

SUSTAINABLE FOREST MANAGEMENT: A SOCIAL CAPITAL APPROACH FOR WOMEN FOREST FARMERS ON THE SLOPES OF MOUNT KENDENG, NORTH CENTRAL JAVA

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ABSTRACT

The social capital approach and collaboration are the main focus in the management of natural resources such as forests. The social capital owned by women forest farmers is realized through social leadership, local wisdom, trust, and social institutions. This research aims to map social capital in ecological, social, and economic aspects of forest conservation efforts. The research was conducted on women forest farmers on the slopes of Mount Kendeng Utara, Central Java, namely in Blora Regency and Rembang Regency. Data were collected through moderate participation observation and in-depth interviews with several informants, then analyzed using qualitative methods of case studies. The typologies of social capital found are divided into three: bonding, bridging, and linking. In sustainable forest management, the dominant social capital in the economic aspect is bonding social capital, which increases the motivation, solidarity, productivity, and income diversification of women forest farmers. Bridging social capital strengthens social and ecological sustainability through compliance with the chairman of the Forest Farmers Group who are indigenous leaders, facilitating the exchange of information and forest management practices. Strengthening the social capital of women forest farmers requires a participatory, equitable, and gender-just approach to achieve sustainable forest management.

Keywords: *social capital, women, forest farmers, sustainable forest management*

INTRODUCTION

Forests are one of the buffers for life and sources of prosperity that need to be maintained sustainably and optimally maintained (Soraya, 2019). Forests have a vital role in maintaining the balance of the ecosystem, providing natural

resources, and supporting the lives of humans and various other living things. Indonesia has a very large forest area, which is 120,773,441.71 hectares (Rochmayanto et al., 2023). Through this potential, Indonesia plays an important



role in realizing sustainable forest management that supports sustainable development (Jhariya et al., 2019). The principle of sustainable development emphasizes that growth must be inclusive (Liu et al., 2023) and environmentally friendly (Maleksaeidi & Memarbashi, 2023). The 2030 Sustainable Development Goals (SDGs) agenda motivates the growth of sustainable development which is currently the focus of countries in the world. The SDGs have driven change towards sustainable development based on human rights and equality to promote social, economic, and environmental development (Katila et al., 2020). The SDGs guarantee "No-one Left Behind" (Sénit, 2020) and have 17 goals and 169 targets arranged in four pillars. The 15th goal of the SDGs emphasizes the protection of terrestrial ecosystems which is one of the crucial problems that must be overcome (Streimikis & Baležentis, 2020), one of which is sustainable forest management (Hiratsuka et al., 2019).

Sustainable forest management requires strong cooperation between communities around forests (Dahar et al., 2022) and the government (Moktshim, 2020). Local communities are the spearhead in natural resource management, while the

government is tasked with optimizing forest functions and benefits by balancing ecological, economic, and social aspects through policies that have been formulated (Gunawan et al., 2022).

Sustainable forest management is carried out carefully to prevent environmental problems from arising. This is part of sustainable natural resource management and supports sustainable development (Yamamoto & Matsumoto, 2022). Fair and optimal management of forest resources can provide social, ecological, and economic benefits (Prins et al., 2023). However, forest management has faced many challenges in maintaining efficiency and paying attention to nature conservation (Idris, 2019).

Women living around forest areas in various parts of the world have been active in protecting, utilizing, and conserving forests and other natural resources (Pandey & Pokhrel, 2021). Research conducted by (Begum et al., 2022) discusses the impact of women's participation in forest resource management. Women can have a dual role, namely playing the role of housewives and working to help improve the family economy (Antriyandarti et al., 2024), as women forest farmers do.



Women forest farmers have strong motivations built from individuals, environments, and personal experiences to manage forests (Parvin et al., 2023). Their participation is supported by social capital, an active relationship involving trust, mutual understanding, and common values and behaviours among families, fellow forest farmers, and other coordination to facilitate access to resources.

Women forest farmers in Blora and Rembang Village have a strong motivation in managing forests, supported by social capital obtained from relationships in the community. This capital includes trust, social networks, and norms that lead to active participation and togetherness in preserving forests. The importance of this social capital is reflected in their consistency in the shared forest management program, which not only impacts forest resource management but also social and economic development in the region.

This study aims to classify forms of social capital and analyze the impact of women's social capital on ecological, social, and economic sustainability. Women forest farmers are expected to leverage social networks, values, and trust to become agents of change in

increasing environmental, economic, and sustainable practice awareness. This role of women is important in the management of natural resources, traditional knowledge, income increase, welfare, and environmental awareness. The results of this research are expected to help formulate an inclusive program to improve the welfare of forest communities and maintain forest sustainability with social capital and local wisdom.

MATERIALS AND METHODS

This study uses a qualitative method with case studies. Case studies are used to properly examine the social capital owned by women in villages located in forest areas on the slopes of the Kendeng Mountains in managing forests in the agroforestry program (Savari & Khaleghi, 2024). The research location was chosen purposively, namely in villages in the forest area along the slopes of North Mount Kendeng which is between Blora and Rembang Regencies, Central Java, Indonesia. An interesting condition that occurs on the slopes of Mount Kendeng as a research location is that they have the principle of "mother earth" which makes the forest their livelihood. Forests surround villages in the North Kendeng Mountains area with



an area of 76.63% or 369 hectares (Perum Perhutani Divisi Regional Jawa Tengah

Kesatuan Pemangkuan Hutan Kebonharjo, 2022) as shown in **Figure 1**.

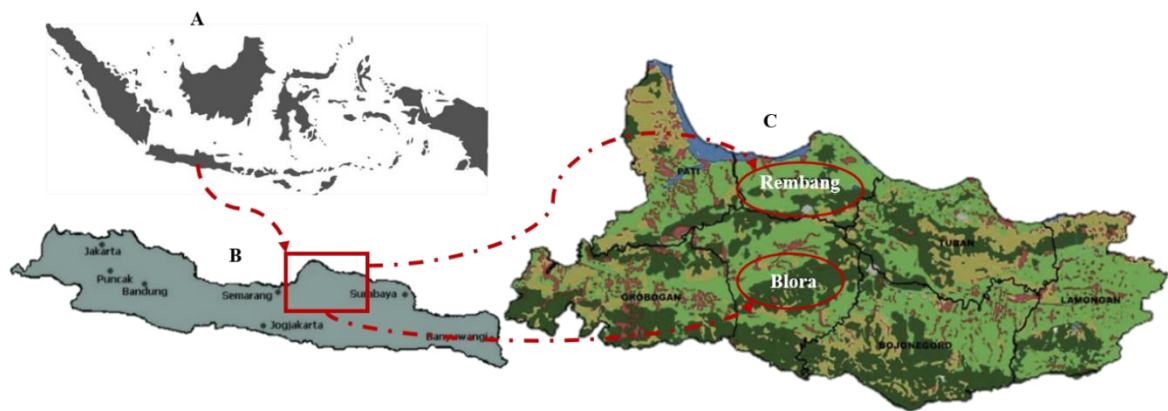


Figure 1. Research Location

Note: Figure A. Map of Indonesia; Figure B. Map of Java; and Figure C. Kendeng Mountain Area Map in Rembang and Blora (Central Java).

Source: Secondary Data, 2022

This study uses primary data and secondary data. Primary data was obtained through the moderate participation observation technique where researchers lived together and were directly involved in the activities carried out by women forest farmers. In addition, in-depth interviews were also conducted with informants such as women forest farmers, chairmen of forest farmer groups, accompanying facilitators, community leaders, government officials, and forest police. Secondary data was obtained from browsing the literature of reports and documents from the Indonesian State Forestry Company, the Public Summary of the Kebonharjo Forest Management

Unit, the Forest Management Unit, the Forest Management Resort, the village monograph, and the Forest Village Community Institution related to the research study. In the first objective, this study analyzes the social capital focused on women forest farmers through gender analysis by classifying them based on typology or level of social capital, namely bonding, bridging, and linking (Azad & Pritchard, 2023). The next analysis is to look at the impact of women's social capital of forest farmers on ecological, social, and economic aspects through interpretative phenomenological analysis which can be seen in **Figure 2**. Phenomenological analysis according to (Banton et al., 2023) is a qualitative

research approach that is committed to examining how people understand their main life experience in this case, namely the experience of women forest farmers in sustainable forest management to improve their well-being.

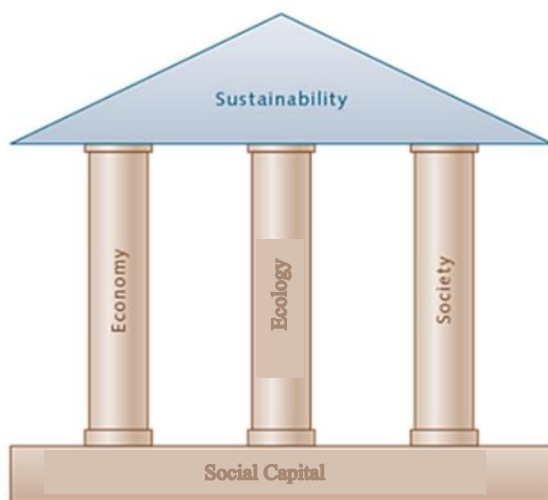


Figure 2. Models to depict components of sustainable forest management

Source: Adapted from Prins et al's Theory (2023)

This study examines the impact of social capital on economic, social, and ecological aspects in sustainable forest management according to the concept of Prins et al. (2023). The findings of social capital are categorized based on these aspects, focusing on the identification and analysis of social capital typologies (bonding, bridging, linking) and their influence on forest management in Blora and Rembang Regencies. The analysis was carried out to see how each typology of social capital affects economic aspects

(trade in forest products, employment, income), social aspects (community involvement, relationships between forest farmer, participation in forest management), and ecological aspects (conservation practices, environmental maintenance, ecological awareness). The results of this analysis are then mapped and compared through tables to identify the typology of social capital that has the most influence on each aspect in the research site as shown in **Table 1**.

Table 1. *Research Dimension*

Sustainable Forest Management	Social Capital	Information
Social Aspects	Bonding Social Capital	
Economic Aspects	Bridging Social Capital	Findings and implications
Ecological Aspects	Linking Social Capital	

Source: Adapted from Woolcock's theory of Social Capital (1998)

RESULTS AND DISCUSSION

Classification of Social Capital Typology

Social capital has three typologies, namely bonding, bridging, and linking. These three typologies are a manifestation of energy and power that can optimize other capital. The social capital of women forest farmers operates and influences their activities in managing forests. **Table 2.** Showing the



results of the classification of the typology of social capital of forest farmers in forest management under the auspices of the Community Shared Forest Management (PHBM) program. PHBM is a program that aims to improve the welfare of communities around forests through sustainable and participatory forest management. This program involves local communities in managing

and utilizing forests together with forest managers, such as Perhutani. Through PHBM, the community is expected to obtain economic, social, and ecological benefits from forests while preserving the environment (Widiyanto, 2016).

Table 2. Classification of Social Capital Typology of Women Forest Farmers in Slope Village of Mount Kendeng, North Central Java (Rembang and Blora Districts)

No	Typologies	Characteristic	Classification Results
1	<i>Bonding</i>	Binding, Inward Looking, Homogeneous	Family members (husbands, wives, children), fellow women forest farmers, village communities
2	<i>Bridging</i>	Bridging, Ourward Looking, heterogeneous, between social groups that have the same stratification	Women forest farmers with Forest Farmer Groups, women forest farmers with Forest Village Community Institutions (LMDH), collectors, sellers of agricultural production facilities, capital borrowers (Bank BMT or cooperatives)
3	<i>Linking</i>	Connecting, heterogeneous, there is stratification such as public relations with the government	Women forest farmers with Perhutani officers, such as Foremen, Mantri, Perhutani Assistants, Facilitators, Forest Lap Units (FMUs)

Source: Primary Data and Secondary Data, 2024

Social capital plays an important role in the lives of women forest farmers. Social bonding capital, such as mutual trust, norms, and networking, helps them overcome common problems. In this group, the trust and support of family and fellow farmers creates strong solidarity and cooperation. Social capital bridging expands relationships with external parties, such as non-governmental organizations, strengthens collaborative

capacity and assists in the management of forest resources. Social capital linking connects farmers with government agencies, namely Perum Perhutani, increasing access to resources and support.



Impact of Women's Social Capital of Forest Farmers on Sustainable Forest Management

Forest resource management encourages women to play an active role in the Community Shared Forest Management (PHBM) program. Therefore, social capital serves as a strategy to develop the rural economy and society in forest areas and protect forest ecosystems. Women's participation in forest management through the PHBM program has an impact on various aspects that support forest sustainability. *Sustainable Forest Management (SFM)* is an approach that aims to maintain, manage, and use forests responsibly, meeting current social, economic, and environmental needs without sacrificing the ability of future generations to meet their needs. The SFM concept aims to balance the use of forest resources and the preservation of ecological, social, and economic functions of forests, as explained below.

Forest Sustainability (Ecological Aspect)

Forest sustainability means that forest farmers and Perhutani synergize with

each other and have a shared role in protecting forests and utilizing forests to meet their needs. Perhutani as the person in charge of forest management also needs the awareness of the community around the forest to manage the forest sustainably. The meaning of forests in ecological functions gives importance to the community so that those who live around the forest can use it for their daily needs. Communities around forests must also strive to manage forests so that their vegetation is maintained, able to maintain sustainability and create a balanced and mutually beneficial relationship with nature. The social capital of women forest farmers plays a very important role in the sustainable management of forest natural resources, by strengthening social relations and trust among women forest farmers. This allows them to work together to conserve biodiversity, strengthen conservation practices, and protect forest ecosystems. The findings of the impact of social capital on the concept of Sustainable Forest Management on the ecological aspect are seen in **Table 3** below.



Table 3. The Impact of Social Capital on *Sustainable Forest Management* on Ecological Aspects

Social Capital Typology	No.	The Impact of Social Capital on Sustainable Forest Management on Ecological Aspects
<i>Bonding Social Capital</i>	1.	The tradition of " <i>weton</i> " and " <i>pranatamangsa</i> " → as cultural heritage has a positive impact on the cycle of better planting patterns.
	2.	Local knowledge about forest ecology → have an impact on forest women farmers to carry out proper natural resource management practices
<i>Bridging Social Capital</i>	1.	A high sense of obedience and obedience to the Chairman of the Forest Farmers Group (KTH) who is considered a traditional leader → the agroforestry pattern which is carried out following the orders of traditional leaders.
	2.	There is an <i>actor perspective</i> of obedience to community leaders, namely " <i>Bayan</i> " → women forest farmers follow what is ordered, for example, planting fruit trees in the forest.
<i>Linking Social Capital</i>	1.	The participation of women forest farmers in members of Forest Areas with Special Management (KHDPK) through the Non-Governmental Organization (NGO) Semut Ireng → a planting system with a more dominant combination of fruit crops, such as durian and mango.
	2.	The synergy between forest farmers and Perhutani → the formation of agrotourism to maintain natural ecosystems through a tourism approach. However, this tourism potential has not been utilized optimally.
	3.	Relations with foremen (KPH Perhutani officers) → Women forest farmers received counselling on environmentally friendly forest management practices such as the dosage of pesticides, fertilizers, planting patterns, and others.

Source: Research Analysis, 2024

In the aspect of ecological sustainability, bridging social capital has a more dominant influence. The community obeys traditional leaders in terms of choosing plant types and agroforestry patterns, rather than directions from Perhutani. The obedience of forest farmer women around the forest was formed because of the perspective of actors, namely the traditional leader as well as the village apparatus or "*Bayan*" who is known as a strong man. A strong man dares to take firm action against every violation that occurs in the village forest

area. The people of Mount Kendeng, especially those who enter Blora Regency, consider that the forest area around them is a heritage of their ancestors that must be protected. Blora Regency is thick with Samin customs that are still deeply rooted. The community has a motto "*iki ibu bumi ku*" which means this is my mother earth. "*Ibu bumi wis maringi, ibu bumi dilarani, ibu bumi kang ngadili,*" which means Mother Earth has given, Mother Earth is hurt, Mother Earth will judge. This message has become a culture in the Blora community,



so people consider that forest land belongs to their ancestors. Therefore, the compliance of women forest farmers is due to traditional leaders, not because of Perhutani as the land owner.

Women who are related to the environment are now widely voiced through ecofeminism (Imran et al., 2021). It is this ecofeminism that emphasizes the environment and the relationship between women and the earth on an analytical and practical basis. Environmental ethics in the implementation of agroforestry are more complied with by women, such as not being allowed to spray pesticides and herbicides on annual crops, not burning plant litter carelessly, and participating in protecting annual crops. The social capital of women forest farmers plays an important role in sustainable natural resource management. By strengthening

social ties and trust between women forest farmers, they can work together to preserve biodiversity, strengthen conservation practices, and protect forest ecosystems.

Occurrence of Interaction and Relations (Social Aspect)

Women forest farmers who are involved in agroforestry activities have better social interaction with the surrounding community. They have cultivated plots that are located nearby. Therefore, the women forest farmers in the area will go to the land together, take turns bringing food and drinks, and work together to make huts for shelter, helping each other alternately in planting or harvesting. **Table 4.** Investigate the implications of women forest farmers' social capital on forming social relationships and interactions (social aspects).

Table 4. Impact of Social Capital on Sustainable Forest Management on Social Aspects

Social Capital Findings	No.	Impact of Social Capital on Sustainable Forest Management on Social Aspects
<i>Bonding Social Capital</i>	1.	The trust that exists among women forest farmers → has resulted in a rotating cooperation system, where women forest farmers work together without expecting wages → creating harmony and community strength.
	2.	<i>Nyambang</i> culture (the activity of talking over lunch during a break) → various knowledge and increased solidarity among women forest farmers
	3.	The culture of earth alms (the spirit of cooperation between women forest farmers → increases the spirit of family and mutual help
<i>Bridging Social Capital</i>	1.	The high level of mutual trust and obedience to the management of the Forest Farmers Group (KTH) and non-governmental organizations, who are also indigenous leaders → Showing the strong influence of the semi-traditional Samin Tribe in the community → The interaction and social dynamics of the community that are formed will follow the traditional leaders.



Social Capital Findings	No.	Impact of Social Capital on Sustainable Forest Management on Social Aspects
	2.	Cooperation with the Forest Village Community Institution (LMDH) → Strengthening relationships between forest farmers and fulfilling farming infrastructure
	3.	Interaction with traders of agricultural production facilities → This meeting not only strengthens relationships but also improves skills and insights in managing agriculture more effectively.
	4.	Network with traders and collectors → ease of access to capital loan information
<i>Linking Social Capital</i>	1.	Compliance with NGOs → Illegal land buying and selling has an impact on the bad relationship with Perhutani.
	2.	Network with Forest Lap Units (FMUs) → aid donations once a year

Source: Research Analysis, 2024

In the social aspect, bridging social capital has a strong influence on social sustainability in the North Kendeng Mountain Slope area. The compliance of forest farmer women to the Chairman of the Forest Farmer Group as a traditional leader is a key figure in the social mobilization of the community. With this compliance, it strengthens the exchange of local information and knowledge in forest management between fellow women forest farmers. Through social networks, women forest farmers can gain access to resources such as information on financial loans, technical assistance such as hiring transportation services in transporting crops from the forest to be brought home, fulfilling farming infrastructure and markets for the sale of their persil products. This network plays an important role in expanding the social relations of women forest farmers.

Improving Welfare (Economic Aspect)

People living in forest areas are highly dependent on forest resources because they live far from the hustle and bustle of the city and access to knowledge. Women forest farmers have a high amount of time in forest management as a consequence of dual roles. The people of Blora still preserve the custom of "Samin", which is a farming culture from generation to generation. Women forest farmers must divide their time and adapt to the environment to balance the burden of domestic and public work as their productive work. The contribution of women forest farmers can help increase overall family income. **Table 4.** It shows that social capital from the typology of bonding, bridging, and linking has an impact on the economic sustainability of the community.



Table 4. The Impact of Social Capital on Sustainable Forest Management on Economic Aspects

Social Capital Findings	No.	The Impact of Social Capital on Sustainable Forest Management on Economic Aspects
<i>Bonding Social Capital</i>	1.	Mutual trust between families in the division of productive and reproductive work time → Women are allowed to work to help fulfil the economy.
	2.	The traditional view of women requires them to participate in work → make their contribution an inseparable part of their daily lives.
<i>Bridging Social Capital</i>	1.	A strong network of traders → makes it easier to sell agroforestry crops at appropriate prices and higher bargaining power.
	2.	Savings and loan activities with traders of agricultural production facilities → Facilitate the capital of women forest farmers
<i>Linking Social Capital</i>	1.	The network with the formal institution of the Forest Stewardship Unit (FMU) → Gain benefits in sharing non-timber forest revenues.
	2.	Cooperation with Perhutani → Initiation and assistance in agro-tourism management in improving the economy of local communities

Source: Research Analysis, 2024

Based on **Table 4**, sustainability in the economic aspect is greatly influenced by social capital bonding. The close relationship between women forest farmers and their families and fellow forest farmers can increase motivation, solidarity, and active participation in forest management, as well as diversify income through non-timber forest products looking for and selling teak caterpillars, teak leaves, and wood rendezvous together. Women's involvement in various economic activities can help diversify family livelihoods, reducing dependence on one type of activity, and increasing economic resilience. Despite having to experience

hassles because they have a dual role, women forest farmers never feel objectionable and rarely complain to their families. They consider this to be a common thing to do when they are married together when the household is experiencing economic difficulties, so as a wife, you must also help your husbands in earning a living. Increasing income through social capital allows women forest farmers to increase their access to economic resources and markets. Collaboration between women in social networks can open up opportunities to get resources, information, and access to better markets. Women forest farmers can even sell the results of teak caterpillar



searches online for IDR 100,000 per kg,-
. In addition to getting market access,
women farmers also get access to loans
from sellers of agricultural production
facilities, which makes it easier for them
in capital matters. Agro-tourism
management with Perhutani also helps
improve their economy.

The dynamics of women forest farmers
produce diverse social capital in
supporting aspects of sustainable forest
management in the PHBM program. This
social capital is formed through the
pattern of activities of women forest
farmers in managing forests in their
village areas, as well as the perspective of
the community who consider village
forests as common property. This view
influences various patterns of social
capital that develop in society.

Strengthening the social capital of
women forest farmers requires a
development approach based on
participation, equality, and gender justice
that can be the key to achieving
sustainable forest management (SFM).

Figure 3. Showing the impact of
women's social capital in the forestry
sector with the realization of sustainable
forest management. Based on the results
of the analysis, it can be seen that the
sustainability of the economic aspect is

influenced by social capital bonding,
where the close relationship between
women forest farmers and their families
and fellow forest farmers increases
motivation and solidarity, as well as
productivity and income diversification
through the development of non-timber
forest products. Bridging social capital
also plays an important role in social and
ecological sustainability, with forest
farmers' compliance with the chairman of
the Forest Farmers Group who is an
Indigenous leader. This encourages the
exchange of information and
recommended forest management
practices. Compliance with indigenous
leaders also affects the selection of crop
types and agroforestry systems, with non-
compliance potentially leading to
exclusion from communities.
Strengthening the social capital of
women forest farmers requires a
participatory, equality, and gender
justice-based approach to achieve
sustainable forest management.
Therefore, the results of this study show
that the contribution of women in both
economic, social, and ecological fields is
very real, but this phenomenon is only
hidden or less conscious. This is due to
the absence of data and lack of studies on
women in natural resource management.



It is precisely with the findings of the social capital of women forest farmers that it turns out to be the key to the

success of sustainable forest management.

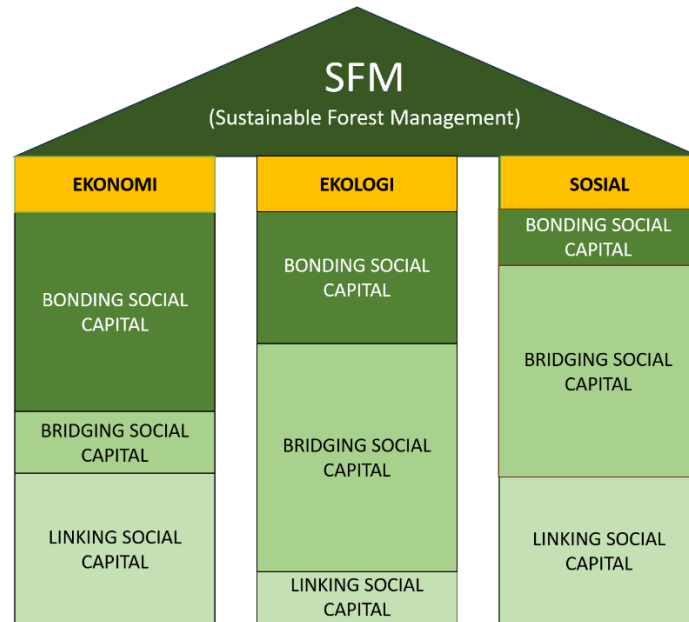


Figure 3. Findings on the Impact of Social Capital of Women Forest Farmers on the Slopes of Mount Kendeng, North Central Java, Based on Typology on Sustainable Forest Management

Source: Primary Data Analysis, 2024

(Note: The larger the bar chart, the greater the influence on aspects of sustainable forest management)

CONCLUSIONS

This study identifies three typologies of women's social capital that support sustainable forest management: bonding, bridging, and linking. Bonding social capital involves the relationship between women forest farmers and their families, fellow forest farmers, and communities, which increases motivation, solidarity, productivity, and income diversification through the development of non-timber forest products. Bridging social capital includes relationships with Forest Farmer

Groups, Forest Village Community Institutions (LMDH), collectors, sellers of agricultural production facilities, and capital borrowers, who support the exchange of information and forest management practices. Linking social capital involves relationships with Perhutani officers and NGOs.

Research shows that bonding social capital plays an important role in the sustainability of economic aspects while bridging social capital supports social and

ecological sustainability through compliance with the chairman of the Forest Farmer Group who is a traditional leader. This compliance affects the selection of crop types and agroforestry systems, with non-compliance potentially leading to exclusion from the community. These findings highlight the real contribution of women in forest management, which is often hidden or under-realized. The social capital of women forest farmers can be the key to the success of sustainable forest management.

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