

Understanding Social Capital in Management of Community Forest in Indonesia

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ABSTRACT

Community forests are defined as forests that grow on private land and are managed by farmers on a small scale. Most of the community forests in Indonesia are managed by farmers, who mostly use social capital in community forest management. Understanding social capital of farmers in managing community forests is important to empower them. This research was a survey conducted by involving 240 respondents in three districts: Bulukumba (South Sulawesi Province), Gunungkidul (Yogyakarta Special Province), and Pati (Central Java Province). The research showed that majority of the farmers believed that community forests can support their livelihoods. Moreover, the research used trust, norm, and network to measure the social capital employed in the community forest management. The result revealed some trusted stakeholders for intervention in community forest management across the study locations were other farmers, farmer group committees, and farmer groups. Meanwhile, the norms that the farmers used in community forest were tradition and custom. In addition, the farming network was identified to understand behavior of the farmers in forest product marketing. A total of 68% of the farmers sell timber, whereas the others (52%) sell crops. Traders are the most important stakeholder in community forest product marketing. From this identification of social capital, we could develop appropriate strategies for intervention to manage the community forests for sustainable community forest management.

Keywords: community forest; norm; network; stakeholder; trust

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1. Introduction

In several developing countries, such as India, Nepal, Cambodia, Vietnam, and Philippines, community forestry plays a role in alleviating poverty while conserving forests (Sunderlin et al. 2006; Harada et al. 2014). The community forest development in Indonesia aims to solve environmental problems, especially to conserve and/or rehabilitate degraded lands.

The development of community forests (*hutan rakyat*) in Indonesia has received attention

from many parties because of its specificity toward management and utilization. Despite their small scale, community forests can contribute to meeting the needs of families of forest farmers through forest products (timber, crops, fruit, herbs, and others). Community forests are defined as forests that grow on private land and managed by farmers on a small scale; these forests consist of home gardens (*pekarangan*), drylands (*tegalan*), and woodlots (*alas*) (Hinrichs et al. 2008; Roshetko et al. 2013; Fujiwara et al. 2017).

The area of community forests in Indonesia in 2011 was 1,560,229 ha or 1.13% of the total forest land (133.69 million ha) (MoF, 2012). Additional community forest areas in 2016, 2017,

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and 2018 reached 190,568 ha, 164,239 ha, and 162,500 ha, respectively (MoEF, 2019). In 2019, potential standing stock of the community forests in Indonesia reaches 18,809,142 m³ (MoEF, 2020).

Currently, community forests have an important role for farmers. They are used as savings by farmers to meet certain needs or in cases of emergency. The consequence is that trees will be harvested if farmers need cash to meet their needs despite the small size of trees (Rohadi et al. 2012; Roshetko et al. 2013; Fujiwara et al. 2018).

The farmers' motivation in managing community forests will determine the form of community forest management. Differences in the management and utilization of community forests are influenced by the motivation of farmers, culture of local community, capital owned by farmers, and the role of stakeholders and policies related to the development of community forests. Managing community forest also determines how to blend complex farming system management with traditional knowledge and practices and responses to emerging commercial markets (Irawati et al. 2014). Earlier studies have identified the characteristic and policy challenges of community forest management (Perdana et al. 2012; Roshetko et al. 2013; Fujiwara et al. 2018). Moreover, Maryudi et al. (2015); Maryudi et al. (2016) examined how local farmers knowledge on regulatory framework on timber marketing.

Community forests have contributed considerably to farmers' incomes, which may come from agricultural crops, plantations, timber, and non-timber forest products. This income will improve the livelihood of farmers. Diverse factors of community forests contribute to farmers' income. A key factor influencing a farmer's wealth is the size of land owned by them. In general, the larger the land owned, the greater the additional income from community forests will be. Land size is the main indicator that determines the welfare level of community forest farmers in Indonesia (Oktalina et al., 2015). The study also showed that 35% of community forest farmers belong to the low-level wealth category (Oktalina et al., 2015).

Using livelihood assets classified by Department for International Development (DFID), Oktalina et al. (2015) identified the type of capital used by farmers in managing community forests in Indonesia. The most utilized by the farmers in managing community forests is

social capital rather than financial, physical, natural and human capital.

Based on these findings, this study focused on in-depth understanding of social capital used by farmers to manage their community forest. This study aimed to understand three dimensions of social capital elucidated by Fukuyama (2007), i.e. trust, norm, and network that are owned and used by smallholder farmers in managing community forests at the study sites.

2. Theoretical underpinning

Forestry systems are not only influenced by physical capital (standing stock of trees, infrastructure, and land condition) but also economic capital, and social capital (cooperation and network) (Coleman, 1990; Putnam, 2000; Guillen et al., 2015). Social capital refers to connections among individuals, whereas social networks and norms of reciprocity and trustworthiness arise from such connections (Borg et al., 2015). Some studies on social capital in forest management have been carried out. Guillen et al. (2015) qualitatively tested the existence of social capital in small-scale forest management in Southern Sweden. In this study, the importance of recognizing personal relationships and the catalyzing role of bonding social capital were ascertained to understand local forest management situations. Nath et al. (2010) examined the status and formation of social capital and its contribution to forest management and livelihood in Bangladesh. Variable social capitals in this research were groups and networks, level of trust, social cohesiveness and inclusion, collective activities, and participation. This study presented that high social capital is related to desirable forest conditions. This condition can be observed in villages that have the closest relationship with the project staff. The highest satisfaction level was observed with the success of tree growth.

For Indonesia case, Lee et al. (2017) identified key factors that influence social capital in management of community forests around Mount Ciremai National Park. The research determined two factors affecting social capital in forest management, namely, internal factors (individual characteristics and knowledge of community forest management) and external factors (extension activities, the role of farmer groups, and access to information). Other research conducted in Boalemo District explored which type of social capital that can be utilized in management of community plantation forest

(Sylviani et al., 2020). Results of the research showed that strengthening social capital in its dimensions of trust, norm and network would encourage the independence for both farmers and farmer groups in managing their community plantation forests.

Based on Putnam's (1993) definition, social capital comprises three main pillars: (1) attempts to manage the relation network; (2) mutual trust that leads to; (3) attitude and habit to mutually respect and help others (norms of reciprocity); thus, cooperation can be established to overcome problems related to common interests (Ariana et al., 2006). Trust is product of social capital expressing expectation that arise in community for the benefit of other members of the community (Hadisurya, 2017). Trust arises when parties believed in each other so they are willing to share resources. Norm is a set of rules arise from understanding, values, expectations and goals that can be sourced from religious values, morals, professional ethics or secular values which are built and evolved through the history of certain social groups (Fukuyama, 2019). Norm is expected to be obeyed and followed by members of the social groups. Social capital also enables emergence of potential resources in a form of network of raw material, markets, information and other capital resources to be utilized by individuals or community groups (Saleh et al., 2018).

3. Research Method

The research sites were located in three regencies: Gunungkidul (Yogyakarta Province), Pati (Central Java Province), and Bulukumba (South Sulawesi Province) (Fig. 1). Gunungkidul has an established culture of growing trees for commercial timber production. However, migration and demographic changes have created a trend of aging farmers, reduced availability of farm labor, conversion of farmland to intensively used lands (housing and industry), and extensive planting of trees on farmland. However, whether the increased area of community forests will receive the necessary silviculture practices to produce high-quality wood for industry is uncertain. Pati is dominated by smallholder farmers with integrated agricultural and forestry enterprises. Over the past decade, sengon (*Paraserianthes falcataria*) has become an increasingly popular timber species grown by smallholders since its only need 4-6 years to be harvested. This tree is traded to a variety of

processors within the province, who in turn produce plywood for national and international markets. Bulukumba has community forest programs for expanding the forest processing sector, in which new processors increase the competitiveness of forest products from smallholders.

Data collection was conducted on a survey in 2017 involving 240 respondents from three study sites, namely, Gunungkidul (90 respondents), Pati (90 respondents), and Bulukumba (60 respondents). The respondents were randomly selected from sample villages where the farmers managing community forests. The survey was conducted using a questionnaire with open and close questions. There were 14 questions to measure trust, 33 questions to measure norm and 11 questions to measure network.

Measurement of trust was based on to whom farmers mostly give their trust to various stakeholders involved in community forest management. The stakeholders identified here were other farmers, key persons, committees of farmer group, farmer groups, village government, village government officers, extension officers, non-governmental organizations (NGO)/universities/facilitators, financial institutions, traders, brokers, and industries/processors. To measure the trust, we use Likert scale of 1–3 (1 = agree, 2 = uncertain, and 3 = disagree). Then, the level of trust was presented in percentage of responses from the respondents. Social norms are common rules (formal or informal) shared by certain groups. The norms identified in this study were customs, traditions and consensus. We explore how existence of the norms was used by farmers in managing their community forests and compliance of the farmers to the norms. The results were presented in percentage. Meanwhile, the network was explored through identification of how farmers use the forest products, who the buyers are and how price information obtained. In this study, the community forest products were classified into agriculture crops, estate crops, and trees; the forest product buyers identified were trader, processor, market, neighbor, and others; while the source of price information were neighbor, broker, NGO, media, and others. The data were presented as percentages. In addition, triangulation data were collected by in-depth interview of the key persons.

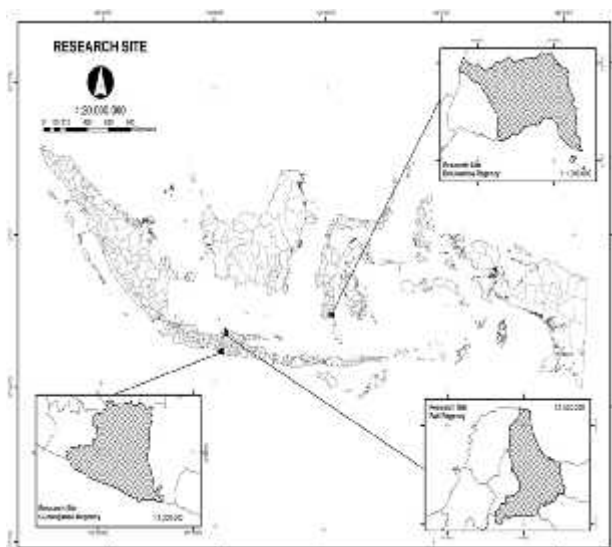


Figure 1. Research site: regencies of Bulukumba, Gunungkidul, and Pati

4. Result and Discussion

4.1. Result

Table 1. Community forest farmer characteristics

Location	Average Age (years)	Education	Land size (ha)	Family members
Pati	53	SD (67%)	1.15	4
Gunungkidul	54	SD (44%)	0.32	4
Bulukumba	50	SD (37%)	1.15	3

SD: elementary school (age of 7–12 years);

4.1.2. Trusted stakeholder of community forest farmers

This study found that, in average, 90% of the respondents across all research sites believed that community forests can support their livelihoods. The respondents from Bulukumba was observed had the highest belief (93%), followed with Pati (92%) and Gunungkidul (86%). Moreover, the respondents had trust to

4.1.1. Community forest farmer characteristics

Community forest farmers in Indonesia have diverse characteristics. Several of the farmer characteristics identified in this study include age, education, land size, and household number (Table 1).

The age of community forest farmer in Indonesia on average is 53 years old and in the range of 49–59 years old. The education level of community forest farmers is mostly at the level of primary education, that is, elementary. The level of education could affect readiness of farmers in receiving new information and their desire to learn new things. The community forest farmers with a low level of education usually maintain traditional community forest management practices that were inherited from their predecessors. Other characteristic of community forest farmer is the size of land they managed, which is related to scale economy of business. This study showed that average land size of the community forest at the study sites was 0.84 hectare. On this small piece of land a farmer family, with 3 to 4 family members per household, rely their livelihood.

some stakeholders who provide information on new technology and innovation valuable in community forest management. This trust will affect acceptance of intervention from stakeholders to farmers as individuals or groups. Trust will influence individual to share the knowledge. (CHUI, et al., 2006). Willingness to share knowledge with other is very important to manage community forest successfully. Table 2 illustrates trusted of community forest farmers.

Table 2. Trusted stakeholders of community forest farmers (%)

Stakeholder	Bulukumba	Gunungkidul	Pati
Other farmers	83	90	93
Farmers group committee	85	76	63
Farmer group	80	77	59
Trader	68	67	54
Village government	79	59	44

Stakeholder	Bulukumba	Gunungkidul	Pati
Extension officer	68	59	51
Key person	65	82	37
NGO/University	65	59	52
Local government	78	43	42
Village officer	58	58	41
Industry	40	26	37
Broker	20	29	7
Financial institution	35	13	14

Chui et al., 2006 said, that trust has been identified as a key element in fostering the level of participation. The most trusted stakeholders recorded in Bulukumba were farmer group committee (85%) then followed by other farmers (83%) and farmer groups (80%). In Gunungkidul, the highest trusted stakeholders were observed for other farmers, key persons and farmer groups with the value of 90%, 82% and 77%, respectively. Collective life in the Javanese tradition is reflected in Gunungkidul, indicated in the very high level of farmers' trust to other farmers. Farmers observed how other farmers managed community forests and imitated their practices. This behavior pattern could be used as basis for formulating various policies on community forest management through a participatory process. The same situation occurred with the community forest farmers in Pati, where they had the highest level of trust in other farmers (93%), followed by those in committees of farmer group (63%) and farmer groups (59%).

4.1.3. Norms for community forest management

Results of the research on the three locations revealed different levels of norms used to regulate forest management (Table 3). The existence of norms in community forest management in the study location varied greatly. Norms that identified in this study consist of customs, traditions and consensus. The customs referred to this research are the rules/activities that exist and are carried out in the community but are not formal legal rules. Tradition is behavior, belief that comes from cultural heritage from the past that is passed down from generation to generation. Consensus is an agreement made to be carried out by a society.

The community forest farmers in Bulukumba believed that custom (58%) is more important compared with other norms to manage community forest, whereas farmers in Gunungkidul perceived that consensus (32%)

became the basis for forest management by farmers. For the community forest farmers in Pati, tradition (97%) greatly influences the way of community forest management. A limited number of respondents in Pati claimed that traditions are inapplicable to community forest management. In addition to the tradition, in Pati, customs also shared positive values in community forest.

Table 3. Perception of existence norm to manage community forest (%)

Norm	Bulukumba	Gunungkidul	Pati
Custom	58	5	60
Tradition	45	8	97
Consensus	34	32	27

The research conducted in three locations attempted to identify the norms that give positive values in community forest management. Knowing the high-priority values in controlling community behavior is very useful in attempting to formulate the suitable approach to empower the community. Interventions are expected to become effective when they are implemented in accordance with the norms adhered to by the community given their high adaptability. The norms explored in this research are related to the existing norms used to manage community forest, farmers' compliance level to the norms, and sanction of norms in community forest management. In general, the respondents in the three sites stated that customs and traditions share the rules related to community forest management.

Although norms regulating community forests management were observed at the research sites, people's compliance level with the existing norms should be determined. The higher the community compliance level with the existing norms, the more intervention effects are shared by the norms on large respondents compared with norms that share a lower compliance level. Table 4 presents the compliance level with the norms at these research sites.

In Bulukumba, the norms with the highest level of compliance by respondents were customs (100%) and traditions (92%). This finding shows that community forest farmers in Bulukumba still uphold customs and traditions in the management of community forests. The large percentage of farmers' obedience to custom (58% and tradition (45%) is in accordance with the existence of both norms based on farmers' perceptions (Table 3). In Gunungkidul, traditions and consensus had the highest level of compliance by the community on managing community forests, with the values of 81% and 80%, respectively. For farmers in Gunungkidul, their obedience. In Pati, the community exhibited the highest level of compliance to customs and traditions, with the values reaching 84% and 100%, respectively. The community forest farmers in Pati recognize the existence of custom and traditions in community forest management and comply with both norms.

Table 4. The compliance level of the farmer to the norm (%)

Norm	Bulukumba	Gunungkidul	Pati
Custom	100	60	84
Tradition	92	81	100
Consensus	67	80	47

Customs and traditions are the priority social capital that can be used to intervene with the community. Meanwhile, consensus can be an alternative means to apply in Gunungkidul because in this location, consensus shared the highest value from the respondents. In general, consensus can be developed because the average level of compliance presented by the respondents to this norm was high at more than 50%.

4.1.4. Network on community forest management

The dominant community forest products in the study sites were agricultural crops, estate crops, and timber. Most of the community forest products are sold. Farmers sell high proportion (68%) of the harvested timber from their community forest, whereas the rest is used for subsistence purposes, such as building houses and making furniture. Timbers harvested from community forests are sold (68%), 52% of short-term agricultural crops are sold, and the rest is consumed by farmers themselves.

Most of the community forest farmers in Pati sell their community forest products (agricultural, estate, and timber products), whereas those in Gunungkidul mostly use their

community forest products (agricultural, estate and timber) for their own needs. Farmers in Bulukumba mostly use community forest products in the form of agriculture and timber, whereas most of the harvested crop estates are sold. Fig. 2 presents the details of the community forest products sold for each location.

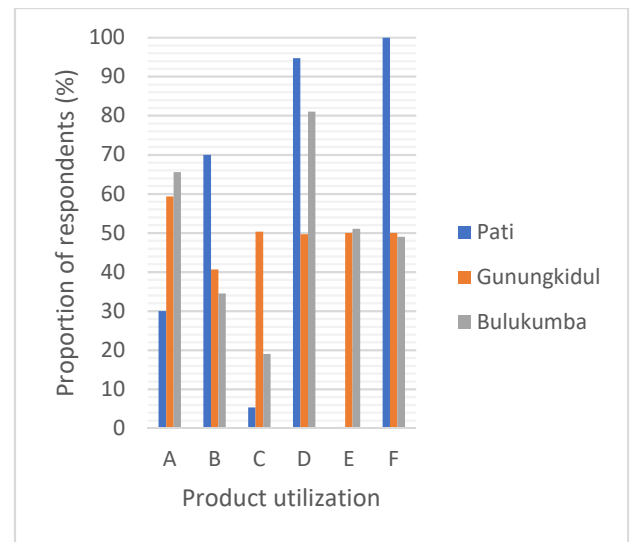


Figure 2. Community forest product utilization

Notes: A = agricultural product for self-consumption, B = agricultural product for sale, C = crop estate for self-consumption, D = crop estate for sale, E = timber for self use; F = timber for sale

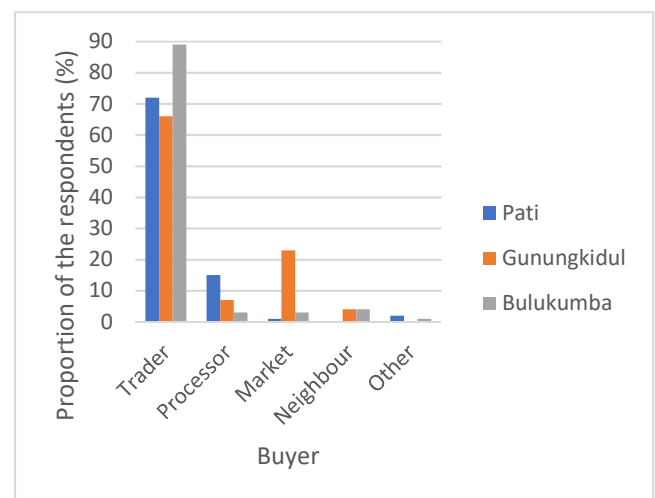


Figure 3. Buyer of community forest products

Farmer networks in marketing community forest products determine the value of products being sold. The present study showed that the community forest farmers market their forest products through several schemes, including direct marketing to end consumers, through brokers, traders, and industries (Fig. 3). The

majority of community forest farmers (72%) in Pati sell their forest products through traders. Similarly, those in Gunungkidul (66%) and Bulukumba (89%) trade their forest products to traders.

The farmers' preference to sell their products is influenced by several factors, including access to information on prices. The sources of information on the price of community forest products may be neighbors, brokers, media, or farmers' partners in community forest management. Most community forest farmers in Pati obtain price information from their neighbors (55%) who had sold community forest products before, whereas in Gunungkidul (32%) and Bulukumba (77%), farmers acquire price information from various sources, such as forest farmer groups (FFGs), forest extension officers, and traders (Fig. 4).

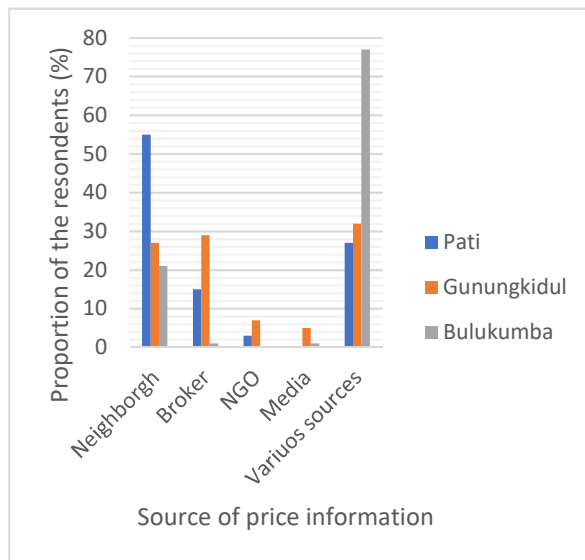


Figure 4. Price information source of community forest products

4.2. Discussion

4.2.1. Community forest farmer characteristics

The productive age, according to Indonesia Statistics (2020), is between 15 and 64 years old. In this research the average age of community forest farmers in Indonesia is 53 years old and between 49–59 years old. This condition indicates that community forest farmers in Indonesia are of productive age, thus having the potential to improve their knowledge and skills.

This research reported that the educational level of farmers is mostly at the elementary school level. Most farmers in Pati (68%), Gunungkidul (45%), and Bulukumba (37%) graduated from

elementary school. As a consequence, the knowledge and skills of community forest farmers in silvicultural techniques in the three research sites are poor (Stewart et al., 2014; Van de Fliert, 2013). This condition will cause difficulty for the transfer of technology and new knowledge for farmers. Thus, various trainings are needed to increase the capacity of community forest farmers. Capacity building through Master TreeGrower training is one of the means that can be carried out to improve knowledge and skills in community forest management (Muktasam et al., 2019).

The present study determined that the average land size of the community forest at the study site was 0.84 hectare. According to Neilson (2016), farmers are unlikely to meet their daily needs, which require at least 2 ha of land. This condition is related to the economies of scale in community forest management. The low area of farmers' land has resulted in inefficient community forest management. As a consequence, the relatively small size of community forest land causes farmers to adopt a diversification strategy to increase yields and reduce risk (Oktalina et al., 2015).

4.2.2. Trusted stakeholders of community forest farmers

The community forest plays important roles in improving community welfare; such roles include (1) supporting the direct consumption of community in meeting its subsistence needs; (2) offering support to meet urgent needs; (3) providing possible ways to overcome poverty (Babulo, 2009). The current research revealed that although community forests are managed in small scale, the majority of farmers (90%) believe that community forests can contribute in many ways to their livelihoods. The high belief of community forest farmers in Indonesia agrees with the findings of other studies. Chu et al. (2019) reported that forests contribute significantly to livelihoods, especially in increasing the income of farmers in Vietnam. Race et al. (2019) stated that forests contribute 29% of the total income of community forest farmers in Indonesia. Oktalina et al. (2015) reported that in Gunungkidul, the contribution of community forests to livelihoods ranges from 13% to 40%. Meanwhile, in Pati, the contribution of community forests to family income ranges from 25% to 32% per year (Irawanti et al., 2014).

The results of this study show the large dependence of farmers on forest products and the level of belief that forests can support the

livelihoods of farmers in Indonesia. The farmers of community forests are those who depend on farming for their livelihood. The low productivity of agricultural products will cause them to live in poverty. The productivity of lands needs to be increased to alleviate poverty. The process of increasing farm productions can be achieved by intensive and extensive means. According to Manik (2003), farming production is influenced by several factors, such as 1) the size of owned land, 2) farming patterns, 3) agro-ecology, 4) the cost of production factors and technology, and 5) the ease of marketing and cost of goods. These factors must be considered in the intervention of increasing land productivity.

The study of Oktalina et al. (2014) in Gunungkidul showed that community forest farmers can be categorized into three classes based on their properties: high- (15%), medium- (50%), and low-wealth (35%) farmers. In each class, the dominant assets used for community forest management activities differ, but social and physical capitals are generally more prevalent in all wealth categories. Wealthy farmers mostly utilize their physical and human assets. Wealthy farmers also have more production tools and equipment to manage forest than moderately wealthy and poor farmers. In addition, wealthy farmers have comparatively good education and skills, which are important components in human assets, that is, wealthy farmers use more human assets than other wealth classes in managing community forest because the former invest more in these components. By contrast, moderately wealthy farmers predominantly utilize physical and financial assets, whereas poor farmers rely more on social capital in managing their community forest given their limited assets. In Indonesia, a traditional value, *gotong royong*, is a mutual cooperation in which people help each other voluntarily. This kind of social capital is used by most farmers especially those of lower wealthy classes in rural areas to manage community forests. In rural areas, people depend on each other for their livelihood.

Although the majority of farmers in the study sites are poor (35%), they have a strong belief (90%) that community forest can help them to fulfill their needs and improve their livelihoods. Their trust is part of the social capital, which has a very high potential in community empowerment. The existence of community forest is believed by farmers to increase income and support their livelihood. Usually, the community forest product

is used to the family need that required large cost, for example to pay school tuition, hospital fees, celebration and other urgent needs. The level of trust in the community forest depicts the respondents' belief in the ability of community forests to support their livelihoods and is a form of social capital, which can determine the success of community forest development. This social capital can then be considered as a network in social relationship characterized by the existence of norms of trust and mutual relationships that lead people to achieve their common interest. This social capital can unite communities together (Stone et al., 2002). Trust for certain social analysts is considered as an integral part of social capital in the development.

Community forest management is extremely complex and specific because management is carried out in accordance with the characteristics of community forest farmers and management objectives. In managing community forests, farmers will interact with stakeholders. The social capital in the form of social trust toward community forests will promote coordination and communication. The coordination and communication established due to mutual trust will affect the collective action to achieve mutual benefits, that is, prosperity. Social capital builds social bonds based on trust. Thus, the social capital will have substantial meaning with regard to social assets that are controlled and operated in the social system. Ultimately, the social bonds formed by trust building will create a network of social bonds of intentionally formed community infrastructure (Fukuyama, 2001).

As previously described, the community forest farmers in Bulukumba trust the groups of committees (85%), other farmers (83%), and farmer groups (80%). The high level of trust in the committee group is in line with the research findings reported by Race and Sumirat (2015), who stated that the benefits for small-scale forest growers flowing from investment in processes that build social capital may include the development of an approach to forestry program by local FFGs. For the Bulukumba community, farmer groups are the most trusted stakeholders. Thus, intervention for farmers in forest management can be achieved through these stakeholders. The high trust of community forest into the groups of committees is based on the experience that had been run in Bulukumba Regency for reforestation activities from the government or other stakeholder are informed and implemented through groups of

committees. Furthermore, the group of community delivered this to the community forest farmers. The farmers in Gunungkidul trust other farmers (90%), key persons (82%), and farmer groups (77%), whereas those in Pati trust other farmers (93%), group committees (63%), and farmer groups (59%) to manage community forests. The identification of the most trusted stakeholders is important to determine the stakeholder for conducting interventions, such as empowerment activities for smallholder forest farmers. Empowerment is a process leading to self-reliance where the community is assisted, supervised, and facilitated to analyze their issues, determine the best solution options using their own resources, and create activities with their own ability (Awang, 2008).

Rustiadi et al. (2009) stated that trust promotes an opportunity for economic and development of stakeholders to interact with the assurance that the other party will not commit fraud. The network extends information to expand individual boundaries, whereas norms are the basis for stakeholders to build a collective action. The identification of stakeholders trusted in forest management will determine the most trusted stakeholders by farmers. Through stakeholders who are trusted by farmers, various interventions and transfer of innovation and technology can be attained. The most trusted stakeholders in the study area are other farmers. This finding was due to the collectivism nature of communities in Indonesia. Hasbullah (2006) claimed that various collective actions based on strong mutual trust will increase community participation including cooperation building.

According to Chamber (1987), the individuals/groups that need empowerment are those who are poor and lack power. Therefore, empowerment requires the role of outsiders. The main task of empowering bodies (government, NGO, etc.) is to encourage and create individuals or groups who can make behavioral changes toward self-reliance. Changes in this behavior are specified in the aspects of knowledge, attitudes, and skills that are useful to improve the quality of life and welfare. The empowering bodies should be able to intervene with the existing individuals or groups to achieve an innovation to improve empowerment. Stakeholders who can provide interventions can be either formal or non-formal officers. The community consists of individual bonds that are related to one another and to those whose opinions have great influence. In this case,

individuals or groups will listen to and imitate other individuals whom they trust (Anwas, 2014). The level of trust in stakeholders will greatly affect the entry and acceptance of innovation. With mutual trust, tolerance and cooperation in good networks can be built within and among communities. The empowerment stakeholders can be either formal or non-formal officers.

4.2.3. Norms for community forest management

The existence of common rules, norms, and sanctions prompt individuals to believe in investing themselves in group activities and control their behavior in the society (Hasbullah, 2006; Rustiadi et al. 2009). The norms held by farmers must be considered to intervene with community forest management through trusted stakeholders. Social capital is formed from informal norms in the form of rules, which are deliberately created to support cooperation among individuals. The norms that create social capital vary from mutual relationships that are later elaborated into doctrines. In addition to written rules, such as those that exist in social organizations, establishing cooperation on social interaction is associated with traditional values. Such values include honesty, commitment, fulfillment of obligations, mutual bonds, and others. These social values are virtual rules in a social system to control people's behavior in their interactions with others (Fukuyama, 2001).

Customs, and traditions are the most influential norms for farmers in Bulukumba (58%), Gunungkidul (33%), and Pati (97%), respectively. Norms are guidelines for living and behavior of human beings and individuals applied to the society. Norms consist of understandings, values, expectations, and goals that are believed and shared by a group of people. Norms can be sourced from religion, moral guidance, and secular standards and professional ethics. Norms are built and evolve based on the history of cooperation and are applied to support cooperation (Fukuyama, 1999). Community norms ensure that social relations in a social system (society) work as expected (Soekanto, 1982). Norms are important elements of social capital given that a social association (social organization) contains norms in the form of informal rules and values that facilitate coordination among members within a social system. Norms allow cooperative actions to ease the work to achieve collective benefits that can be shared (Coleman, 1988).

The importance of social capital, such as norms and trust in an institution, as explained by Ostrom (2005), is that if a person has been deeply internalized by a norm, he/she will be very embarrassed when violating the norm. For instance, such a person feels embarrassed and guilty when breaking promises. When the norm is shared with others, the involved parties will prevent each other from violating it and inhibit from performing activities considered erroneous by others. Shame and mutual care between individuals keep an institution running to achieve its goals. Farmers of Bulukumba showed the highest compliance level to customs (100%), whereas those in Gunungkidul and Pati exhibited the highest compliance to tradition (81% and 100%, respectively). The farmers in Gunungkidul were most the compliant to formal regulations (51%), whereas those in Bulukumba and Pati showed compliance rates of 36% and 29%, respectively. These results illustrate that community forest management policies lack affectivity if they are subjected to formal regulations because of the low level of farmer compliance. Community forest management policies will become more effective if they are formulated in a consensus agreed upon by the involved parties. The highest level of farmer obedience to consensus norms was 80% (Gunungkidul), followed by 67% in Bulukumba and 47% in Pati.

4.2.4. Network on community forest management

The community forest products in this study were agricultural crops, estate crops, and timber. The community forest products are used by farmers themselves or sold to meet their needs. Most of the farmers in Pati sell all community forest products in the form of agricultural crops (70%), estate crops (95%), and timber (100%). Timber community forest products in Pati include *Albizia*, which are used for industrial purposes. Most of the farmers in Gunungkidul use agricultural crops for their own needs (59%) (subsistence), 50% of the estate and timber are used for themselves, and the rest is sold. Farmers in Bulukumba mostly sell plantation crops (81%), whereas agricultural crops (66%) and timber (51%) are used for their own needs (figure 2).

Coleman (1988), as one of the founders of the concept of social capital, considers that networks are consequences of the wide application of trust and reciprocal relationship between members of the society. This study showed that

traders are the most important stakeholders in community forest product marketing. Traders are the stakeholders who have intensive contact with farmers in community forest product marketing. However, in relation to product prices, farmers obtain information from neighbors or from other sources, such as farmer groups and extension officers. Information sharing is a key to advancing network sustainability. Information sharing, social cohesion, and mutual goals are important in the farming network (Borg et al., 2015).

The government should intervene with community forest farmers through policies and assistance to support the sustainability of community forest management and improve community welfare. In addition, extendable activities and knowledge enhancement activities need to be provided to farmers to increase land productivity. Stakeholder intervention can be implemented through improvement of production factors. Hasbullah (2006) stated that various development programs run by the government will be more effective if they are applied in a society that has a strong social capital. Social capital is one of the important capitals, in addition to economic capital, used to manage community forests. By mutual trust, tolerance, and cooperation, strong networks can be built within and with other community groups. Community empowerment still needs to be applied given that without any production, social capital alone is insufficient for managing and running a community forest.

5. Conclusion

The majority of community farmers (90%) in the study sites believe that community forests can increase the income and contribute to their livelihoods. By understanding farmers' social capital, we can set up intervention strategies, such as collective action and capacity building of farmers, to manage community forests. Based on the level of trust toward stakeholders, intervention with community forest management can be implemented effectively through other farmers, farmer groups, and farmer group committees. The farmers of community forest mostly obey the norms in managing community forests, such as customs, formal regulations, and traditions. Traders, who have intensive contact with farmers in selling harvested products, are the most important stakeholders in community forest product marketing. Timbers harvested from community forests are sold by farmers (68%),

52% are short-term agricultural crops, and the rest are consumed by farmers themselves. The government should intervene through regulation and assistance to support the sustainability of community forest management and improve community welfare.

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