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# Assessing social capital in community forest management in the Mount Hamiding Protection Forest, North Halmahera District, North Maluku, Indonesia

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**Abstract.** *Kailola J, Purwanto RH, Sumardi, Faida LRW. 2023. Assessing social capital in community forest management in the Mount Hamiding Protection Forest, North Halmahera District, North Maluku, Indonesia. Biodiversitas 24: 431-440.* The success of forest management in the context of community forestry cannot be separated from the contribution of social capital. The Mount Hamiding Protection Forest is administratively located in North Halmahera District, North Maluku Province, Indonesia, and has a high biodiversity value with endemic flora and fauna. However, the management has not shown significant impacts in enhancing the welfare of the surrounding community, and there have been forest disturbances due to anthropogenic activities and vertical conflict. Hypothetically, the high level of social capital can support sustainable forest management and improve people's welfare, yet this has not been tested in the context of Mount Hamiding Protection Forest. Therefore, this research aimed to assess the social capital in community forest management in the Mount Hamiding Protection Forest. The quantitative survey was conducted in six villages in North Halmahera District, namely Wangongira, Efi-Efi, Mamuya, Togawa, Soakonora, and Roko. The elements of social capital assessed were trust, social norms, and social networks. The results showed that the level of community trust in the study area's six villages is in the medium category. However, the trust in the internal community is high, and trust in external stakeholders is medium. The communities in the six villages have overall high social norms. The social networks are high in Togawa, Soakonora, and Roko Villages, while the remaining villages have social networks in the medium category. Generally, the community around the Mount Hamiding Protection Forest area has a moderate social capital category due to a lack of participation and trust in written rules and government institutions. Therefore, the Forest Management Unit of North Halmahera District should strengthen the community's social capital to increase knowledge and understanding of written rules, trust in institutions, and network development through organization and participation.

**Keywords:** Community forestry, protected forest, social capital

## INTRODUCTION

Community forestry has been in the spotlight for decades in forest management. It promotes forest management that involves community participation and is advocated as a win-win solution for resolving tenure conflicts (Maryudi and Krott 2012; Roslinda et al. 2017; Putraditama et al. 2019). The concept first appeared at Jakarta's 1978 World Forestry Congress (Awang 2003; Sanudin and Awang 2019), although the definition varies among academia, government, private sector, and civil society. Some terms include social forestry, collaborative forest management, community forest, and community forest system. Nevertheless, these definitions emphasize community involvement and authority in forest management (Santosa and Silallahi 2011; Gbedomon et al. 2016; Muttaqin et al. 2019).

Participatory community involvement in forest management cannot be separated from elements of social capital, namely trust, norms, and networks (Friedman et al. 2020). According to Rosalinda et al. (2017) and Sikor et al. (2017), social capital plays a role in more efficient and productive forest management. The concept has become a concern in sustainable natural resource management (Roslinda et al. 2017), and it refers to various aspects of an institution or organization, namely norms, beliefs, and networks that can increase the effectiveness of the community to facilitate activities to run well. According to Lins et al. (2017), social capital encompasses people who work together to produce more efficient results in a community. Therefore, the relationship among people is the key to social capital. Trust is a sense of mutual understanding among community members (Li et al. 2017) and is related to cultural values (Pevzner et al. 2015). Meanwhile, social norms are implicit codes of conduct that guide appropriate action (Higgs 2015; Scott et al. 2022). Finally, diverse social networks of bonding, linking and bridging that link groups make management more effective (Dunn et al. 2021).

The Mount Hamiding Protection Forest (MHPF), located in the administrative area of North Halmahera District, North Maluku Province, Indonesia, has a high diversity value with endemic flora and fauna (Kastanya 2019; Mardiatmoko et al. 2020). The protection forest's legal status was declared by the Ministry of Environment and Forestry statement letter through SK.470/MenLHK/Setjen/PLA.0/9/2017-07/09/2017 concerning the Management of Forest Management Unit (FMU) in North Halmahera District. Then, through the Regulation of the Governor of North Maluku No. 44 the Year 2017-27/12/2017, the management unit of the protection forest was established, namely Protection Forest Management (PFMU) Unit II Tiabo North Halmahera. Despite the legal status as a protection forest, the community around the Mount Hamiding Protection Forest had lived and cleared land for plantation crops, such as coconut, nutmeg, cloves, and cacao, resulting in a vertical conflict. According to Reed et al. (2018) and Ellis et al. (2019), the management of protected forests should promote community participation. The involvement of the local community in protected forest management is closely related to social capital, which has ties and norms in the community as an essential element. This is because high social capital is an important factor affecting the success of various community-based programs (Roslinda et al. 2017). The participation of local communities can address the challenges of aligning the objectives of protection with development goals, and it commits to being involved in the decision-making process of forest management (Paudyal et al. 2018; Méndez-López et al. 2019). Participation provides income and information, as well as contributes to strengthening social capital (Valenzuela et al. 2020).

The community in North Halmahera District has traditional wisdom known as the Hibualamo culture. The Hibualamo community is an indigenous people living in the North Halmahera Regency area who have values of togetherness or solidarity in meetings and forest management. MHPF, with customary norms, serves as guidelines in the cooperative relationship with the term Babari or Hirono under the existence of the tribe that occupies the land of Hibualamo, which is a potential social capital developed to manage MHPF. Therefore, it is necessary to explore the values of the Hibualamo community to facilitate forestry in protected areas. This research aims to determine the social capital contained in the community, hence, it can contribute to community forests in MHPF management.

## MATERIALS AND METHODS

### Study area

This research was conducted in six villages in the MHPF area of North Halmahera District, North Maluku Province, Indonesia. The villages included Roko, Sokonora, Togawa, Mamuya, Efi-Efi, and Wangongira. The district is located between 1°57' N - 3°00' S and 127°17' E - 129°08' E, with an area of 3,892 km$^2$ and a distance of 120.29 km to Sofifi, the capital city of North Maluku Province (BPS Hamahera Utara 2022). The study area has soil types of Entisol (Hapludants and Dystrudepts) and climate type B with 7-9 wet months and 1-3 dry months (Watimena 2011). The selection of the villages as the studied area is because they represent villages in protected forest areas with high biodiversity, norms, beliefs, and networks around the Mount Hamiding Protection Forest (MHPF), as seen in Figure 1.

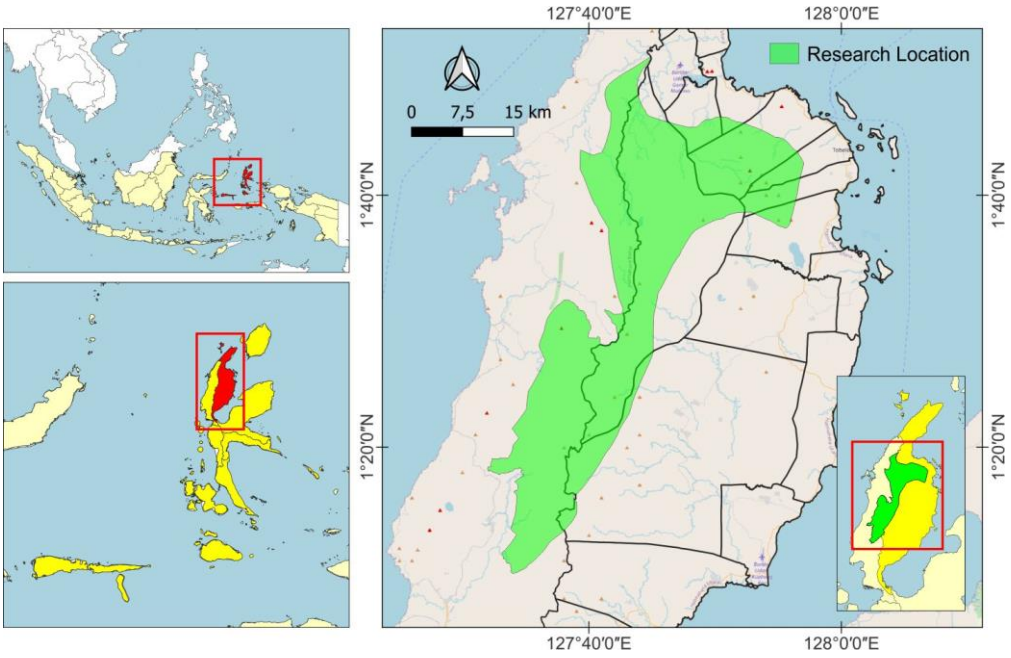


**Figure 1.** Research location in the Mount Hamiding Protected Forest (MHPF) North Halmahera District, North Maluku Province, Indonesia

**Data collection procedure**

This research was conducted using a survey method, with data collected using questionnaires. Respondents' criteria were people who live around the protected forest areas and conduct cultivation activities. Samples were taken randomly, and the number of respondents was determined based on the formula by (Sevilla et al. 1993) as follows:

$$n = 1 + \frac{N}{N + e^2}$$

Where: n: number of samples, N: population, e: tolerance limit error (5%).

The total respondents were 346 out of 2,540 families from all villages. The number and characteristics of the respondents in each village are detailed in Table 2.

**Data analysis**

The results of the interviews were analyzed using the descriptive method to explain the elements and levels of social capital. Meanwhile, the calculation of value intervals to describe characteristics is based on the level of social capital regarding norms, beliefs, and social networks. The main concept in this research is the social capital developed by Putnam and Leonardi (1993). Faith is the power to influence the principles of social welfare and economic progress achieved through society and social support institutions (Putnam 1993). A group or community members should uphold specific standards or "norms" that cannot be separated from beliefs. This is because norms are tools used to maintain consistency between status and play a role in maintaining social structures. The network is related to typology according to the characteristics and orientation of the group (Putnam 1993). Social groups formed based on beliefs of the same lineage tend to have high cohesion, but the reach of networks is minimal. In contrast, groups formed on equality based on direction and aims with a more significant number of management characteristics than contemporary companies have higher member engagement rates and bigger networks to tap (Roslinda 2016). Aspects of trust comprised individuals, families, and institutions. Norms consist of written and unwritten rules, and social networks are organizational networks and community participation. According to Saputro (2012), the level of social capital is divided into low, medium, and high, and the calculation of the Interval Value is as follows:

$$\text{Value Interval} = \frac{\text{Highest total score} - \text{Lowest total score}}{\text{Total class}}$$

Assessment of social capital, such as trust, norms, and networks, used a Likert scale as follows: (I) Assessment of the level of public trust with 15 elements, Xmax = 45, Xmin = 15, and N = 10. Therefore, the confidence level can be divided into: (i) low when the score is <25, (ii) moderate when the score is between 25-35, and (iii) high when the score is >35. (II) Assessment of social norms with 10 elements, X max 30, Xmin = 10, and N = 6.7. The level can be divided into: (i) low when the score is <16.7, (ii) moderate when the score is 17.7-23.4, and (iii) high when the score is >23.4. (III) Assessment of social networks with 10 elements, X max 30, Xmin = 10, and N = 6.7. The level can be divided into: (i) low when the score is <16.7, (ii) moderate when the score is 17.7-23.4, and (iii) high when the score is >23.4.

The summary of scoring of each social capital element can be seen in Table 1.

## RESULTS AND DISCUSSION

**Characteristics of respondents**

The characteristics of the community in MHPF can be seen in Table 2. The respondents based on the village are 43, 117, 49, 71, 47, and 19 from Roko, Soakonora, Togawa, Mamuya, Efi-Efi, and Wangongira, respectively. The education level of the respondents from the six villages was no school (0.6%), elementary school (35.8%), junior high school (26.9%), senior high school (31.5%), and university graduate degree (5.2%). This illustrates that most people in the MHPF area have an elementary school education level. Therefore, the impact on human resources is relatively low in managing forest resources. However, it impacts the condition of social capital in the community regarding beliefs, norms, and networks. In terms of occupation, the composition of the respondents was farmers (98.6%), traders (0.6%), entrepreneurs (0.6%), and the private sector (0.3%). Therefore, the community members mostly work as farmers, which seems closely related to the respondents' level of education. Regarding age, there were 45 respondents (13%) between the productive ages of 15 and 46, whereas the unproductive age of 46 consisted of 341 individuals (87%). This age level shows that the number of productive ages is smaller than unproductive ages. This impacts productivity, which is related to income and welfare. According to Suandi et al. (2014), productive age also affects income because physically, it has a higher performance than non-productive age. The level of income obtained by the respondents ranges from IDR 739,591.83-2,112,127.66 per month. In terms of a period of stay, the respondents have been living in their villages between 20-79 years, indicating that they have lived long enough in the area. According to the results, the community has understood their area's local sociocultural conditions and biophysical landscape (Dako et al. 2019).

**Identification elements of social capital**

*Trust*

The results of the analysis regarding the element of trust in the community are presented in Table 3. There are 15 sub-elements assessed for the element of trust. The result shows that community trust in managing MPHF in the six villages has a moderate level with an average score of 32.57, with the highest and lowest scores in Roko and Efi-Efi with values of 34.78 and 26.74, respectively. In addition, the results show a high level of trust in family, neighbors, friends, groups, individuals from the same ethnic group, religious and community leaders, and written rules. Meanwhile, trust in the District Government, Provincial Government, and written rules is low.

**Table 1.** Assessment of element of social capital of community forestry in the Mount Hamiding Protection Forest, North Halmahera District, North Maluku, Indonesia

| Elements of social capital | Total questions | X min | X max | Interval | Score criteria | | |
|---|---|---|---|---|---|---|---|
| | | | | | Low | Moderate | High |
| Community trust | 15 | 15 | 45 | 10 | <25 | 25-35 | >35 |
| Community social norms | 10 | 10 | 30 | 6,7 | <16,7 | 17,7-23,4 | >23,4 |
| Community social network | 9 | 9 | 27 | 6 | <15 | 15-21 | >21 |

**Table 2.** The characteristics of the respondents at the research location in the Mount Hamiding Protected Forest (MHPF), North Halmahera District, North Maluku, Indonesia

| Characteristics | Village | | | | | |
|---|---|---|---|---|---|---|
| | Wangongira | Efi-Efi | Mamuya | Togawa | Soakonora | Roko |
| No. of respondents | 19 | 47 | 71 | 49 | 117 | 43 |
| Education | | | | | | |
| No formal school | - | - | 2 (2.82%) | - | - | - |
| Elementary School | 14 (73.68%) | 16 (34.04%) | 38 (53.52%) | 7 (14.29%) | 34 (29.06%) | 12 (27.91%) |
| Junior High School | 3 (15.79%) | 14 (29.79%) | 20 (28.17%) | 7 (14.29%) | 30 (25.64%) | 25 (58.14%) |
| Senior High School | 0 | 15 (31.92%) | 8 (11.27%) | 34 (69.39%) | 45 (38.46%) | 4 (9.30%) |
| Graduate Degree | 2(10.53%) | 2 (4.26%) | 3 (4.23%) | 1 (2.04%) | 8 (6.84%) | 2 (4.65%) |
| Occupation | Farmer (100%) | Farmer 46(95.83%)<br>Private 1(2.13%) | Farmer 100%<br>others just free time:<br>sand laborer 6, employee 1, entrepreneur 1 | Farmer (100%) | Farmer 115(98.29%)<br>Trader 1 (0.86%)<br>Entrepreneur 1 (0.86%) | Farmer 42(97.67%)<br>Entrepreneur 1 (2.33%) |
| Income/month | IDR1,123,684.21 | IDR 2,112,127.66 | IDR 1,629,225.35 | IDR 739,591.83 | IDR 1,288,461.53 | IDR 1,515,813.95 |
| Length of stay (year) | 32 -75 | 41-79 | 28 -78 | 31 - 69 | 20-79 | 27-75 |

**Table 3.** The level of trust of community to several actors and rules regarding the management of the Mount Hamiding Protected Forest (MHPF), North Halmahera District, North Maluku, Indonesia

| Trust indicator | Wangongira | Efi-Efi | Mamuya | Togawa | Soakonora | Roko | Average score |
|---|---|---|---|---|---|---|---|
| Trust in others, family, neighbors, friends, groups | 2.74 | 2.53 | 2,09 | 2.57 | 2.56 | 2.63 | 2.50 |
| Belief in individuals from the same tribe | 2.74 | 2.13 | 2.09 | 2.57 | 2.564 | 2.63 | 2.50 |
| Belief in individuals from different tribes | 2.16 | 1.81 | 2.56 | 2.51 | 2.45 | 2.67 | 2.36 |
| Trust in religious leaders | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Trust in community leaders | 3,00 | 3,00 | 3,00 | 3,00 | 3,00 | 3,00 | 3.00 |
| Trust in the village head | 1.79 | 1.60 | 1.97 | 1.83 | 1.80 | 2.67 | 1.94 |
| Belief in unwritten rules | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Trust in FMU officers | 1.57 | 1.67 | 1.69 | 1.68 | 1.76 | 1.91 | 1.71 |
| Trust in Akemalamo River Basin Management office | 1.50 | 1.68 | 1.98 | 1.98 | 2.06 | 1.90 | 1.85 |
| Trust in Social forestry office and environmental partnership | 1.77 | 1.40 | 2.01 | 1.99 | 1.99 | 1.30 | 1.74 |
| Trust in officers from the agricultural service | 1.68 | 1.65 | 1.62 | 1.69 | 1.99 | 1.62 | 1.71 |
| Trust in NGO | 1.74 | 1.09 | 1.85 | 1.94 | 2.36 | 2.74 | 1.95 |
| Trust in officers from other agencies (Development Planning Agency at Sub-National Level Department of the environment, industry, and trade) | 1.77 | 1.40 | 2.01 | 1.99 | 1.99 | 1.30 | 1.74 |
| Trust in the Tourism Office | 1.79 | 1.60 | 1.97 | 1.83 | 1.80 | 2.67 | 1.94 |
| Trust in written rules | 1.74 | 1.71 | 1.69 | 1.69 | 1.80 | 1.74 | 1.73 |
| Total score | 31.99 | 26.74 | 32.53 | 33.27 | 34.12 | 34.78 | 32.57 |

Notes: X max = 45, X min = 15, N = 10. Category score < 25 = low/weak, 25-35 = moderate, > 35 = high/strong

These results suggest that people within the same ethnicity are more trustworthy. The finding is in line with the statement from (Roslinda et al. 2017) that trust in people with the same ethnicity will be higher when compared to those with different ethnicity. According to (Putnam and Leonardi 1993), the high trust within the same ethnicity is because of the formation of trust through genealogical bonds of the same identity. Interestingly, a

lack of openness in leadership, particularly in financial management (village fund allocation), undermines the community's faith in the village head. On the other hand, community members highly trust religious leaders, community leaders, and unwritten rules. The values of religious teachings should be practiced among fellow people. Unwritten rules are passed down by parents or elders to the younger generation to form a condition or culture of social norms. This is in line with the statement by Engbers et al. (2017) and Qurniati et al. (2017) that trust significantly affects social capital in forest management.

The trust in institutions related to protected forest management of North Halmahera District (i.e., Department of Agriculture, Development Planning Agency at Sub-National Level, Environment, Food Security, Industry, Trade, Tourism), Provincial Government (Forestry Service and Forest Management Unit), Ministries (Akemalamo River Basin Management Office, social forestry office and environmental partnership), and from Non-Governmental Organizations (NGOs) is in the medium category. This indicates that the community does not fully trust the institutions in protection forest management due to the lack of officers from agencies in terms of assistance and counseling. According to findings in the field, when there is an activity or project, officers from government institutions come to the village to carry out activities. Trust is the primary determinant of the quality of cooperation and social participation (Bizikova et al. 2012; Acedo and Gomila 2015). The main category of measures of social capital centers around the concept, including residents' perceptions about the virtues of the people with whom they work and interact. According to (Robbins dan Pettinicchio 2012; Engbers et al. 2017), trust assesses the extent to which residents trust others.

*Social norms*

The results of the analysis regarding social norms in the management of protected forest areas are presented in Table 4. There were 10 sub-elements assessed in social norms. The community's social norms were at the high category level, with an average score of 24.24. The highest social norm is in Efi-Efi Village, with a score of 24.54, and the lowest is in Roko Village, at 23.87, suggesting that the community still upholds social norms which relate to the values of cooperation, honesty, knowledge of unwritten rules, and compliance with the regulation in forestry. The social norms are still strong because these have been embedded in the community and continue to be conveyed repeatedly by traditional leaders. This is in line with the statement from Roslinda (2016) and Dako et al. (2019), where social norms are in the high category.

Knowledge of the community and the unwritten rules is in a high category. The community does not cut down trees in the protected forest area to prevent damage to the ecosystem. The protected forest not only has an ecological function of regulating water systems but also provides benefits as a food source, such as sago (*Metroxylon sago*), sweet potatoes (*Ipomoea batatas*), vegetables such as melinjo leaves (*Gnetum gnemon*) and bamboo shoots (*Bambusa* spp.), honey bees and a source of medicines. The high level of public knowledge and understanding of unwritten rules is because the tribe (*adat*) leaders continue to promote and impose strict sanctions. Differing from knowledge of unwritten rules, the community knowledge regarding the written rules on the prohibition of felling trees in protected forest areas is minimal, as well as the level of compliance. This is likely because of the lack of socialization and assistance from relevant agencies (e.g., FMU) regarding sustainable forest management.

There are different ethnic groups across the villages studied. In the villages of Togawa, Soakonora, and Roko, the dominant ethnic group is the "Galela Tribe", and in the villages of Efi-Efi and Wangongira, the dominant tribe is the "Tobelo Tribe". The Galela tribal community has a legacy from their ancestors about the values of cooperation built in the community known as "Babari". The Babari tradition is based on the sense of brotherhood and is commonly practiced when the community works together on agricultural activities, building houses and places of worship. While in the Tobelo Tribe, the culture of cooperation and mutual assistance is known as "Hirono". This tradition is practiced when clearing new land to plant rice or secondary crops, harvesting rice and building houses, including inter-religious houses of worship, and conducting personal counseling with Simon Kotu, the traditional head of the Efi-Efi Village.

The values of honesty in the community are categorized as high. One example of obedience to the values of honesty is when passers-by do not steal goods or agricultural products placed by the owner along the road. Knowledge about community harmony has become a cultural value and is called "O Dora" which is practiced as an attitude of love toward fellow humans and between individuals and society as a binding element. A concrete example of the application of O Dora in daily life is when a community gets hunted animals from a protected forest area, then the catch is distributed to neighbors in need. Likewise, when someone harvests crops, such as rice, bananas, or sweet potatoes, these are distributed to neighbors in need. Dasanayaka and Matsuda (2022) stated that local wisdom related to the management of forests needs to be preserved.

*Social networks*

Social networks have three structural types, namely bonding, bridging, and linking (Aldrich and Meyer 2015). The ties involve close relationships between family and friends (Frankenberger et al. 2013). It connects group members based on ethnicity, race, religion, and identity (Aldrich and Meyer 2015). According to (Seitz and Misra 2020), social network research is carried out in a single group or organization because of the importance of the response rate. Gorriz-Mifsud et al. (2017) and Auer et al. (2020) stated that social networks are vital, specifically in building collaboration. Social networks are important in improving a community's capacity through empowerment activities to increase the knowledge and abilities of individuals or groups in the network. Knowledge and capacity are essential to maintain forest productivity and sustainability.

**Table 4.** The social norms held by the community regarding the management of the Mount Hamiding Protected Forest (MHPF), North Halmahera District, North Maluku, Indonesia

| Social norms indicator | Wangongira | Efi-Efi | Mamuya | Togawa | Soakonora | Roko | Average score |
|---|---|---|---|---|---|---|---|
| Knowledge of written rules regarding protected forest management | 2.26 | 2.57 | 2.18 | 1.98 | 1.96 | 1.84 | 2.13 |
| Knowledge of unwritten rules regarding protected forest management | 2.84 | 2.62 | 2.34 | 2.86 | 2.81 | 2.79 | 2.71 |
| Knowledge of the value of honesty in society | 2.82 | 2.13 | 2.68 | 2.57 | 2.56 | 2.63 | 2.57 |
| Knowledge of the values of harmony in society | 2.82 | 2.87 | 2.89 | 2.94 | 2.56 | 2.88 | 2.83 |
| Level of compliance with written rules on protected forest management | 2.16 | 2.20 | 2.30 | 1.16 | 2.10 | 2.00 | 1.99 |
| Level of compliance with unwritten rules | 2.26 | 2.62 | 2.34 | 2.30 | 2.56 | 1.84 | 2.32 |
| There is no violation of the written rules | 1.42 | 1.72 | 2.04 | 1.98 | 1.96 | 2.1 | 1.87 |
| There is no violation of the unwritten rules | 2.79 | 2.62 | 2.09 | 2.86 | 2.56 | 2.40 | 2.55 |
| Togetherness in works | 2.2 | 2.32 | 2.23 | 2.67 | 2.79 | 2.51 | 2.46 |
| Knowledge of the rights of others. | 2.79 | 2.87 | 2.89 | 2.94 | 2.56 | 2.88 | 2.82 |
| Total | 24.38 | 24.54 | 23.98 | 24.26 | 24.42 | 23.87 | 24.24 |

Note: X max = 30, X min = 10, N = 6.7. Category score < 16.7 = low/weak, 17.7-23.4 = moderate, > 23.4 = high/strong

The results showed that ten social network elements were assessed with an average value of 23.06 (Table 5). Three villages have strong social networks, namely Roko, Togawa, and Sokonora, with a score of 23.7-24.17, while Efi-Efi, Mamuya, and Wangongira are at a moderate level with values ranging from 20.68-22.22. The moderate level of social networks in the Efi-Efi, Mamuya, and Wangongira villages suggest that community members have not fully participated in building relationships and collaboration outside their groups regarding protected forest management. This is because the community in Mamuya and Wangongira villages experience obstacles in building institutional cooperation, which hampers communication.

On the other hand, Togawa, Soakonora, and Roko communities have solid social networks because leaders and community groups can work together. This finding indicates that the community has a high level of cooperation in the group/community. This is based on the attitude of mutual trust and the existence of bonds in the local community because a value has been built closely related to social networks. The community highly values and cares for the forest called "O Baliara". Maintaining nature created by God, where mutual care and support are vital in creating a prosperous life. This can be seen daily through various natural ecosystems, flora, and fauna. Mutual respect between various ethnic groups allows them to work together in managing protected forests as places of activity.

The community is quite involved in the group, and the assistance is moderate, implying that it has not run optimally. Results of an interview with Mr. Ul Lemon (group member) Village Forest Management Institute (VFMI) showed that outsiders that migrate to the villages (for example, from Buton, Ambon, and Java) are allowed to use land and increase family income, which in local terms known as raka. The level of participation and cooperation is high, where the outsider community can adapt to the culture, and the social network formed is quite strong.

The analysis results regarding the indicator of group collaboration, the ability to build networks outside the community, the level of togetherness in solving problems, and sharing of information within and outside the group were moderate. This illustrates that the community in the research location has a modest ability to develop networks and collaboration, likely caused by a relatively low education level that mostly only took elementary school (35.8%). Therefore, relevant agencies (NGOs, Universities), Local Governments, District Governments, Provincial Governments, and the Ministry of Forestry and Environment must synergize to solve this problem.

Similarly, the results regarding community relations with NGOs, District Governments (Agriculture, Tourism), Provincial Governments, and the Ministry of Forestry and Environment (Akemalamo River Basin Management Office, social forestry office, and environmental partnership) were at a moderate level. The existence of NGOs and various institutions has minimal impacts on the community, specifically in terms of providing an understanding of protected forest management. The level of community relations with the village government has a medium category, meaning that the community does not participate in various activities in the village. For example, findings showed that the community rarely attends events organized by the village government because only certain people are invited to discuss and formulate village development program plans. According to Seitz dan Misra (2020), building a network requires individual abilities/skills to develop an organization. Social networks connect people across explicit, formal, or institutionalized gradients of power or authority across society (Szreter and Woolcock 2004; Kawamoto and Kim 2019). They are useful for sharing knowledge and addressing organizational needs (Yi 2009; Seitz and Misra 2020).

**Table 5.** Level of social networks in the community regarding the management of the Mount Hamiding Protected Forest (MHPF), North Halmahera District, North Maluku, Indonesia

| Social network indicator | Wangongira | Efi-Efi | Mamuya | Togawa | Soakonora | Roko | Average score |
|---|---|---|---|---|---|---|---|
| The level of cooperation within the group/community | 2.63 | 2.32 | 2.23 | 2.67 | 2.79 | 2.84 | 2.58 |
| The sense of belonging in the group to the protected forest | 2.84 | 2.62 | 2.34 | 2.86 | 2.81 | 2.86 | 2.72 |
| Level of involvement in participating in group activities | 2.82 | 1.96 | 2.11 | 2.69 | 2.69 | 2.60 | 2.51 |
| Collaborating with groups in the community | 2.82 | 2.87 | 2.31 | 2.50 | 2.78 | 2.64 | 2.69 |
| Collaborating with groups outside the community | 2.26 | 1.09 | 1.85 | 2.43 | 2.44 | 2.44 | 2.09 |
| Ability to build networks within the community | 2.16 | 2.57 | 2.59 | 2.64 | 2.66 | 2.63 | 2.73 |
| Ability to build networks outside the community | 2.00 | 2.37 | 2.39 | 2.44 | 2.16 | 2.43 | 2.30 |
| The level of togetherness in solving problems in the group/community | 1.42 | 1.81 | 2.16 | 1.94 | 2.09 | 2.05 | 2.01 |
| Ability to share information within the group | 1.57 | 1.67 | 1.69 | 1.68 | 1.76 | 1.91 | 1.71 |
| Ability to share information outside the group | 1.7 | 1.40 | 2.01 | 1.99 | 1.99 | 1.30 | 1.73 |
| Total | 22.22 | 20.68 | 21.68 | 23.84 | 24.17 | 23.7 | 23.06 |

Note: X max = 30, X min = 10, N = 6.7 . Category score < 16.7 = low/weak, 17.7 – 23.4 = moderate, >23.4 = high/strong

**Level of social capital**

Social capital is a productive asset that facilitates economic improvement (Tiepoh and Reimer 2004). According to (Harrison et al. 2019), people and communities with good networks are more likely to achieve better outcomes. Community forestry has been promoted as a strategy to address rural poverty and is a win-win solution for addressing tenure conflicts (Maryudi and Krott 2012). Community forestry is a complex collective action by users in a broader network of various local, national, and international actors (Moeliono et al. 2017). Therefore, the elements of social capital play an important role in managing community forests.

Table 6 shows the community's social capital in six villages around the Mount Hamiding Protected Forest. Soakonora has a high level of social capital, with an average score of 82.71. The other five villages have a medium level with an average score of 71.96-80.37. In terms of trust, the community in the studied area has a high level of trust internally within the community due to strong community relationships originating from the same lineage (ethnicity, taste, or religion), which shares similar values (norms). This affects the social network formed in the community, which is relatively high or strong.

Meanwhile, the level of trust and social networks with external actors have a medium category because the community is careful with outsiders or various institutions, NGOs, Universities, regencies, and Provincial and Central Governments. Therefore, it is necessary to increase the capacity of individuals and groups through community empowerment activities by increasing knowledge about written rules regarding sustainable forests and product management to improve welfare. It requires stakeholders, including NGOs, Universities, regencies, and Provincial Governments, to increase public trust in institutions and written rules through intense meetings. Szreter and Woolcock (2004) and Poortinga (2012) stated that the distinction between binding and bridging aspects could be understood in various ways. Meanwhile, bonding social capital refers to a relationship of mutual trust and cooperation between people who share identities. It is based on a relationship of trust and reciprocity for its existence and duration. The information in the contacts acts as a link to strengthen and unite the network's individuals. Sustainable development issues are characterized mainly by events of general interest as causes of social and global importance (Najjar et al. 2019; Bizarrias et al. 2022).

**Contribution of Social Capital in Community Forest Management in the MHPF Area**

The results showed that most people in the MHPF area are farmers (98.6%), with a majority having an elementary school education level (35.8%) and an average stay in the area of 20-79 years. Most of the local communities are indigenous peoples consisting of the Tobelo and Galela tribes, while small immigrants consist only a small portion. Such demographic conditions affect the social capital of the community. The social capital of the Hibualamo community who inhabit the MHPF area consists of elements of trust, norms, and social networks embedded in their daily lives. The data and information regarding social capital provide insight into the FMU MHPF as the management body of the protected forest, which can be used as a reference for implementing community forestry programs. Based on the results, the element of trust in the community is very high. The strong ties among families and community members influence because most local people come from the same ethnicity, namely the Tobelo and Galela tribes. The relationship forms a strong bond of trust in individuals, families, friends, and groups of traditional and religious leaders, as well as adherence to various unwritten rules, which have positively impacted the sustainable management of protected forests.

**Table 6.** Social capital of the community regarding the management of the Mount Hamiding Protected Forest (MHPF), North Halmahera District, North Maluku, Indonesia

| Elements of social capital | Wangpngira | Efi-Efi | Mamuya | Togawa | Soakonora | Roko | Total | Average |
|---|---|---|---|---|---|---|---|---|
| Trust | 31.99 | 26.74 | 32.53 | 32.27 | 34.12 | 27.21 | 160.71 | 30.81 |
| Networks | 22.22 | 20.68 | 21.68 | 23.84 | 24.17 | 23.70 | 124.98 | 22.72 |
| Norms | 24.38 | 24.54 | 23.96 | 24.26 | 24.42 | 23.87 | 145.43 | 24.27 |
| Total | 78.59 | 71.96 | 78.17 | 80.37 | 82.71 | 74.78 | 431.13 | 77.26 |

Note: X max = 105, X min 35, N = 23.33. Category score < 58.33 = low/weak, 58.33 - 81.33 = medium > 81.33 = high/strong

**Table 7.** Villages in the Mount Hamiding Protected Forest (MHPF) area that have been granted community forestry management permits

| Village | Scheme | Decree | Name of the institution | Permit area (ha) |
|---|---|---|---|---|
| Efi – Efi | Community Forest | SK.9597/Menlhk-PSKL/PKPS/PSL.0/1/2019 | Forest famer group Niamara | 268 |
| Mamuya | Village Forest | SK.158/Menlhk-PSKL/PKPS/PSL.0/3/2021 | Village Forest Mamuya | 1,163 |
| Togawa | Village Forest | SK.7964/Menlhk-PSKL/PKPS/PSL.0/9/2019 | Village Forest Pomasi Ngongano | 1,757 |
| Soakonora | Village Forest | SK.7386/Menlhk-PSKL/PKPS/PSL.0/9/2019 | Village Forest Soakonora | 1,861 |
| Roko | Village Forest | SK.833/Menlhk-PSKL/PKPS/PSL.0/3/2021 | Village Forest Roko | 108 |

Source: North Halmahera FMU (2022)

The results showed that the community has high social norms inherited from their ancestors within the cultural framework of the Hibualamo with insight into the values of local wisdom. This causes the community to feel responsible for the management of MHPF. The inhabitants are dominated mainly by the Tobelo and Galela Tribes, who have a distinct culture of cooperation known as "oh hayangi". Planting and harvesting agriculture products in the Tobelo and Galela languages is known as "Hirono" and "Babari". This culture impacts the community's responsibility to manage protected forests sustainably. It considers the current carrying capacity of the protected forest, which can be sustained for the needs of future generations and aligned with the programs of the Ministry of Environment and Forestry.

Access to protected forests is granted through different programs, namely Community Forest (*Hutan Kemasyarakatan/HKm*) and Village Forest (*Hutan Desa*), which are very relevant to the biophysical and sociocultural conditions (Table 7). The field data showed that several communities around MHPF areas had obtained management permits, namely Efi-Efi Village with Community Forest management permits and Mamuya, Togawa, Soakonora, and Roko with Village Forest management permits. In addition, Wangongira Village is in the process of applying for permits for the village forest.

The community in the MHPF area has a high internal social network within the group, but there is a lack of relationships with external stakeholders. Social networks, both internally and externally, are keys to the success of social capital development which depend on the ability of individuals to participate in the network (Hasbullah 2006; Dako et al. 2019). Therefore, this is a concern for FMU to increase the capacity of individuals or groups to build social networks, especially for external stakeholders. In this regard, social media has various benefits for sharing information and knowledge in protected forest management.

This study's result is similar to the research of Melia et al. (2022), which analyses the community's social capital in the management of Tengkawang. They stated that social capital in community-based forest management has the following characteristics: (i) Commitment to mutual efforts and cooperation occurs when it provides benefits collectively instead of individually (selfish); (ii) Community values lead to effective collaboration; (iii) The main issue in collective action is how cooperation in sharing and distributing resources can be successful and sustainable; (iv) Institutional mutual benefits; (v) Opportunities to increase productivity; (vi) The positive-sum goal (instead of zero-sum goal) is to maximize the interests and obtain mutual benefits; (vii) Interdependency in a positive way with more emphasis on providing benefits to others.

In conclusion, the level of social capital of communities living around the Mount Hamiding Protected Forest (MHPF) (i.e., Wangongira, Efi-Efi, Mamuya, Togawa, Soakonora, and Roko Villages) was in the medium category. Based on the level of social capital in MHPF, it is easy to implement community forestry and village forest programs. This is because such programs are well-suited to the biophysical and sociocultural conditions of the local community in increasing productivity to support sustainable development management activities. Therefore, community support and participation are needed in managing MHPF by building collaborative networks. After obtaining permits from the Ministry of Environment and Forestry, it will be easier to implement community and village forests. Nonetheless, the-FMU of North Halmahera District should strengthen the community's social capital to increase knowledge and understanding of written rules, trust in institutions, and network development through organization and participation.

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