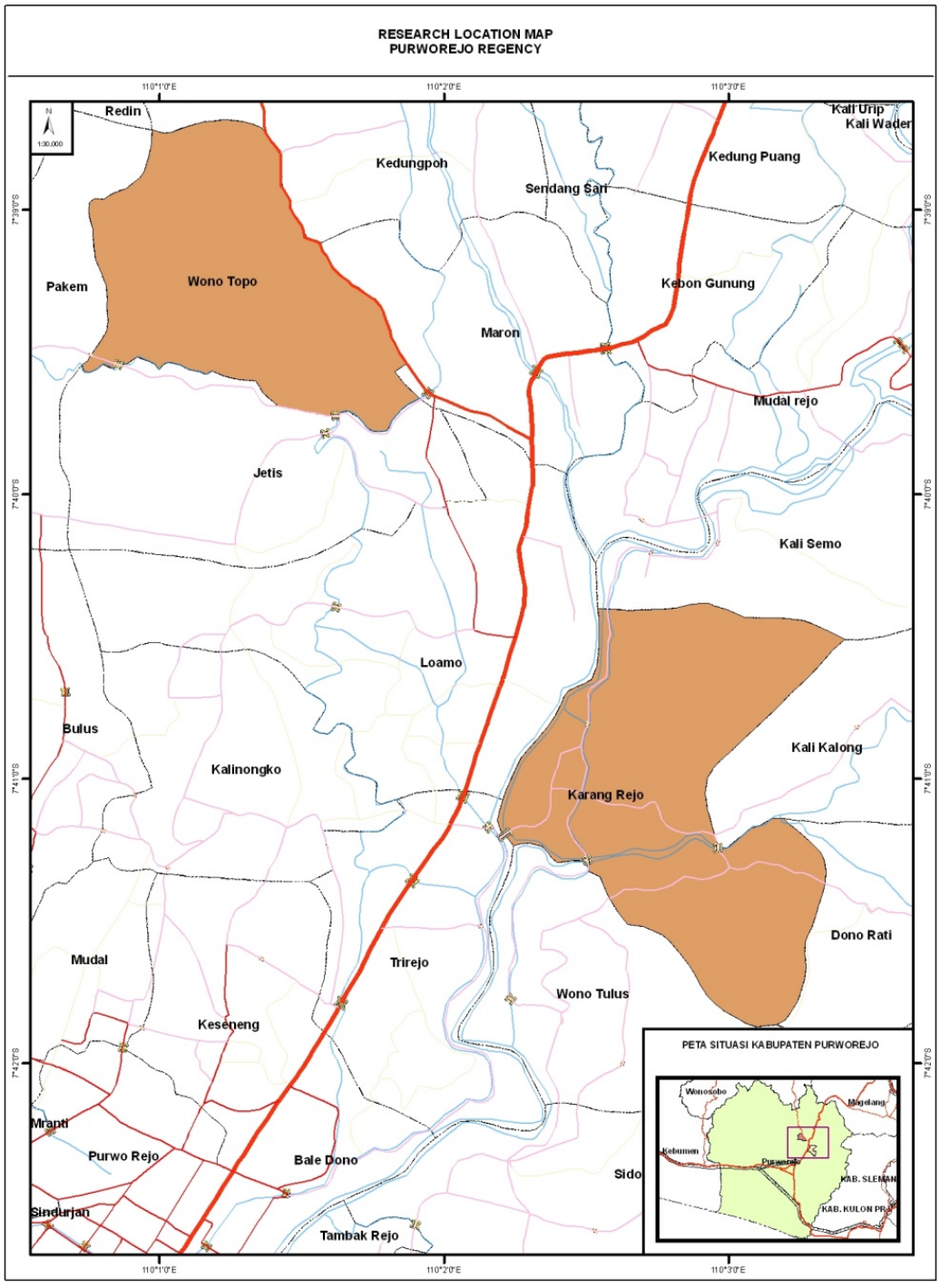
4.2. Profile of Forest Farmer Group

Forest farmer group is informal organization in the village. Karangrejo and Wonotopo have their forest farmer association with different motivation and programs as shown in the table below.

Table 5. Profile of forest farmer group in Karangrejo and Wonotopo

	KarangrejoVillage	**Wonotopo Village**
- Name	KTHR Murakabi	KTHR Wonoupoyo I
- Founded	1998	2011 (re-activated)
- Number of member	75	45
- Frequency of meeting	Once in a month in Javanese calendar	Once in a month in Javanese calendar
- Name of Leader	Patnani	Wagino
- Activity in 2014	1. Ecotourism 2. SVLK (Verification System of Timber Assurance)	1. Afforestation 2. Community forest enrichment through plant diversification 3. SVLK (Verification System of Timber Assurance)
- Planning and monitoring in group	Exist	Not exist, incidental

Figure 17. Location map of Karangrejo and Wonotopo village, Purworejo

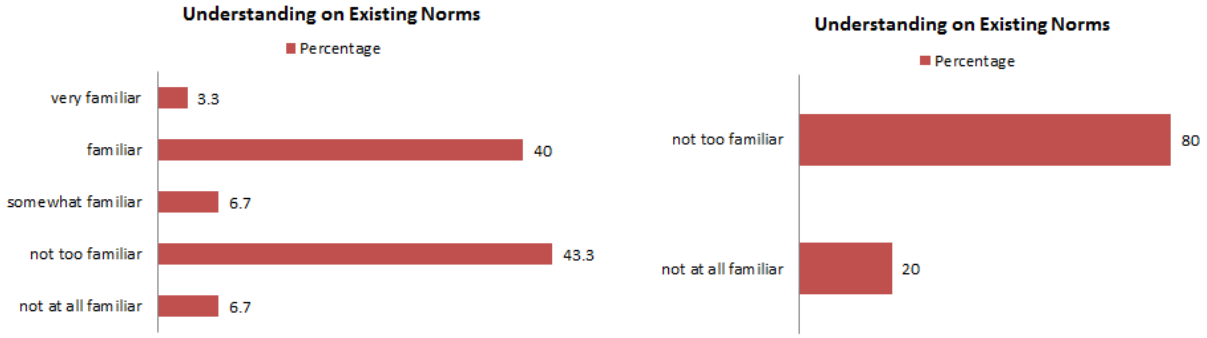


4.3. Social Bonding and Sustainable Community Based Forest Management

4.3.1. Norms and Sanction

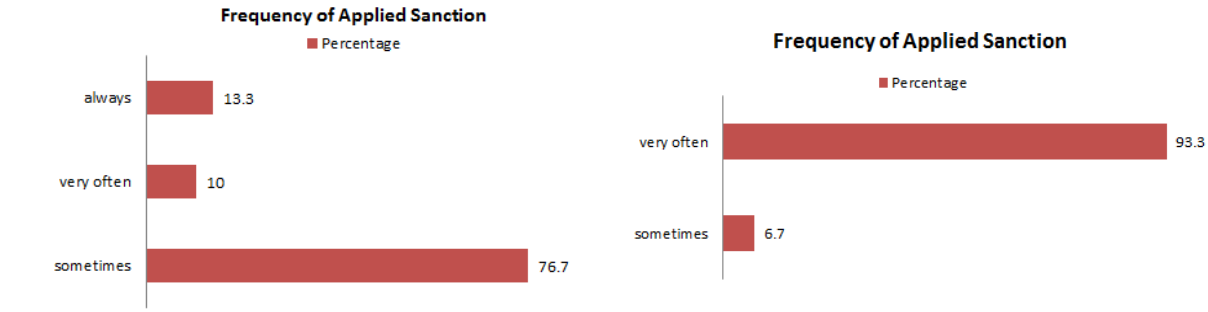
Understanding on existing norms and sanction in the society related to community forest is important variable that determines the behaviour of the society toward the forest. The investigation revealed that in Karangrejo only 40%of the respondent familiar with existing norms on protecting forest in the village, whilst 43.3% is not familiar with any rules regarding forest protection (Figure 18). Meanwhile in Wonotopo, 80% of the respondent does not familiar with norm or rules to protect the forest. Further investigations revealed that only elderly people familiar with local wisdom that states if cutting one tree you should plant another. Meanwhile, younger generation does not understand if there is a rule in protecting forest.

Figure 18. Percentage of Understanding on Norms in Karangrejo (left) and Wonotopo (right)



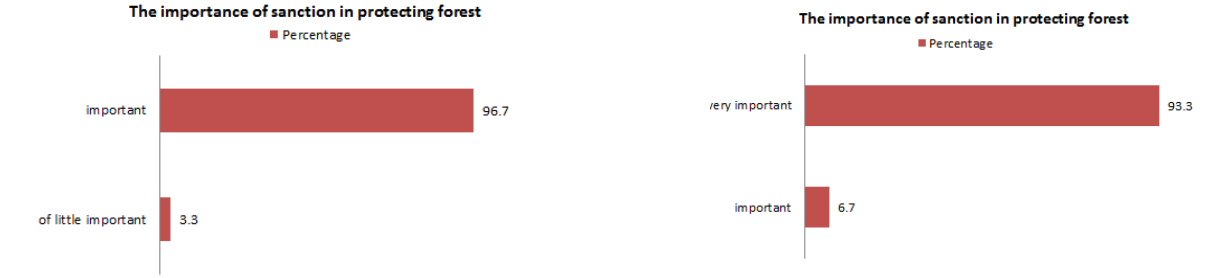
In terms of applied sanction on norms violation, 76% of the respondent in Karangrejo stated that the sanction only sometimes is applied because of the rare case of violation (Figure 19). Meanwhile, in Wonotopo, although the respondents do not familiar with norms, the majority of respondent answered that the enforcement of sanction is very often (93%).

Figure 19. Percentage on Frequency of applied sanction in Karangrejo (left) and Wonotopo (right)



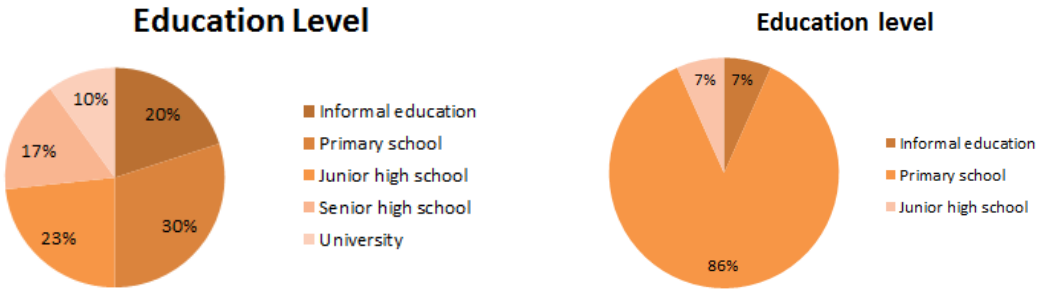
Further findings revealed that the both village agree on the importance of sanction in order to protect the forest. In Karangrejo, 96.7% of the respondent states that it is important, while Wonotopo states that it is very important (93.3%) (figure 20).

Figure 20.Percentage on the importance of sanction in protecting forest in Karangrejo (left) and Wonotopo (right)



Additionally, within KTHR Murakabi (forest farmer group in Karangrejo) itself, the education level of the member mainly primary school (30%). Only 10% of the group member attains university level (Figure 21). Furthermore, the majority of education level attainment in KTHR Wonoupoyo I (forest farmer group in Wonotopo) is primary school (86%). Only 7 % of the respondent attains junior high school, and 7% reach senior high school (figure 21).

Figure 21. Education level in KTHR Murakabi (left) and KTHR Wonoupoyo I (right)

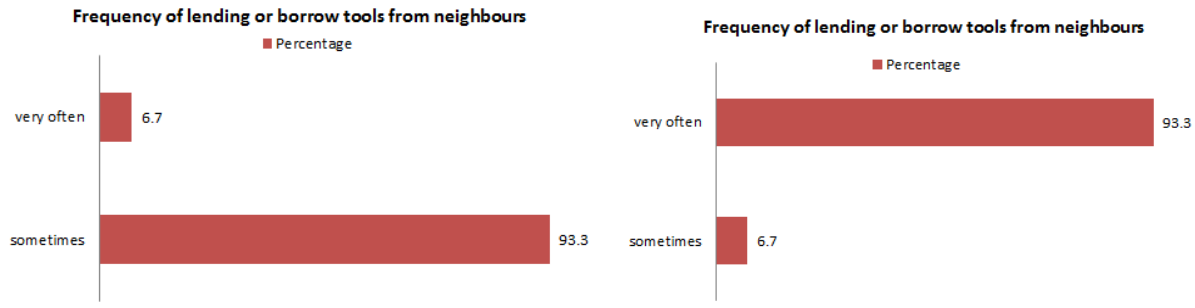


Further correlation analysis is utilized to explore the connection between education level and understanding on existing norms. The analysis aims to measure the strength of the relation. The results revealed that there is strong positive correlation between education level attainment and understanding on existing norms in Karangrejo [r=.580, n=30, p=.001] (Annex 1). This means that higher education lead to higher awareness and understanding on the existing norms. Conversely, there was no sign of correlation between the two variables in Wonotopo [r=.000, n=30, p=1] (Annex 2). It means that no relation exists between education level and knowledge on norms in the village. Further interview with head of KTHR Wonoupoyo I revealed that this is due to the missing local wisdom about forest in the area and low awareness to protect it.

4.3.2. Relation of Trust

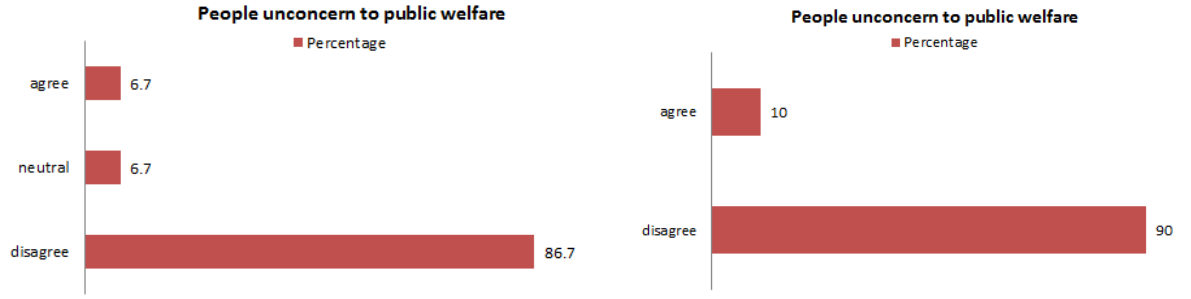
Trust is the foundation of bonding in the society. The findings show the high level of trust in Karangrejo village. This is shown in the descriptive table below where 93.3% of the group member sometimes lend or borrow tools from their neighbour (Figure 22). Meanwhile, Wonotopo shows that the majority of the respondents highly trust their neighbour (93.3%). This reflects the habitual activity of the forest farmer.

Figure 22. Percentage of trust in Karangrejo (left) and Wonotopo (right)



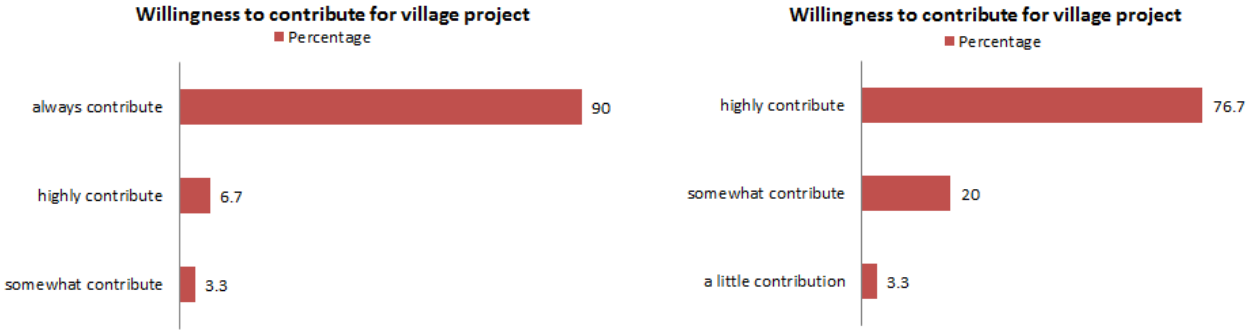
Furthermore, 86.7% of the respondent in Karangrejo believes that people are highly concern on public welfare (Figure 23). Meanwhile in Wonotopo, 90% of the respondent believes that their community is highly concern about public welfare.

Figure 23. Percentage level of consideration to public welfare in Karangrejo (left) and Wonotopo (right)



In Karangrejo, 90% of the respondent always contributes to the public welfare by willing to spend money for communal welfare (figure 24). Meanwhile, in Wonotopo, 76.7% of the respondent is highly willing to contributes, while 20% of the respondent occasionally willing to contributes their money for communal welfare.

Figure 24. Percentage level of contribution to public welfare in Karangrejo (left) and Wonotopo (right)

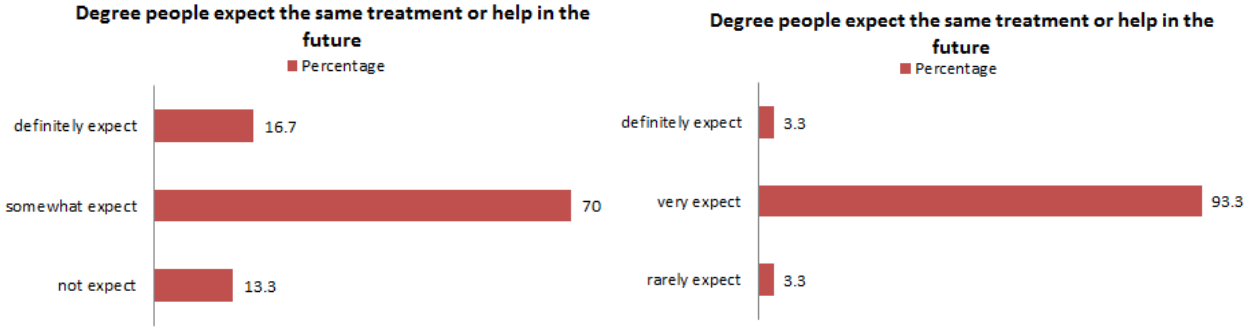


Overall, the relation of trust among forest farmer in Wonotopo is almost similar with Karangrejo. They trust their neighbour, concern about public welfare, and willing to spend some effort for the community welfare.

4.3.3. Reciprocity and Exchange

Exchange of help or degree of reciprocity is major component that support social bonding. The survey reveals that the majority of forest farmer in Karangrejo somewhat expect that their neighbor will do same help in the future (70%) (Figure 25). The chart shows that there is an expectation, however, if they do not achieve the same treatment in the future it would be no problem for them. In the same manner, Wonotopo shows that 93.3% of the respondent highly expecting the same treatment in the future when they help their neighbour. This reveals that the community depends on each other. The reciprocal treatment is significant in determining the bonding in the group.

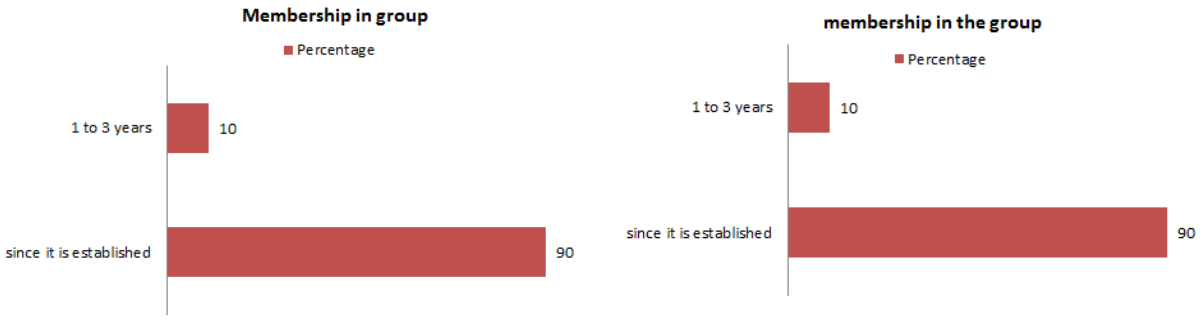
Figure 25. Percentage of reciprocity in Karangrejo (left) and Wonotopo (right)



4.3.4. Association
-Karangrejo

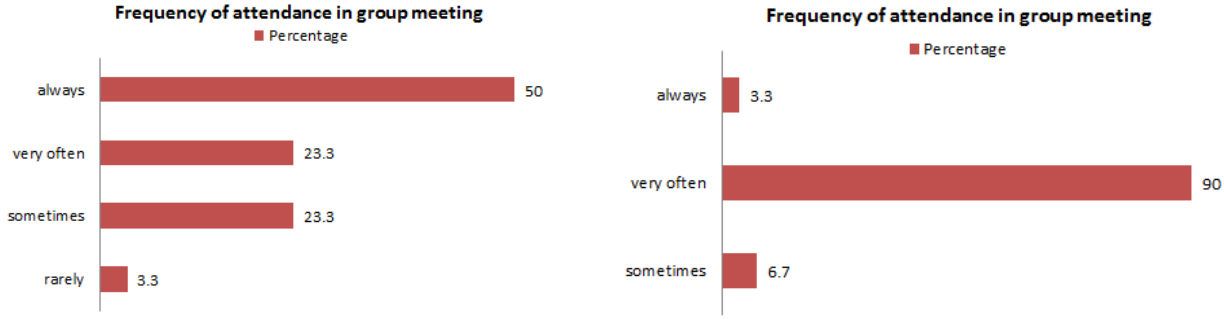
The finding revealed that the majority of respondent (90%) joined the Murakabi forest farmer organization since it was established in 1998 (figure 26). Similar with Karangrejo, the majority of the member (90%) joined the Wonoupoyo I since it was reactivated in 2011.

Figure 26. Group membership in Karangrejo (left) and Wonotopo (right)



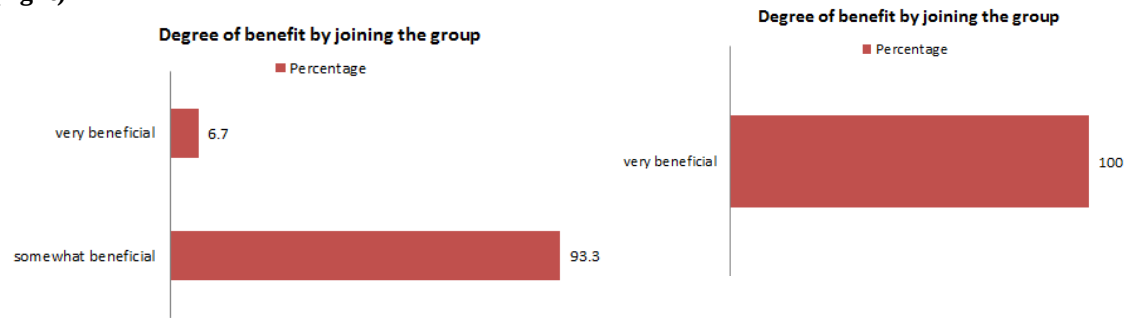
However, only 50% of the respondent in Karangrejo always attends the group meeting (figure 27). Meanwhile, 90% of the respondent in Wonotopo is very often attends the group meeting.

Figure 27. Percentage on frequency of attendance in group meeting Karangrejo (left) and Wonotopo (right)



In Karangrejo, only 6.7% of the respondent thinks that the organization is very beneficial, whilst 93.3% think that somewhat it is beneficial (figure 28). In the same manner, all the respondent in Wonotopo thinks that join the organization is very beneficial.

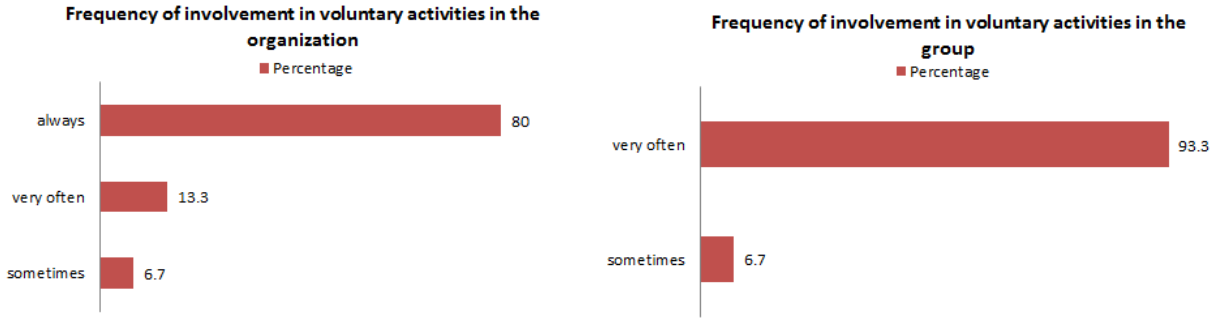
Figure 28. Percentage of opinion on the benefit of joining group in Karangrejo (left) and Wonotopo (right)



Furthermore, in Karangrejo, 80% of the respondent always involves in the voluntary activity of the group (figure 29). Indeed, 93.3% of the member in Wonotopo very often involves in voluntary activity of the forest farmer group. In short, the member enjoys the benefit of

joining the group. Thus, they are actively involved in the organization and willing to do voluntary activity with the forest farmer group.

Figure 29. Participation on voluntary activity in Karangrejo (left) and Wonotopo (right)

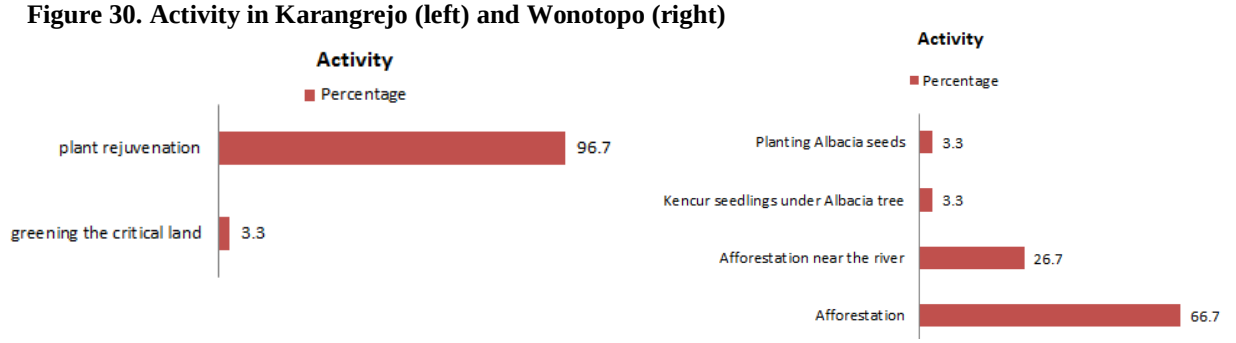


4.3.5. Initiative

The findings revealed that the member of Murakabi in Karangrejo totally believes in the importance of community organization in order to address the problem in their community forest. The activity of the group at the moment of research fieldwork was plant rejuvenation (93%). It is interesting because the farmer do the same activity in their own land. It means that almost all the farmer is in the same phase of planting trees.

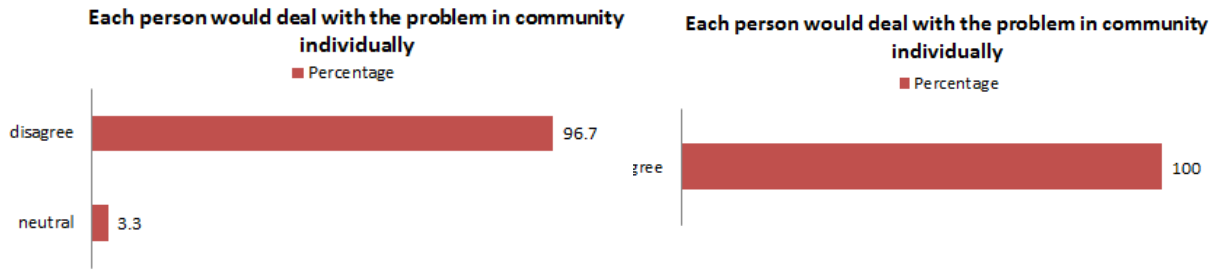
The group member of Wonoupoyo I in Wonotopo had the same opinion with Karangrejo. They believe that community group is important to address a need or problem in the community. In contrast to Karangrejo, Wonoupoyo I group member held different activities in the community forest. Although the majority of activity was afforestation (66.7%), there were other activities such as *Kencur* seedlings under *Albacia* tree (3.3%), also plant *Albacia* seeds (3.3%) (figure 30).

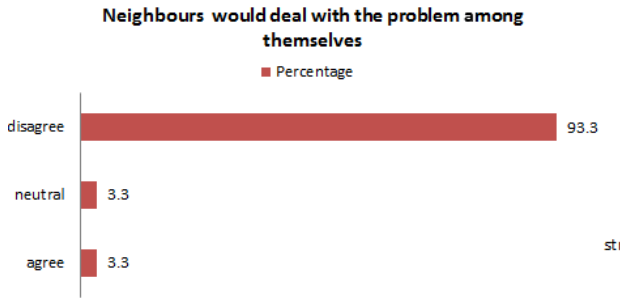
Figure 30. Activity in Karangrejo (left) and Wonotopo (right)

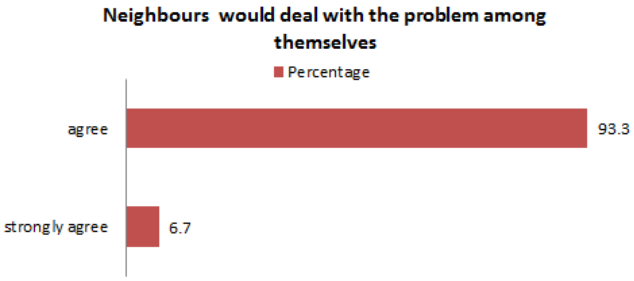


The group member in Karangrejo believes that problem related to community forest should not be solved individually (96.7%) or among neighborhood (93.3%). In contrast, all of the respondent in Wonotopo agree that problems should be solved individually (100%) or among neighborhood level (93.3%) (figure 31).

Figure 31. Problem solving initiative in Karangrejo (left) and Wonotopo (right)

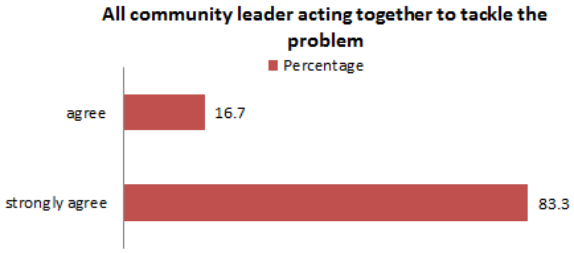


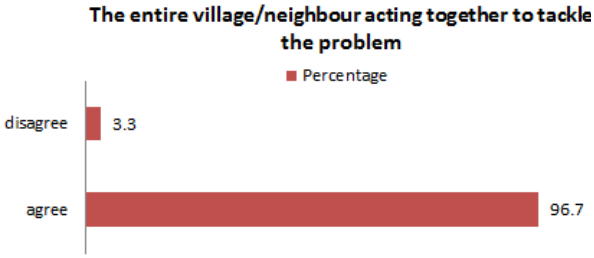


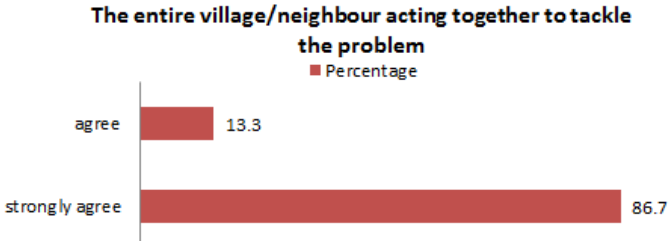


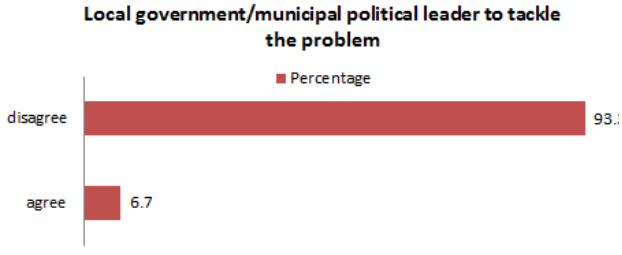
Furthermore, all respondents in Karangrejo agree that they should involve all community leaders (100%) and the entire village to act together in solving the problem (96.7%). They also disagree if only local government that tackle the problem without coordination with the community (93.3%). Similar to Karangrejo, high number of the respondent in Wonotopo are strongly agree that if there are problems, all community leaders should act together (83.3%) as well as the entire village (86.7%). In contrast to Karangrejo, almost all of the respondent agree that municipal or local government should tackle the problem in their community forest (96.7%) (figure 32). This shows the high dependency on government assistance.

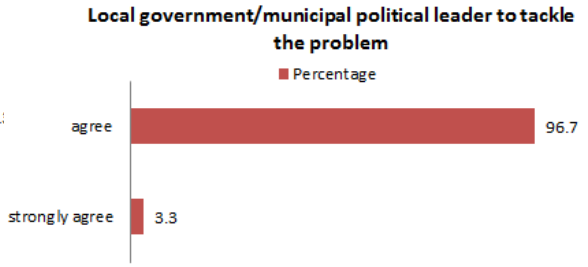
Figure 32. Problem solving initiative in Karangrejo (left) and Wonotopo (right)











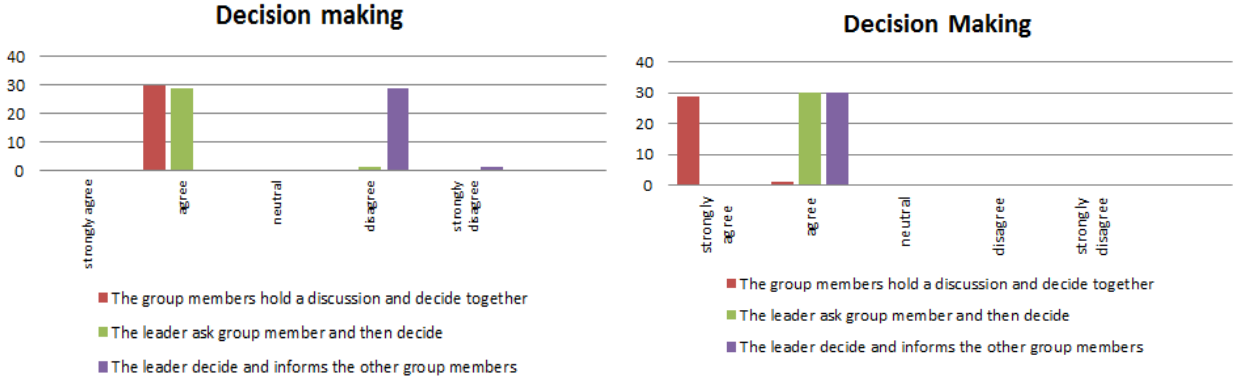
4.3.6. Decision making

In terms of decision making, all of the respondents in Karangrejo agree that they should discuss and decide together (100%). It also revealed that usually the leader asks the member first before deciding something (96.7%). Accordingly, the respondent are disagree if their leader take decision without involving the member (96.7%) (figure 33).

Almost similar to Karangrejo, but somewhat in different degree, almost all of the member of the group in Wonotopo believes that they should discuss and decide together (96.7%). All of

the respondent agree that usually the leader asked the group member then decide something (100%). However, they also agree that the leader should decide and informs the member of the group (100%).

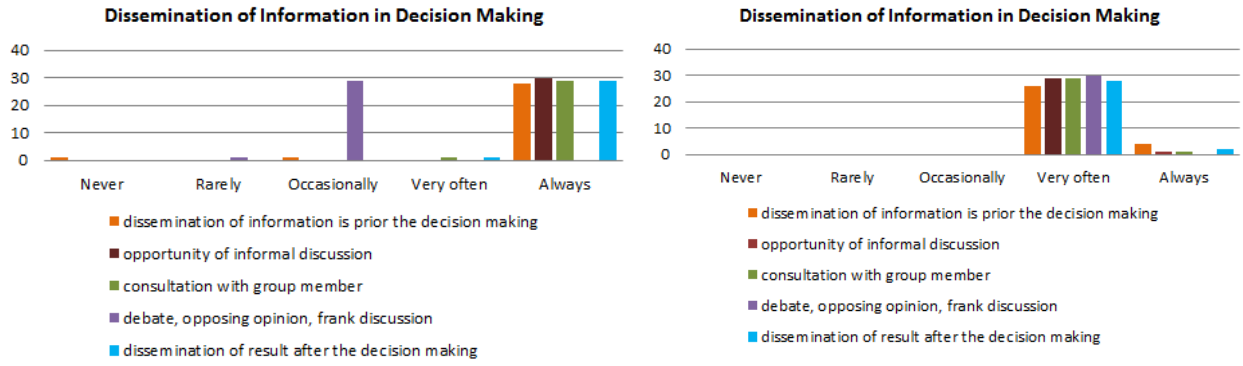
Figure 33. Decision making in Karangrejo (left) and Wonotopo (right)



Dissemination of information in Karangrejo indicated that the leader always disseminates the information prior the decision making (93.3%), afterwards, the group member always holds informal discussion (100%). Debate and opposing opinion are occasionally happens (96.7%). Then, the leader consults to the member before taking a decision (96.7%). Dissemination of the result is always done after the decision making (96.7%) (figure 34).

In the same manner, data findings in Wonotopo revealed that dissemination of information prior the decision making in the group is very often (86.7%). Furthermore, informal discussion is very often held (96.7%) with opposing debate or frank discussion very often occurs (100%). According to the respondents, the leader consults with the member very often (96.7%) before taking a decision. The member also states that the leader disseminate the result after the decision making (93.3%).

Figure 34. Dissemination of information in Decision Making in Karangrejo (left) and Wonotopo (right)



4.3.7. Statistical Analysis

Regression analysis is utilized to discover the relation of land status and extent of land ownership with various social bonding variables in the two villages. The two measures are used to discover the relationship with other variables; contribution, participation, norms, trust, and attendance in community meeting (see Annex). Land status and land extent are chosen because it characterized the community forest in the area that distinguish the two villages.

- **Karangrejo**

The result indicated that there is no significant correlation between land status and the willingness to contribute efforts/money for village project [r=.083, n=30, p=.661]. It also has

no significant correlation with participation on voluntary activity in the group [r=.124, n=30, p=.513]. Furthermore, land status does not correlate with understanding on norms to protect forest [r=.024, n=30, p=.899]. The findings also revealed that there is no correlation between land status and trust [r=.071, n=30, p=.708]. Land status shows no significant correlation with the frequency of attendance in the community meeting [r=.235, n=30, p=.211].

Meanwhile, land extent as predictor reveals that it has no significant correlation with willingness to contribute efforts for communal project [r=.211, n=30, p=.263]. it also has no correlation with participation in groups voluntary activity [r=.070, n=30, p=.712]. Additionally, it does not have significant correlation with understanding on norms to protect forest [r=.350, n=30, p=.058]. In the same manner, it also has no significant correlation with trust in the community [r=.286, n=30, p=.125]. Moreover, it has no significant correlation with frequency of attendance in the meeting [r=.123, n=30, p=.517].

Overall, based on descriptive analysis, the social bonding in Karangrejo is high. However, the findings revealed that all variables do not significantly correlate to the two predictor variables (land status and land extent). Hence, the result indicates that there are other factors, besides of predictor variables that contribute to social cohesion in Karangrejo. However, it needs further research to explore factors that connect individual and lead to communal action in the village.

- **Wonotopo**

Wonotopo has different pattern of social bonding compared to Karangrejo. Similarly, land status and land extent are utilized as predictor to measure social bonding variables; contribution, participation, norms, trust, and attendance in community meeting. In terms of land status, the findings show that there are significant and high positive correlation between land status and the willingness of community to contribute some efforts for the village [r=.562, n=30, p=.001], y=2.154+0.846x, R Square shows that 31.6% of the willingness to contribute in village project can be predicted from land ownership status. Meanwhile, it has no significant correlation with participation on voluntary activity in the village [r=.288, n=30, p=.122]. However, strong positive correlation occurs between land status and understanding on norms to protect the forest [r=.784, n=30, p=.000], y=0.077+0.923x, R Square shows that 61.5% of familiarity on norms can be predicted from land status. Similarly, there is strong positive correlation between land status and trust in the community [r=.681, n=30, p=.000], y=3.000+0.500x, R Square shows that 46.4% level of trust in the society can be predicted from land status. On the contrary, no correlation exist between land status and attendance in community meeting [r=.042, n=30, p=.827].

Meanwhile, land extent as predictor in Wonotopo shows no significant correlation with willingness of contribution to communal project [r=.247, n=30, p=.188]. Furthermore, it also shows no correlation with participation to groups voluntary activity [r=.027, n=30, p=.889]. In the same manner, it shows no significant correlation with understanding on norms [r=.175, n=30, p=.356]. Similarly, there is no significant correlation between land extent and trust in the community [r=.027, n=30, p=.889]. Last variable also shows no correlation between land extent and attendance in community meeting [r=.069, n=30, p=.718].

In brief, land status strongly correlate and influence the perception on contribution, norms and trust in Wonotopo (Annex 8). However, land status does not significantly correlate with participation and attendance on community meeting. Meanwhile, land extent shows no significant correlation with the five variables (contribution, participation, norms, trust, and attendance in meeting). Overall, land status is able to predict contribution, norms, and trust in social bonding, whilst other variables are influenced by other factor. Similarly, land extent as predictor, indicates that there are other factors that contribute to the social bonding in Wonotopo. However, it needs further exploration.

4.4. Social Bridging and Sustainable Community Based Forest Management

4.4.1. The Relation of Formal and Informal Institution

The presence of formal and informal institution is common in Indonesia. The relationship is complementary, for instance forest farmer group helps the government implementing the program also disseminate new policy, the informal group usually also has savings and loans activity to support the operationalization of the group and helps the member at the same time. Informal institution considered as significant aspect in social capital study. It has the functions of safety net when formal institution does not function well in the society (Narayan, 1999). The relationship of formal and informal institution is a variable of social bridging which determines the strength of social capital. Furthermore, it influences the sustainable forest management in the area.

- Karangrejo

KTHR Murakabi in Karangrejo has good relationship with formal institution in this term is government. Information from Community Forestry Research Centre, Gadjah Mada University (PKHR) supports it.

> "Karangrejo has good relationship with DISHUT. Even before we came in 2005, the village regularly received the program from DISHUT such as seedling, KBR (Nursery Seedlings Farm)" (Interview with Deputy of Community Forestry Research Center PKHR, 8 July 2014)

The forest farmer group also has strong connection with other informal institution within the village such as with women association in 10 neighbouring household under Family Welfare Empowerment program (*Dasawisma* PKK) and Woman Farmer Group (KWT). KTHR Murakabi often involved the woman groups in nursery seedlings activity in the village and also in ecotourism activity. Youth association (*Karangtaruna*) also involved in the tourism activity. All of the informal groups in the village cooperate together for communal welfare and works together to protect the forest. This is due to the same motivation to obtain economic benefit from forest conservation efforts. Thus, they no longer depends their livelihood on timber.

At the same time, KTHR Murakabi also cooperates with external informal group APHR Manunggal Rasa, association of smallholder forest farmer which cover six villages in Loano sub district. The project is Timber Legality Assurance System (SVLK), a government program from Ministry of Forestry with aims to ensure the legality of timber sold in the market. The project is assisted with local non-government organization ARUPA to increase capacity building and infrastructure preparation.

- Wonotopo

People of Wonotopo have different character and history from Karangrejo. They experienced a corruption case in the past. This makes them do not trust group, village officer or any government assistance.

> "Actually there are potential forests that can be incorporated in KTHR Wonoupoyo I, unfortunately the owners do not interest to join the organization because of their doubt. This is due to the corruption case in the past government of this village. They were asked people to sign a paper to get capital assistance from government in a rural agribusiness development project (PUAP) but, in fact, people did not received anything from them. I experienced it myself. Therefore, people do not trust government anymore." (Interview with head of Wonoupoyo I forest farmer group, 3 July 2014).

However, KTHR Wonoupoyo I was reactivated in 2011 with motivation to develop community forest and re-connect again the society. The secretary of the group, pak Wagino, actively communicates with forestry field officer (PKL) as the representative of formal

institution DISHUT (Forestry Agency). From PKL, the group receives various assistances such as training and farming tools. However, since the group is newly established, it takes time to convince people to develop the community forest. Usually, the training applied internally within the group member, if it is succeed then people will follow, i.e the planting of red ginger.

Wonoupoyo I also has a relationship with other external informal group, APHR Purwolestari, association of smallholder forest farmer which cover six villages in Gebang sub district. In this case, Wonoupoyo I is the member of the association. The association bridging the forest farmer group in six villages with private party PT.INDOTAMA, a timber manufacturer company in Purworejo. The APHR also acts as the gate for the implementation of SVLK (Timber Legality Assurance System) from formal institution, in this case is Ministry of forestry. Similar to Karangrejo, local NGO from Yogyakarta (ARUPA) is involved in community empowerment for infrastructure preparation of the program.

4.4.2. The Linking Networks

According to Dahal and Adhikari (2008), networks ease coordination at different level. Furthermore, it strengthened the social capital in the community. Moreover, Woolcock and Swetser (2002) states that linking means the connection with power, for instance financial influence. The research reveals different pattern of linking network between Wonotopo and Karangrejo. The analysis is described below.

- Karangrejo

The interview with Patnani (head of KTHR Murakabi) revealed that forest community of Karangrejo has created connection with many stakeholders beyond the village (figure 36). The effort actively started in 2005 when there was assistance from Community Forestry Research Centre, Gadjah Mada University (PKHR) in terms of community empowerment for community based forest management. The project duration was from 2005 to 2010, started with initial assessment, institutional empowerment, and preparation of human resource and natural resource (Interview with Deputy of Community Forestry Research Centre/ PKHR, 8 July 2014). Therefore, the role of PKHR is significant in increasing the capacity of community forest. The idea of ecotourism village was raised in 2008. The PKHR facilitated the idea of the community which aims to get the benefit from the forest but also conserve it at the same time. The connection with PKHR remains strong until now.

Although the project is over, the result can be seen from the increasing capacity of community forest, particularly the KTHR Murakabi. The group able to develop community forest into ecotourism, furthermore, the village established Village Tourism Board (BPD) in order to maintain cooperation with other party and financing the activity. Afterwards, support came from the government in the form of financial assistance in National Program for Community Empowerment project (PNPM Tourism project) through Cooperative, Industry, Commerce, and Tourism Agency (DISKOPERINDAGPAR) in 2013 and 2014. The funding is utilized to build tourism facility (figure 35). However, the institution that supposed to support ecotourism (BPD) is not well developed yet. The problem is in the human resource skill for instance in arranging the budget, rules and regulation, and ticketing. Hence, for now, KTHR Murakabi helps to manage the ecotourism activity.

Furthermore, KTHR Murakabi invites private party to support the activity. A tourism company from Magelang namely Bogowonto Indonesia Adventure (BIA) provides instructor and boat for rafting in Bogowonto river. The mutual relationship is lasting until now. The company also support the marketing of ecotourism in the village. The leader of KTHR

Murakabi stated that from January to June, the visitor reached 1.200, mainly students from Purworejo and Yogyakarta.

At the same time, faculty of agriculture Muhammadiyah Yogyakarta University (UMY) also involved and assisted the ecotourism activity by provide training on local food processing, as recommended by PKHR (based on interview with Deputy of Community Forestry Research Center, 8 July 2014). The goal is to add value on traditional food such as cassava which is easily found in the village. The training involved woman groups such as KWT (Woman Farmer Association) and PKK (through *Dasawisma* or woman association of 10 neighbouring household). The food such as cassava brownies is sold to the tourist. This income generating activity supports the economy of the village. Furthermore, KTHR Murakabi also involved young people of *Karangtaruna* (youth association) as tourist guide, also students of SMA 3 senior high school. Thus, the strength of link with local informal group is quite strong and mutually beneficial.

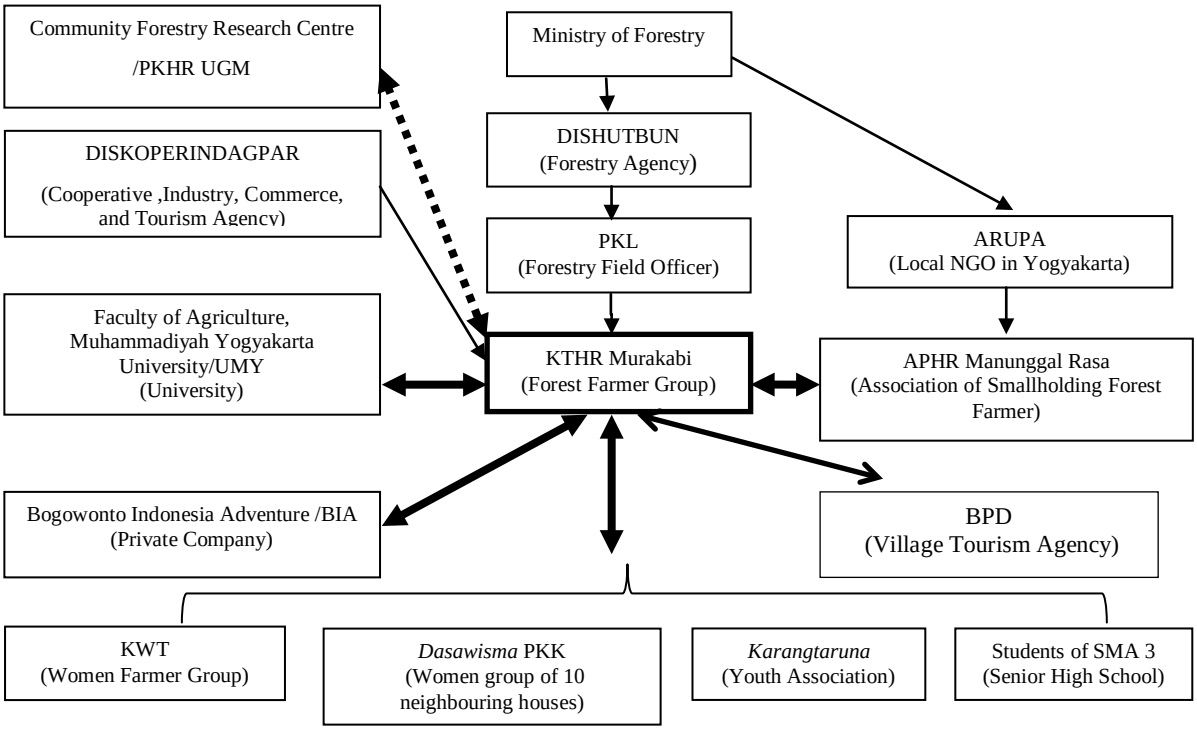
Figure 35. Ecotourism utility (left), the office of APHR Manunggal Rasa in Karangrejo (right)

Besides of ecotourism, KTHR Murakabi through APHR Manunggal Rasa (Association of Smallholder Forest Farmer), is assisted by ARUPA, local NGO from Yogyakarta, in capacity building and infrastructure preparation for SVLK (Timber Legality Assurance System). This is a program initiated by Ministry of Forestry to assure the legality of timber sold in the market. In this on-going project, KTHR Murakabi role is as the member of APHR Manunggal Rasa. The project channeled to APHR Manunggal Rasa, where KTHR is the targeted group. In this relationship, KTHR is bounded by the regulation of APHR. Because the project is still on going, the community forest yet benefit the result scarcity (interview with Patnani, Head of KTHR Murakabi, 3 July 2014).

According to interview with Patnani, the cooperation of KTHR Murakabi with other party, as well as local informal group has strengthened the bonding among the society because they enjoy the communal benefit. Furthermore, it motivates the community to protect the forest as their natural asset scarcity (interview with Patnani, Head of KTHR Murakabi, 3 July 2014).

To sum up, the successful of community forest in Karangrejo is because of high awareness, also participation of all the stakeholder and community together to achieve sustainable community forest. However, all the effort could not be separated from local leader, Patnani, which is significant in building links and network. He was a member of house of representative (DPRD) of Purworejo regency. Thus, he has knowledge on government programs and good networks with stakeholders such as university, local government and central government. Furthermore, the network provides information that becomes a chance for the community to develop their capacity. The role of local leader is supported by ease of accessibility on information in the area. The factors combine and help the community forest achieve its goal, obtain economic benefit and conserve the forest at the same time.

Figure 36. Network connection of Murakabi Forest Farmer Group Karangrejo village



Notes:

⟷ = Direction of the bridging (one way/two way cooperation), the thickness level shows the strength of the relationship

- Wonotopo

The linking network of Wonoupoyo I is illustrated in the flow chart (figure 38). According to interview with Wagino (head of KTHR Wonoupoyo I), stakeholders involved in the development of the community forest in Wonotopo are government, private sector, and other forest farmer association. Wonoupoyo I is the member of APHR Purwolestari that automatically bounded by the rules and regulation of the association. Some project is channelled through this association although targeted to forest farmer group. For instance, the cooperation with PT INDOTAMA a timber manufacturer company based in Purworejo that produces a wide variety of wood panels. The other project is SVLK (Timber Legality Assurance System), a program from Ministry of Forestry in order to assure the timber legality and forestry product sold in Indonesia and abroad (2013, Raharjo). For the project, Ministry of Forestry is assisted by ARUPA, a local NGO in Yogyakarta, to prepare the infrastructure through capacity building (Raharjo, 2013), for instance forest inventory training and timber volume measurement.

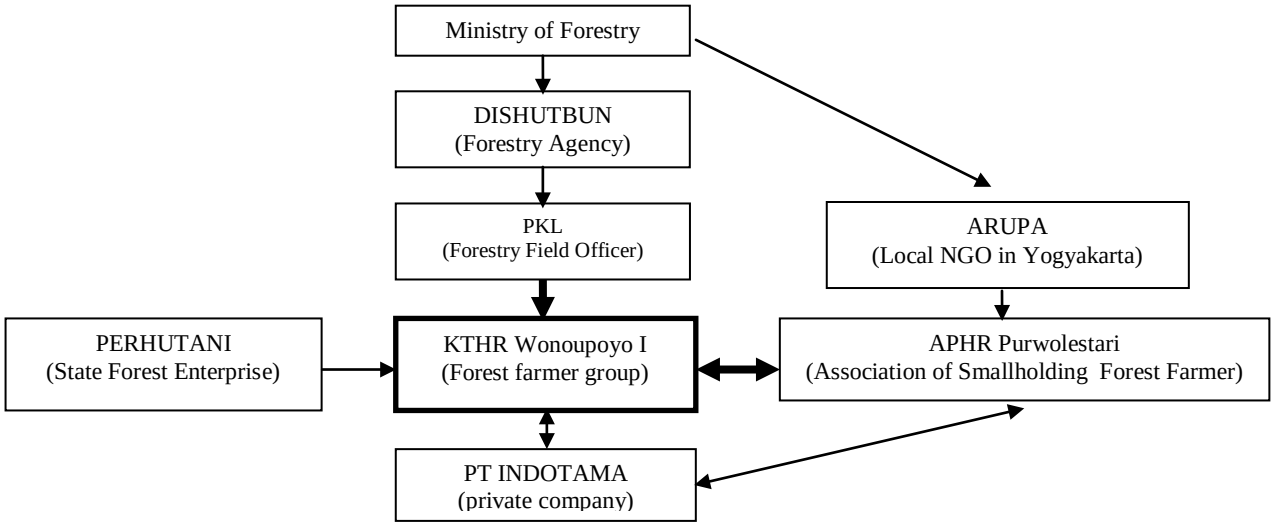
APHR Purwolestari is founded based on the goal to empower smallholder forest farmer in order to obtain good price of timber and strong bargaining power toward timber industry (interview with Forestry Agency, 3 July 2014). The association awarded by the Ministry of Forestry, in 2012, for its good cooperation with timber industry and intensive afforestation (Kedaulatan Rakyat, 2012). Obviously, APHR has an agreement with PT INDOTAMA. The six villages are the main timber supplier for the company, including Wonotopo. Problem raised in 2013 when the company claimed that they have distributed 15.000 seeds of *Albacia*, while in fact, only 1.300 seeds was received by the six villages. This incident disturbed the relation between APHR Purwolestari and PT INDOTAMA. Some parties such as PKL (Forestry Field Officer) and PERHUTANI (State Forest Enterprise) encourage the association

to review again the contract with the company. PERHUTANI once give assistance in the forms of seeds to Wonotopo. According to Wagino (head of KTHR Wonoupoyo I), the rationality behind the cooperation with the company was because of the price. They offer 500.000 IDR per m3 of *Albacia* timber which is consider as high price for the farmer compared to when they sell it to middlemen.

Figure 37. Forest plant diversification project (left), *Albacia* forest in Wonotopo village (right)

The strong connection is formed between KTHR Wonoupoyo I and APHR Purwolestari. Wonoupoyo I highly depends on APHR Purwolestari in terms of projects and cooperation with external parties. The same pattern occurs with forestry field officer (PKL). The group has strong connection and actively search for new information and training from government through PKL officer. PKL bridging the forest farmer group with forestry agency/government (DISHUTBUN). The officer task is to disseminate information and programs related to community forest. Additionally, in Wonotopo case, PKL officer suggests KTHR Wonoupoyo I to send proposal of assistance to DISHUTBUN in order to get, for instance, farming tools. The officer also informs the farmer when there is training and project related to community forest. Hence, the role of PKL and APHR Purwolestari are significant to the development of KTHR Wonoupoyo I.

Figure 38. Network connection of Wonoupoyo I Forest Farmer Group Wonotopo village



Notes:

↔ = Direction of the bridging (one way/two way cooperation), the thickness level shows the strength of the relationship

4.5. Sustainable Forest Management

The research revealed that every stakeholder has different perspective on forest sustainability. According to forest farmer, forest is sustainable when it able to provide water, fresh air and protect from landslide. However, when the stakeholders were asked whether community forest in Karangrejo and Wonotopo sustainable, they have different answer.

> "The pattern of harvesting should avoid cutting young trees, farmer must harvest the tree that has reached mature age. After harvesting they should plant again. We hope that for every 1 Ha of community forest consist of 1.650 trees with space 2x3 meter. That is the ideal condition. In Karangrejo, the forest is sustainable enough, but in Wonotopo still need some improvement because it does not reach the 1.650 trees per hectare" (interview with Forestry Agency of Purworejo/ DISHUTBUN, 2 July 2014).

Forestry agency (DISHUTBUN) states the sustainability using the parameter of tree density in community forest. Accordingly, forest with less density is not sustainable. This case happens in Wonotopo. However, traditional forest farmer often do not know about the ideal space of planting trees, they just planting the trees. This is support by the statement of Patnani, head of KTHR Murakabi.

> "In Karangrejo, we just plant the tree. We never consider how much the ideal space is" (interview with head of Murakabi forest farmer group, 2 July 2014)

Meanwhile, Community Forestry Research Center of Gadjah Mada University (PKHR) has its own opinion about sustainable forest management in community forest.

> "I am not worry with the sustainability of community forest in Java. We have done many researches and the result found that no prove of unsustainable forest management in Karangrejo and other area. This is because the small plot of land in private ownership. People will manage and protect their land because it is their source of livelihood, not only from the *tumpang sari* (intercropping) but also from the timber" (interview with Deputy of Community Forestry Research Center / PKHR, 8 July2014)

Furthermore, she also states that sustainable forest measurement should be looked holistically.

> "There are three fundamental requirement for sustainable forest management, in every type of forest neither state forest nor private forest, they are:
>
> - Status of area and boundaries are clear,
> - The assurance that harvesting does not exceed the annual allowable cut.
> - The assurance on the success of forest regeneration.
>
> From the three above we can break it down because each of parameter consists of many supporting variables. So we cannot justify whether Karangrejo forest is sustainable or not without looking at other variable. Qualitatively, I can say that Karangrejo community forest is sustainable" (interview with Deputy of Community Forestry Research Center/ PKHR, 8 July2014)

However, for community forest in Wonotopo, the head of KTHR Wonoupoyo I has his own statement about forest sustainability in the village.

> "The community forest in here is not sustainable because people lack of awareness on the importance of forest. People cut the trees but do not plant it again, especially young generation ignore the importance of planting new seeds after cut the tree. They also ignore selective cutting. Land clearing is often occurs in here. After they harvest the timber, they plant cassava on it. It is dangerous for steepy topography and can caused landslide" (interview with head of Wonoupoyo I forest farmer group, 3 July 2014).

Based on the information above, it is concluded that sustainable forest management consists of many variables that should be reviewed one by one. However, qualitative information from stakeholders states that generally Karangrejo community forest is sustainable. Meanwhile, Wonotopo community forest needs more attention to obtain forest sustainability.

4.6.Discussion

The study about sustainable community based forest management through the lens of social capital offers different insight in environmental management. Human as the subject has significant role in determining the quality of the environment. The social connection within the society and with outsider creates a pattern that affect the development of community forest. Furthermore, it influences the sustainability of community forest management.

The investigation on social bonding with descriptive statistic shows that basically there is no significant different between the two village (table 6). The differences are in the presence of norms in the two villages and different degree of initiative in addressing a problem. In Karangrejo, there are rules to protect the forest and water. For instance, village regulation Perdes no.210/PD/VII/07 prohibit fishing using electricity, poison and chemical ingredients (figure 52). Although 43.3% of the respondent not too familiar if such regulation does exist, further interview shows that they have high consideration to protect their environment because of history in the past where they experienced landslide and water scarcity (interview with Patnani, Head of KTHR Murakabi, 3 July 2014). Meanwhile, almost all of the respondents in Wonotopo do not familiar to any local wisdom or regulation to protect the forest. Only elderly people believe on the importance of planting trees soon after cutting the trees. This wisdom is not recognized by younger generation. However, the respondent realizes that implementation of sanction is important to protect the forest. Further investigation revealed that in forest farmer group itself there is no rule or regulation yet to protect and manage the forest (interview with Wagino, Head of KTHR Wonoupoyo I, 4 July 2014).

Figure 39. Prohibition Board in Karangrejo

Meanwhile, the degree of initiative shows that Karangrejo inhabitants prioritize on internal discussion to solve a problem. They states the important to discuss and decide together within the community instead of solve it individually or invite government to solve the problem. On the contrary, Wonotopo emphasize on the role of individual and neighbourhood level to solve problem. They also think that government should solve the problem in their community. This shows the high dependency on government.

Table 6. Summary of descriptive analysis on social bonding

Variables	Karangrejo	Wonotopo
1.Norms and sanction in protecting forest	**Familiar (96.7%)**	**Not familiar (80%)**
2. Relation of trust	- 93% trust their community, 86.7% concern on public welfare, - 90% always contribute efforts for public welfare	- 93% trust their community, - 90% concern on public welfare, - 76.7% contribute efforts for public welfare
3. Reciprocity and exchange	70% somewhat expect reciprocal act	93.3% expect reciprocal act
4.Association	- 73% actively attend group meeting, - 93.3% feel somewhat join the group is beneficial, - 80% always involved in group voluntary activity	- 93.3% actively attend group meeting, - 100% feel the group is very beneficial, - 93.3% very often involved in group voluntary activity
5.Initiative	- **Problems should not be solved individually (96.7%) or among the neighborhood (93.3%),** - community leader (100%) and the entire village to act together in solving the problem (96.7%), - **disagree if local government tackle the problem in the community forest (93.3%)**	- **Problems should be solved individually (100%) or among neighborhood level (93.3%).** - all community leaders should act together (83.3%) as well as the entire village (86.7%). - **agree that municipal or local government should tackle the problem in their community forest (96.7%).**

Source : Authors analysis (2014)

Further statistical analysis using regression analysis is utilized to explore the dynamics of social bonding based on land extent and land ownership status. Five questions in the questionnaire are chosen to represent contribution, participation, norms, trust, and frequency of attendance in community meeting. This aims to explore social bonding in the society and its relation to collective action. The result revealed that in Karangrejo, land ownership status and land extent have no significant correlation with trust, norms, contribution, participation and frequency of attendance in community meeting. It means that there are other factors that influence social bonding in the community. Meanwhile, in Wonotopo, land ownership status significantly influence perception of contribution, norms and trust in the society, but does not significantly correlate to participation and frequency of attendance in the meeting. At the same manner, land extent has no significant correlation with the five variables of social bonding. Similar with Karangrejo, there are other factors that contribute to social bonding in Wonotopo that need further research.

Further investigation in Wonotopo revealed that there was weak relationship with government in the past that impacts on the development of the area (interview with Wagino, head of KTHR Wonoupoyo I, 4 July 204). The society felt that they have been betrayed by village officer in corruption case regarding to financial aid in a rural development project. Therefore, the inhabitant prefers to manage their own land, they do not interest on joining any kind of group or organization (figure 53).

Although the case was years ago, the impact of this disbelieve influences the decision of the community to cooperate with government until now. Furthermore, it affects the linking network with other party. However, Wonoupoyo I forest farmer group attempts to restore the

trust especially among the group member by actively participated in government program. The head of the group, which is also head of sub village, actively creates link with government through forestry field officer (PKL). He also involved in APHR Purwolestari, as the representative of Wonotopo. Accordingly, the constraint is to convince people about the benefit of a training or program from the government. In order to solve it, he disseminates the information within the group first and practices the training by himself. For instance, he practice the steps to overcome tree disease in natural way without using chemical ingredients, then after it succeed people will follow (interview with Wagino, head of KTHR Wonoupoyo I, 4 July 2014).

The survey analysis, interview and observation revealed that Wonotopo highly rely upon assistance from government. KTHR Wonoupoyo I count on PKL and APHR Purwolestari for new information and programs. Furthermore, outcome of the interview indicates that every program, training, and assistance must be based on their suggestion and approval. This is due to limited knowledge and capacity to build network with other parties.

Community forest in Wonotopo characterized by small plot of land and shared ownership. The area is typical of subsistence agriculture where farmers focused on growing food to feed themselves and their family. Agroforestry system *tumpang sari* or intercropping is one way to survive. The problem of *tebang butuh* or cutting trees when they urgently need cash is uncontrolled in this village. Unfortunately, there are no rules or regulation yet about timber harvesting in forest farmer group and village. Thus, people often cut young tree that has not reach mature diameter yet which is 10 cm for *Albacia.* Furthermore, the environmental awareness is very low (interview with Wagino, Head of KTHR Wonoupoyo I, 4 July 2014). Survey result shows that most of the farmers do not recognize local wisdom to protect their environment. It is often that after cutting trees people do not plant with the new seeds. However, this unclear planting pattern makes the forest unsustainable. Forest regeneration, natural or artificial is one indicator of sustainable forest because it influences the protective functions of forest resources (2006, FAO).

Figure 40. Forest plant diversification project (left), barren land in Wonotopo village (right)

The case of community forest in Karangrejo is quite different compared to Wonotopo. The community characterized by solid social bonding. This is due to long history of partnership with outsider and beneficial cooperation. The inhabitant learnt to cooperate with other stakeholders to achieve their goal in community forest management.

According to Patnani (interview, 2 July 2014), the main purpose of community forest in Karangrejo is for conservation. This motive is based on the history of the area which was prone to landslide and lack of water in 1960's. Then, local leader start to plant trees in the dry

hill. The effort is followed by the inhabitants. Nowadays, the inhabitants benefit from the presence of forest by water availability throughout the season. Furthermore, there are many springs occurs in the area (more than 15) even in top of the hill people easily found it (figure 41). The forest farmer group, as well as the village, has rules and regulation to protect the forest and the river. However, people of Karangrejo already have high awareness on the importance of forest.

Some constraints exist in the community forest development in Karangrejo. Since it is located in private land, *tebang butuh* or cutting trees when people need cash immediately is also exist in the village. This is problematic especially because the private land issue. Nevertheless, the inhabitant applied selective cutting and only cut the trees if it really necessary and the tree has reached mature age. Afterwards, they plant new 10 seeds immediately. Thus, land clearing harvesting does not exist in this village (see figure 41). Furthermore, limited human resource capacity is another problem in the village. It becomes a potential constraint when ecotourism is developed, particularly in the management. The Village Tourism Agency (BPD) which is established in 2012 yet has specific rules, regulation, planning and clear budgeting until now due to limited skilled human resource.

In this village, informal groups are well developed such us KWT (Woman Farmer Asociation), *Dasawisma* PKK (Woman Group of ten neighbouring houses), *Karangtaruna* (Youth Association), and KTHR (Forest Farmer Group). They are all involved to support community forest activities ranged from nursery seedlings to ecotourism activity. In the tourism side, the village sometimes invites the high school students to help the village when there are too many visitors. Meanwhile, women groups participated in develop local food to support the village tourism. Furthermore, the benefit from this activity motivates people to protect the forest.

According to interview with Patnani (head of KTHR Murakabi, 3 July 2014), the key to success of Karangrejo village is the cooperativeness of the society. They are willing to accept any new things for their communal welfare. The society is aware on the importance of the forest. However, further research reveals that the strong social capital in communal society couldnot be separated from the role of local actor in the village (Dahal and Adhikari, 2008). The dominant local actor in Karangrejo is the leader of forest farmer association Murakabi namely Patnani. He was also the member of house of representative (DPRD) of Purworejo. His experience and networking with local government, central government, also university helps in encouraging the capacity of the community forest to become independent. The pro-active effort in order to build link and network contributes significantly to the development of community forest. The strong social bonding equipped with good networking and cooperation with other parties, such as university, government, private party, and recently the NGO, makes community forest of Karangrejo achieve its goal: forest conservation and economic benefit without sacrifice the forest.

Figure 41. New *Albacia* plant in Karangrejo village (left), spring under *Gayam* tree (right)

4.7. Summary

The finding shows that group, network, and connectedness plays significant role to the sustainable community based forest management. However, the same physical character of the two villages such as geographic condition, small plot of landownership (0,3 Ha in average), same main land use as community forest, also the land status which is on private ownership are not sufficient in determining the sustainability of the forest. In this private ownership, social mechanism is important as a control factor in order to keep the forest sustainable. Therefore, social bonding and social bridging of groups in community forest as measurement in forest sustainability in this case is relevant.

Overall, the two villages show almost similar level of social bonding. Land ownership status and land extent do not significantly correlate to the social bonding parameters. With exception to Karangrejo, land ownership status in Wonotopo influences the perception on contribution, norms and trust in the society. Moreover, the less significant relationship means that there other factors that explain the social bonding level in the two village.

However, Wonotopo case shows that bridging with external parties is constrained by the sceptical behaviour of the society. Therefore, every assistances with aims to increase the welfare and protect the forest always difficult to be accepted in the society. Meanwhile, Karangrejo has strong social cohesion among the society. They have long history of mutual partnership with other party. Pro-active leader which build and maintain network, also the cooperative society are significant contributing factors for sustainable forest management.

The character of the society makes the two villages has different pattern in forest management. The lesson learnt from the case of the two villages:

- Leadership : strong leadership is determinant factor for community forest development
- Experience : bad experience in the past potentially affect the development of community forest, while good experience will motivate people to protect the forest
- Initiative : people with ideas to conserve the forest are more welcome and attract many stakeholders to cooperate
- Motivation: different motivation determines the characteristic of forest management.

In conclusion, human is the factor that should be considered in forest management. Community empowerment will increase the capacity and awareness on the protective function of the forest. Hence, building sustainable forest management should start by building the society which lives around the forest. The guardian of the forest.

Chapter 5: Conclusions and Recommendations

This chapter presents conclusive remarks of the research. The chapter describes the result interpretation to answer research question. The conclusions are linked with theoretical background.

5.1. Research Question and Answers

The research purpose is to explore group, network, and connectedness in the society around community forest. Furthermore, the research investigates the relation of social capital to sustainable community forest management. Analysis based on survey to captured the behaviour of the society through the connection among the group member. Interview results provide depth information on how the society works within the community and with external party to manage the community forest.

5.1.1. Answer to Research Sub Question 1

Q : How does social bonding of forest community influence the sustainable forest management in Wonotopo and Karangrejo?

Survey was conducted to capture opinion about social bonding in the community. The evidence in two villages indicates the significant role of social bonding for the sustainability of community forest. Social bonding is a component of social function of sustainable forest management. Additionally, sustainable forest management requires three factors; clear status of area and boundaries, the harvesting does not exceed the annual allowable cut and the success of forest regeneration. Furthermore, the increase or decrease of forest extent is also influenced by factor such as land use conversion to built-up area. Moreover, over cutting also could be influenced by economical factor. At the same manner, forest regeneration also depends on natural regeneration or artificial generation. Therefore, social bonding in the community has control function for the sustainability of forest management in the area.

In case of Karangrejo, the findings revealed that the village generally has high social bonding. The society maintains strong connection among the community to tackle the problem in the village. However, land status and land extent have no connection with social bonding variables; contribution, participation, trust, norms, and attendance in meeting. Further exploration through interview with university, forestry agency, and forest farmer group indicated other factors such as motivation, history, initiative and leadership that support the bonding. Furthermore, it became adhesive factor that lead collective action and create links with other parties outside the village.

Meanwhile, high social bonding exists in Wonotopo. However, the inhabitant prefer individual action or among neighbourhood to overcome a problem. The findings also indicated the high dependency on government assistance. Furthermore, status of land ownership influenced the opinion on contribution, norms and trust in the society, but has no significant relation with other social bonding variables. Moreover, land extent also has no relation with social bonding. Overall, similar to Karangrejo, there was an indication of the influence of other factors to social bonding in the community. The factors were unknown and need further research. Additionally, further interview revealed that there is lack of trust to government, especially after corruption case that involved village officer. It also revealed that according to farmer, the small plot and private landownership made them prefer to focus on managing their land instead of join forest farmer group.

5.1.2. Answer to Research Sub Question 2

Q : How does social bridging of forest community influence the sustainable forest management in Wonotopo and Karangrejo?

Interview was conducted to map the network and strength of relationship among stakeholders based on the activity in community forest. The analysis concludes that Karangrejo able to create strong links with other party compared to Wonotopo. The society has high awareness and participation to cooperate with many stakeholders to develop their forest. The phenomenon could be due to the historical factor that motivated them to protect the forest. Furthermore, it was supported by capacity development by PKHR in 2005 and the active role of local leader that searched for new opportunity in order to develop their natural asset. At the same manner, there were mutual beneficial cooperation among stakeholders; university, government and private sector. The strong bridging strengthened the connection among the society and motivated them to protect the forest.

Meanwhile, Wonotopo unable to create strong link with other party. The young age of farmer group, also the reluctant of the society to join the group or participate in government project were factors that made the network uneasy to be created. Lack of awareness and motivation to protect the forest made the area were less developed. Furthermore, community empowerment was missing in the village. Training to enhance the capacity was not applied in the community because of limited land and priority. The bridging was weak because of high dependency on government through its forestry field officer, also to APHR Purwolestari. In Wonotopo, it needs more effort and time to develop the community forest in the area.

5.1.3. Answer to Main Research Question

Q : What is the contribution of groups and networks as social capital element for sustainable community based forest management in Wonotopo and Karangrejo?

Based on the analysis, the two villages agreed that forest farmer group is important as a place to exchange the information and a bridge to develop their community. Groups and network connect the society with parties outside of the community in order to solve the problem. Furthermore, it channels the information, projects, and assistance that enable the community to manage their forest in sustainable manner. Therefore, the strength of the group and its linkage affects their capacity to manage the community forest.

Wonotopo has high social bonding but weaker link. Therefore, it did not have adequate power to encourage the society to obtain forest sustainability. Whilst in Karangrejo, high social bonding and well established connection able to encourage the society to protect the forest and maintain its sustainability.

5.2. Reflection on the Literature

Social bonding is the element of social function that determines the forest sustainability. According to Dahal and Adhikari (2008), social bonding is the success factor of collective action. In Wonotopo, high social bonding does not automatically correspond to collective action related to forest management. There were factors such as; small plot of land, the right to manage their land because of private ownership, high shared of land even in the small plot, and also lack of awareness on the importance of forest.

Meanwhile in Karangrejo, high social bonding correspond to collective action, this is because of the history and experience in the past (land slide and water scarcity) inspire the society that in order to achieve common goal they have to work together as one community.

Pretty and Ward (2001) develops typology to assess the human and social capital evolution in groups. They suggest three stages to identify the degree of maturity of social groups;

reactive-dependence, realization-independence, and awareness-interdependence. The three stages is viewed according to five major themes of criteria; worldview of group members, internal norms and trusts, external link and network, technology, and lifespan of group. Reflect to the theory, the finding categories KTHR Wonoupoyo I in Wonotopo as in stage 1 (Reactive-dependence). This is characterized by the formation of the group as reactive response to crisis, high dependency on external assistance (government), and norms are borrowed from external (from APHR Purwolestari). Furthermore, the activity was in the level of applied new technology for the forest, for instance application of new technique in tackle tree disease *karat puru* in forest farmer group.

Meanwhile, KTHR Murakabi in Karangrejo is in stage 2 (Realization-independence).It is characterized by the growing trust among the member, active participation, and willingness to invest in the group. They also developed their own norms and rules, furthermore, aware to the importance of establishing link with other groups and external agencies for their benefit. Moreover, the group is stronger and resilient, start to develop their own individual characteristic, and capable to find solution of existing problem by developing ecotourism.

Larsen (2004) states the importance of existing social bonding before social bridging develops and creates connection beyond neighbourhood. Furthermore, strong social bonding leads to collective action. He also states that social bridging is the action to address problem in neighbourhood level. In Wonotopo, although the bonding is high, it is not adequate enough to build the bridge with other party due to lack of trust to government related to corruption case in the past and minimum assistance on capacity development in the group. Meanwhile, in Karangrejo, the bonding is high and able to build connection with external party because they have history of partnership with other party. This could be because of the success of capacity development program in the group in 2005 by PKHR and followed by other institution that furthermore enable the group to develop themselves and create connection.

5.3. Recommendation

- In order to maintain the link, certain mechanism should be developed to assure the commitment of every party involved in community forest development. Legal framework such as agreement or contract is necessary to ensure that every party meet the obligation and receive their rights. This aims to maintain mutual beneficial relationships among the forest community and external parties.
- Active role of local government in all level such as village (*kelurahan)*, sub district (*kecamatan)* and district *(kabupaten)* is necessary to organize and support community forest in developing their network and link with other parties. Local government as formal institution has key role to open the network. This should be optimized, for instance by active promoting on the excellence of community forest product, ecotourism. Furthermore, this will attract investor to invest, hence, stimulate the economy of community that further will motivate them to protect the forest.

Scope for Further Research

Human and society are dynamics. The dynamics are influenced by many factors. In relation with community forest in the research area, there are unknown factor outside the social bonding variables that determine the cohesion in the community. This factor need further exploration. Furthermore, sustainable forest management consists of determinants factors and derived variables. Meanwhile, social capital is element of social function of it. Although it offers a different perspective on the contribution to sustainable forest management, however, it need holistic approach to assess whether the forest sustainable. Therefore, comprehensive research on sustainable forest management in village level is necessary, especially in community forest where the land is privately owned by the farmer.

Bibliography

Amah, Iis, 2009. Community Forestry in Karangrejo: Social Process of Transformed Agroecosystem at Javanese Rural, Post Graduate Program of Antropology, Faculty of Cultural Science, *Thesis.* Unpublished. Yogyakarta : Gadjah Mada University.

Baggethun, E.G. and Barton, D.N., 2013. Classifying and valuing ecosystem services for urban planning, *Ecological Economics*, 86, pp.235-245. Available at : http://dx.doi.org/10.1016/j.ecolecon.2012.08.019

Barr, Robin et.al., 2012. Sustainable Community Forest Management: A Practical Guide to FSC Group Certification for Smallholder Agroforests, Seattle : The Waterloo Foundation.

Barr, Christopher et.al., 2006. Decentralization of Forest Administration in Indonesia Implications for Forest Sustainability, Economic Development and Community Livelihoods, Bogor : Center for International Forestry Research (CIFOR).

Black, T.T., 1993. Evaluating Social Science Research. London; Sage Publication.

Bueren, E.M.L., and Blom, E.M., 1997. Hierarchical Framework for The Formulation of Sustainable Forest Management Standards, Leiden: The Tropenbos Foundation

Chokkalingnam, U. and Jong, W.D., 2001.Secondary forest: a working definition and typology, *International Forestry Review,* 3(1). Available at : *www.cifor.org/publications/pdf_files/secondaryforests.pdf.* [Accessed 30 April 2014]

Creswell, J.W. and Miller, D.L, 2000. Determining validity in qualitative inquiry. In; Theory into practice Vol. 39, No. 3; Taylor & Francis Ltd. Available at : http://www.tandfonline.com/doi/abs/10.1207/s15430421tip3903_2#.U4Izgna-C7g

Dahal, G.A. and Adhikari, K.P., 2008. Bridging, Linking, and Bonding Social Capital In Collective Action, The Case of Kalahan Forest Reserve in the Philippines, *CAPRi Working Paper No. 79 May 2008*, CGIAR System wide Program on Collective Action and Property Rights (CAPRi). Washington, DC : International Food Policy Research Institute. Available at: http://www.ifpri.org/publication/bridging-linking-and-bonding-social-capital-collective-action [Accessed 7 May 2014]

Food and Agriculture Organization of United Nations, 2006.Global Forest Resource Assessment 2005: Progress Towards Sustainable Forest Management. *FAO Forestry Paper no.147.* Available at : http://www.fao.org/forestry/sfm/24447/en/[Accessed 6 May 2014].

Heny, W. S., 2012. Perception and Behavior of the People Concerning Their Efforts of Preserving the Community Forest in Karangrejo Village, Loano Sub District, Purworejo Regency, Post Graduate Program of Environmental Science. *Thesis.* Unpublished. Semarang : Diponegoro University.

Indonesian Ecolabelling Institute, -, *LEI STANDARD 5000-3 Sustainable Community Based Forest Management*, Bogor : Lembaga Ekolabel Indonesia. Available at : http://www.lei.or.id/community-based-forest-management-certification-system [Accessed 12 May 2014]

Kedaulatan Rakyat, 2013. Kedaulatan Rakyat homepage. [online] Available at: http://krjogja.com/read/152637/aphr-purwolestari-dapat-penghargaan-menteri.kr

Kusumayanto, Y. and Sirait, M.T., 2000. Community Participation in Forest Resource Management in Indonesia: Policies, Practices, Constraints and Opportunities, *Southeast Asia*

Policy Research Working paper no.28, Bogor: ICRAF Southeast Asia. Available at : www.worldagroforestry.org/sea/Publications. *[Accessed 20 April 2014]*

Larsen,L., et.al., 2004. Bonding and Bridging, Understanding the Relationship between Social Capital and Civic Action, *Journal of Planning Education and Research*, 24, pp. 64-77. Available at : doi:10.1177/0739456X04267181[Accessed 9 May 2014]

Lehtonen, Markku, 2004. The environmental–social interface of sustainable development: capabilities, social capital, institutions, *Ecological Economics*, 49, pp. 99– 214. Available at: http://www.sciencedirect.com/science/article/pii/S092180090400076X [Accessed 20 April 2014]

Michon, Genevieve, 2005. Domesticating forests : how farmers manage forest resources, IRD, Center for International Forestry Research (CIFOR) and World Agroforestry Centre - ICRAF, SEA Regional Office, Bogor : CIFOR. Available at : http://www.worldagroforestry.org/regions/southeast_asia/publications?do=view_pub_detail&pub_no=BK0076-05 *[Accessed 20 April 2014]*

Michon, G. et.al., 2007. Domestic Forests: A New Paradigm for Integrating Local Communities' Forestry into Tropical Forest Science, *Ecology and Society,* **12**(2): 1.Available at: http://www.ecologyandsociety.org/vol12/iss2/art1/ [Accessed 30 April 2014]

Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis, Washington DC. : Island Press.

Moench, M. and Gyawali, D., 2008. Desakota: Reinterpreting the Urban-Rural Continuum, Natural Environment Research Council , Swindon : United Kingdom. Available at : http://www.nerc.ac.uk/site/search/index.asp?q=desakota [Accessed 30 April 2014]

Morse, J. M., et.al., 2002. Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods 1* (2), Article 2. Available at: http://www.ualberta.ca/~ijqm/

Narayan, Deepa, 1999. Bonds and Bridges : Social Capital and Poverty, New York : World Bank. Available at *: info.worldbank.org/etools/docs/library/.../narayan.pdf. [Accessed 17 April 2014]*.

Pretty, J. and Ward, H., 2001. Social Capital and the Environment, *World Development* , 29 (2), pp. 209-227. Available at : www.researchgate.net *[Accessed 17 April 2014]*

Potschin, M.B. and Haines-Young, R.H., 2011. Ecosystem services: Exploring a Geographical perspective, *Progress in Physical Geography* , 35 (5), pp. 575-594. *Available at :* http://ppg.sagepub.com/content/35/5/575 *[Accessed 17 April 2014]*

Raharjo, Diah, 2013. Multistakeholder Forestry Programme (MFP 2), Final Report. *Unpublished*. Ministry of Forestry of the Republic of Indonesia.

Safitri, Myrna, 2006. Change without Reform? Community Forestry in Decentralizing Indonesia, [11th IASCP Conference], Bali, Indonesia, June 19-23, 2006. Available at : *dlc.dlib.indiana.edu/dlc[Accessed 5 May 2014]*

Sandelowski, M., 1995. Sample Size in Qualitative Research. In: Research in Nursing & Health. No. 18 pp. 179-183

Statistical Board of Purworejo Regency (BPS). 2013. Purworejo Regency in Figures 2013. Purworejo : BPS. Available at : http://purworejokab.bps.go.id/?hal=publikasi_detil&id=1

Serayu Opak Progo Watershed Management Center, 2009. Statistical Data and Information of Serayu Opak Progo Watershed Management Center, Ministry of Forestry, December 2009. Yogyakarta : BPDAS SOP

Smith, J.W. et.al., 2012. The effects of place meanings and social capital on desired forest management outcomes: A stated preference experiment, *Landscape and Urban Planning,* 106, pp. 207– 218. Available at : http://www.elsevier.com/locate/landurbplan [Accessed 17 April 2014]

Stone, Wendy, 2001. Measuring social capital: Towards a theoretically informed measurement framework for researching social capital in family and community life, *Research paper No. 24, 2001*, Australian Institute of Family Studies. Available at : http://www.aifs.gov.au/institute/pubs/RP24.html[Accessed 9 May 2014]

World Bank, 2002. Social Capital Assessment Tool (SOCAT). Available at : http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPSIA/0,,contentMDK:20472532~isCURL:Y~menuPK:1108016~pagePK:148956~piPK:216618~theSitePK:490130,00.html [Accessed 9 May 2014]

Village Tourism Board of Karangrejo, 2013. Ecotourism village profile of Karangrejo. *Unpublished.*

Yin, R.K., 2003. Case Study Research, Design and Methods, Newsbury Park: Sage Publication.

Annex 1. Interview Guide for Head of Forest Farmer Group

INTERVIEW GUIDE FOR HEAD OF FOREST FARMER GROUP

Introduction

My name is Sulistyowati Diah Kusumawardhani, I am a student of Institute of Housing and Urban Development Studies, Erasmus University. I am currently conducting a research on The Role of Social Capital For Sustainable Forest Management, A Case of Community Forest in Karangrejo and Wonotopo village, Purworejo regency, Indonesia.

Your organization has been identified as one of main stakeholder that important in linking community forest with external parties. As key informant, I would like to ask you some question related to how your institution bridging the community.

The interview would last for an hour. Feel free to express your opinion. No names will be recorded, any information will be treated confidentially and used for academic purpose only.

Origins and development

1. How was this organization created?
   (When? Who was the initiator? What is the initial purpose?)
2. What is the main purpose of your organization today?
   (is there any changes in organizational structure and purpose?)
3. What kind of activities has the organization involved in?
4. What sort of help has it received from outside?
   (is there any assistance or funding from government? What type of support from government/NGO/other party? how did you get this support? who initiated it? How was the support given? what kind of benefit and limitation of the support?

Membership

5. Could you tell me about the membership in your organization?
   (who has been involved? Are all the people in the village involved? If not, why?)
6. In your opinion, why do people willing to join this organization?
   (are the member actively involved in the organization? what kind of demands/requests do they make on the leadership and organization?
7. Do people who become active members of the organization also members of other organization in the community/village?
   (why?)

Institutional capacity

8. Could you explain the leadership in this organization?
   (*How do the relationship of leaders to staff and to the community? Number of leaders/availability? What is the quality and skills of leaders?)*
9. How do you rate the participation in the organization?
   (attendance of meeting within internal organization and with external organization, participation in decision making, dissemination of information prior to decision making, dissemination of the results of decision making, representativeness of women, youth, level of participation of prosperous/elites family in the organization, what is the influence of the elites?)

Institutional linkages

10. Do you have links with other organization outside the village?
    (which organization? what is the nature of the link? when do you feel the need to established collaboration with them?)
11. Do you sufficiently informed about other organization programs and activities?
    (what is your source of information?)
12. Have you work with other organizations to achieve a mutually beneficial goal?
    (for which activities?)
13. Could you describe your relationship with the government?
    (Is there any government assistance? What was your experience? Which level of government do you find most cooperative (local, district, national)? Has the government made particular requests of your organization?)
14. Is your organization linked to any government program?
    (if yes, Which government program(s) is your organization involved with? Why those particular programs? What sort of role does your organization play in the program? Are there certain characteristics of these programs that make it easier for your organization to work with the programs?
15. Do you feel sufficiently informed about government programs and activities?
    (What are your sources of information)
16. Have you attempted to give inputs to the government?
    (if yes, What were the circumstances? What have been the results? What kinds of challenges did you have to deal with? (Probe for any role in planning, operation, and maintenance of government-sponsored services.)
17. Has your organization been invited to participate in any of the various government development planning processes?
    (What do you think about these planning mechanisms?)
18. How do you assess your organization's actual influence on government decision making at the district level?

Thank you

Annex 2. Interview Guide for Head of Village

INTERVIEW GUIDE FOR HEAD OF VILLAGE

Introduction

My name is Sulistyowati Diah Kusumawardhani, I am a student of Institute of Housing and Urban Development Studies, Erasmus University. I am currently conducting a research on The Role of Social Capital For Sustainable Forest Management, A Case of Community Forest in Karangrejo and Wonotopo village, Purworejo regency, Indonesia.

Your institution has been identified as one of main stakeholder that important in linking community forest with external parties. As key informant, I would like to ask you some question related to how your institution bridging the community.

The interview would last for an hour. You are free to express your opinion. No names will be recorded, any information will be treated confidentially and only used for academic purpose.

Institutional linkages

1. Could you describe the coverage area of the *kelurahan*?
2. What is the role and responsibility of your institution?
3. Do you have links with other institution outside the village?
   (which institution? what is the nature of the link? when do you feel the need to established collaboration with them?)
4. Do you sufficiently informed about other institution programs and activities related to community forest?
   (what is your source of information?)
5. Have you work with other institution to achieve a mutually beneficial goal?
   (for which activities?)
6. Could you describe your relationship with the government?
   (Is there any government assistance? What was your experience? Which level of government do you find most cooperative (local, district, national)? Has the government made particular requests of your institution?)
7. Is your organization linked to any government program?
   (if yes, Which government program(s) is your organization involved with? Why those particular programs? What sort of role does your organization play in the program? Are there certain characteristics of these programs that make it easier for your organization to work with the programs?
8. Do you feel sufficiently informed about government programs and activities?
   (What are your sources of information?)
9. Have you attempted to give inputs to the government?
   (if yes, What were the circumstances? What have been the results? What kinds of challenges did you have to deal with? (Probe for any role in planning, operation, and maintenance of government-sponsored services.)
10. Has your organization been invited to participate in any of the various government development planning processes?
    (What do you think about these planning mechanisms?)
11. How do you assess your organization's actual influence on government decision making at the district level?

Thank you

Annex 3. Interview Guide for Forestry and Agriculture Agency

INTERVIEW GUIDE FOR MUNICIPAL FOREST AGENCY

Introduction

My name is Sulistyowati Diah Kusumawardhani, I am a student of Institute of Housing and Urban Development Studies, Erasmus University. I am currently conducting a research on The Role of Social Capital For Sustainable Forest Management, A Case of Community Forest in Karangrejo and Wonotopo village, Purworejo regency, Indonesia.
Your institution has been identified as one of main stakeholder that important in linking community forest with external parties. As key informant, I would like to ask you some question related to how your institution bridging the community.
The interview would last for an hour. You are free to express your opinion. No names will be recorded, any information will be treated confidentially and only used for academic purpose.

Institutional Linkage

1. Could you describe the coverage area of your institution?
2. What is the role and responsibility of your institution?
3. How does your institution involved in the activities of community forest in Karangrejo and Wonotopo?
4. Are the activities regulated and monitored?
5. Are there any government programs in the two villages?
6. What type of support does your institution is given to the community forest in the two villages?
   (*what type of support, level of support (kelurahan, kecamatan, regency, provincial, continuity of support)*
7. What do you think is the challenge of working with the community forest?
8. What do you think is the limitation of the program to the community forest?
9. In your view, what is the relationship of the community forest with your institution?
   (I terms of communication, shared information and programs)
10. How do you connect the community forest with other organization?
    (with which organization/institution? What type of cooperation?)
11. How do you link the community forest with government program?
12. What is the position of your institution in the cooperation of the villages with other parties?
    (in terms of facilitating the networks)

Sustainable Forest Management

13. What measures have your institution taken to ensure the sustainable forest management?
14. In your opinion what kind of improvement is needed for the both villages to improve their forest management?
15. In your view, are there any differences before and after community based forest management?
    (in terms of biodiversity, forest ecology, in the last 10 years?)
16. In your opinion, is there any improvement in the livelihood of community forest?
    (in terms of increasing income, diversification source of livelihood)

Thank you

Annex 4. Interview Guide for University

INTERVIEW GUIDE FOR UNIVERSITY

Introduction

My name is Sulistyowati Diah Kusumawardhani, I am a student of Institute of Housing and Urban Development Studies, Erasmus University. I am currently conducting a research on The Role of Social Capital For Sustainable Forest Management, A Case of Community Forest in Karangrejo and Wonotopo village, Purworejo regency, Indonesia.

Your institution has been identified as one of main stakeholder that important in linking community forest with external parties. As key informant, I would like to ask you some question related to how your institution bridging the community.

The interview would last for an hour. You are free to express your opinion. No names will be recorded, any information will be treated confidentially and only used for academic purpose.

Institutional Linkage

1. Could you describe the role and responsibility of your institution in regards to community forest?
2. Do you informed about the activities of community forest in Karangrejo and Wonotopo?
3. Does your institution involved in the development of community forest in two villages?
   (when?who initiated the program?)
4. What type of support does your institution is given to the community forest?
   (is the project continue?)
5. What do you think is the challenge of working with the community forest?
6. What do you think is the limitation of the program to the community forest?
7. Could you describe the characteristic of community forest in the area?
8. In your view, what is the relationship of the community forest with your institution?
   (I terms of communication, shared information and programs)
9. How do you connect the community forest with other organization?
   (with which organization/institution? What type of cooperation?)
10. How do you link the community forest with government program?
11. What is the position of your institution in the cooperation of the villages with other parties?
    (in terms of facilitating the networks)

Sustainable Forest Management

12. What measures have your institution taken to ensure the sustainable forest management?
13. In your opinion what kind of improvement is needed for the both villages to improve their forest management?
14. In your view, are there any differences before and after community based forest management?
    (in terms of biodiversity, forest ecology, in the last 10 years?)
15. In your opinion, is there any improvement in the livelihood of community forest?
    (in terms of increasing income, diversification source of livelihood)

Thank you

Annex 5. Questionnaire for Community

QUESTIONNAIRE

Introduction

My name is Sulistyowati Diah Kusumawardhani, I am a student of Institute of Housing and Urban Development Studies, Erasmus University. I am currently conducting a study on The Role of Social Capital For Sustainable Forest Management, A Case of Community Forest in Karangrejo and Wonotopo village, Purworejo regency, Indonesia. You have been identified as the member of forest farmer association which is the target group of the research. As the member of forest community, I would like to ask your opinion about social bonding and community participation in the organization. The survey would last for 15 minutes. No names will be recorded, any information will be treated confidentially and only used for academic purpose.

Respondent Information

1. Age of respondent :
2. Gender
    1. Male
    2. Female
3. What is your highest level of education?
    1. No formal education
    2. Primary school
    3. Junior high school
    4. Senior high school
    5. University
4. Main occupation
    1. Unemployed
    2. Farmer
    3. Labour
    4. Other (specify)
5. How many years have you lived in the area?
    1. Less than 1 years
    2. 1 to 5 years
    3. 5 to 10 years
    4. More than 10 years
    5. Since I was born
6. Land status
    1. Privately owned
    2. Join with other person
    3. Other (specify)
7. Extent of land ownership in the forest
    1. Less than 0,3 Ha
    2. 0,3 - 1 Ha
    3. More than 1 Ha

Social bonding

<u>Norms and sanction</u>

1. Does the people familiar about the traditional norms/sanctions presence in the village?(i.e. if they cut the trees near the spring they have to plant 10 trees)
    1. Not at all familiar
    2. Not too familiar
    3. Somewhat familiar

4. Familiar
5. Very familiar

2. If people break traditional norms (i.e. cut the trees in protected area near the spring, fishing using potassium/electric shocks), how often the community apply the sanction?
   1. Never
   2. Rarely
   3. Sometimes
   4. Very often
   5. Always
3. In your opinion, does the sanction important in protecting the forest?
   1. Unimportant
   2. Of little important
   3. Moderately important
   4. Important
   5. Very important

Trust

4. How often do you lend or borrow tools from your neighbour?
   1. Never
   2. Rarely
   3. Sometimes
   4. Very often
   5. Always
5. To what extent do you agree or disagree that people here look out mainly for the welfare of their own family and not concerned with village welfare?
   1. Strongly agree
   2. Agree
   3. Neutral
   4. Disagree
   5. Strongly disagree
6. If a community project does not directly benefit your neighbour but has benefits for others in the neighborhood/village, do you think your neighbour will willing to spend money for the project?
   1. Not at all
   2. A little contribution
   3. Somewhat contribute
   4. Highly contribute
   5. Always contribute

Reciprocity and exchange

7. When you lend your tools to your neighbor, to what degree would you expect they will do the same to you in the future?
   1. Not expect the same treatment in the future
   2. Rarely expect the same treatment in the future
   3. Somewhat expect the same treatment in the future
   4. Very expect the same treatment in the future
   5. Definitely expect the same treatment in the future

Community Participation

Association

8. How long have you been joined the organization?
   1. Less than one year
   2. One to three years

3. Since it is established

9. How many times are the community meeting held?
   1. Never
   2. Rarely
   3. Sometimes
   4. Very often
   5. Always
   6. Other (specify)
10. To what extent do you feel the advantage of joining the organization? (i.e. ease of access to information about tree disease prevention)
    1. None
    2. Not very much
    3. Somewhat beneficial
    4. Very beneficial
    5. Always beneficial
11. How often do you involved in voluntary activities in the organization (i.e. disseminating information about new technology to other member)?
    1. Never
    2. Rarely
    3. Sometimes
    4. Very often
    5. Always

Initiative

12. In the last three years, has the community organized to address a need or problem (i.e. the need of good quality of seed)?
    1. Yes
    2. No
13. If yes, around what issues?
14. Was the initiative successful?
    1. Yes
    2. No
    3. Ongoing

15. If there is a problem that affected the community (i.e. tree disease) to what degree do you think people would do?	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Each person/Household would deal with the problem individually					
Neighbours among themselves					
All community leaders acting together					
The entire village/neighbour acting together					
Local government/municipal political leader					

Decision Making

16. How does the group usually make the decision?	Strongly agree	Agree	Neutral	Disagree	Strongly disagree

The group members hold a discussion and decide together					
The leader ask group member what they think and then decide					
The leader decide and informs the other group members					

17. What do you think about the dissemination of information in decision making	Never	Rarely	Occasionally	Very often	Always
Prior dissemination of information					
Opportunity of informal discussion					
Consultation with group member					
Widespread debate, opposing opinion, frank discussion					
Dissemination of result					

Annex 6. Correlation analysis between education and norms in Karangrejo

Descriptive Statistics

	Mean	Std. Deviation	N
Education level attainment	2.6667	1.26854	30
Understanding of existing norms	2.9000	1.12495	30

Correlations

		Education level attainment	Understanding of existing norms
Education level attainment	Pearson Correlation	1	.580**
	Sig. (2-tailed)		.001
	N	30	30
Understanding of existing norms	Pearson Correlation	.580**	1
	Sig. (2-tailed)	.001	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Annex 7. Correlation analysis between education and norms in Wonotopo

Descriptive Statistics

	Mean	Std. Deviation	N
Education level attainment	2.0000	.37139	30
Understanding of existing norms	1.8000	.40684	30

Correlations

		Education level attainment	Understanding of existing norms
Education level attainment	Pearson Correlation	1	.000
	Sig. (2-tailed)		1.000
	N	30	30
Understanding of existing norms	Pearson Correlation	.000	1
	Sig. (2-tailed)	1.000	
	N	30	30

Annex 8. Regression analysis with Status of Land Ownership as predictor, Wonotopo

1. R Square shows that 31.6% of the willingness to contribute in village project can be predicted from land ownership status

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Status of land ownership[b]	.	Enter

a. Dependent Variable: willing to spend money for village project

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.562[a]	.316	.291	.43853

a. Predictors: (Constant), Status of land ownership

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.482	1	2.482	12.907	.001[b]
	Residual	5.385	28	.192		
	Total	7.867	29			

a. Dependent Variable: willing to spend money for village project

b. Predictors: (Constant), Status of land ownership

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.154	.447		4.820	.000	1.238	3.069
	Status of land ownership	.846	.236	.562	3.593	.001	.364	1.329

a. Dependent Variable: willing to spend money for village project

2. R Square shows that 61.5% of familiarity on norms can be predicted from land ownership status

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Status of land ownership[b]	.	Enter

a. Dependent Variable: Understanding of existing norms

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.784[a]	.615	.602	.25678

a. Predictors: (Constant), Status of land ownership

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.954	1	2.954	44.800	.000[b]
	Residual	1.846	28	.066		
	Total	4.800	29			

a. Dependent Variable: Understanding of existing norms

b. Predictors: (Constant), Status of land ownership

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.077	.262		.294	.771	-.459	.613
	Status of land ownership	.923	.138	.784	6.693	.000	.641	1.206

a. Dependent Variable: Understanding of existing norms

3. R Square shows that 46.4% level of trust in the society can be predicted from land status

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Status of land ownership[b]	.	Enter

a. Dependent Variable: Frequency of lending or borrow tools from neighbours

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.681[a]	.464	.445	.18898

a. Predictors: (Constant), Status of land ownership

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.867	1	.867	24.267	.000[b]
	Residual	1.000	28	.036		
	Total	1.867	29			

a. Dependent Variable: Frequency of lending or borrow tools from neighbours

b. Predictors: (Constant), Status of land ownership

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.000	.193		15.578	.000	2.606	3.394
	Status of land ownership	.500	.101	.681	4.926	.000	.292	.708

a. Dependent Variable: Frequency of lending or borrow tools from neighbours