

Regional Case Study

Promoting Geographical Indication of Banyuwangi Liberoid Coffee: A Community Capital Framework

Danniary Ismail Faronny¹, Wenny B. Sunarharum², Luchman Hakim^{3*}

¹Graduate School Environmental Management and Development, Universitas Brawijaya, Indonesia

²Department of Food Science and Biotechnology, Faculty of Agricultural Technology, Universitas Brawijaya, Indonesia

³Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Brawijaya, Indonesia

*Corresponding Author, email: luchman@ub.ac.id



Abstract

Promoting Geographical Indications (GI) for Liberica coffee in Banyuwangi is essential to enhance its recognition as a strategic economic commodity. This study aims to map communal assets using the Community Capital Framework (CCF) owned by coffee producers, supporting the development of GIs. Data was collected through on-site semi-structured questionnaires and interviews using a qualitative descriptive approach. The analysis, based on the CCF approach encompassing natural, cultural, human, social, political, financial, and built capital, allows for a comprehensive understanding of community resources. Integrating the CCF in promoting GI for Liberica coffee holds potential for sustainable development in Banyuwangi. Considering the seven key capitals (environmental, human, economic, infrastructure, social, cultural, and political) enables the formulation of a comprehensive strategy, ensuring product quality, market value, environmental sustainability, and the community's economic growth. By strengthening the Liberica coffee sector through the integration of CCF and GI promotion, the study facilitates heightened competitiveness, reputation, and market value, benefiting smallholder farmers and fostering overall economic growth. This approach aligns with the broader goals of sustainable development and contributes to the empowerment of the local coffee community in Banyuwangi.

Keywords: Communal assets; geographical indications; liberica coffee; community capital framework

1. Introduction

Coffee is one of Indonesia's most highly regarded exports on a global scale. The distinctive flavor, aroma, and qualities of Indonesian coffee have captured the attention of coffee enthusiasts worldwide. Terroir, which consists of numerous environmental and geographical elements that influence the growth and development of coffee plants, plays a crucial role in determining coffee's quality and character. (Campera et al., 2021; Damary and Riyaldi 2018). Geographical indications (GI) are employed in Indonesia to protect traditional products and their origins. A geographical indication is a system that identifies and safeguards the area of origin of commodities and products with distinctive qualities relating to the local environment and culture. In Indonesian coffee production, GI affirms the terroir relationship of a product, which means the close relationship between environmental factors and human factors that produce distinctive, inherently unique products. (Directorate General of Intellectual Property, 2019; Durand & Fournier, 2017).

The Ministry of Law and Human Rights, via the Directorate General for Intellectual Property, establishes the Geographical Indication (GI) Policy. This policy seeks to protect traditional products and

promote local products by recognizing cumulative intellectual property and binding legal force. According to the Law of The Republic of Indonesia, Number 20 of 2016 on Marks And Geographical Indications defines IG as a sign that indicates the area of origin of an item and product that, due to geographical, environmental factors, including natural factors, human factors, or a combination of these two factors, gives reputation, quality, and specific characteristics to the goods and products produced in that area. (Sasongko, 2018; Damary & Riyaldi, 2018; Directorate General of Intellectual Property, 2019; Laksono et al., 2022).

Liberoid coffee (*Coffea liberica*), more commonly known as Liberica coffee, is a variety of coffee that is gaining attention and focus (Davis et al., 2022). Smallholder farmer cultivates two cultivars of Liberica coffee in Banyuwangi Regency, namely *Liberica* (*Coffea liberica* var. *liberica*) and *Excelsa* (*Coffea excelsa* or *Coffea liberica* var. *dewevrei*). Banyuwangi Regency is one of the coffee production centers in East Java, producing 16,340 kg. of coffee annually. The adjacent community was introduced to coffee cultivation as a potential commodity, particularly on the slopes of Mount Raung and Mount Ijen. Most coffee is cultivated with agroforestry systems (Hakim et al., 2018). Coffee cultivation has become common among producers with high reported productivity due to biophysical factors. As a tradition from previous generations, coffee-based agroforestry is a common agricultural practice in Banyuwangi (Hakim, 2021; Hariyati et al., 2022). In the context of Liberica coffee, GI is a crucial tool for promoting and enhancing the reputation of coffee products and generating economic value.

Mapping coffee community assets is crucial in GI, especially among smallholder farmers. It enables the identification and understanding of the tangible and intangible resources within the coffee community, contributing to successfully promoting GI-potential products. Asset mapping helps highlight the unique characteristics of coffee, establish its connection to the geographical origin and cultural heritage, and enhance market recognition and value. Moreover, it supports capacity-building, empowerment, and the pursuit of sustainable development goals (Beaulieu 2014; Barrera 2020). As a prerequisite for the development of GI, it is crucial to investigate and comprehend the communal assets possessed by producers. Environment, human resources, economic aspects, infrastructure, social life, cultural heritage, and political influence are all examples of communal assets (Mattos, 2015). There needs to be more information related to community asset as *baprimaryata* and information to support the establishment of coffee GI for Liberica coffee from Banyuwangi. The objectives of the research were to investigate and provide a deeper understanding of the communal assets held by Liberica coffee producers within the Community Capitals Framework, analyze the interplay between the Community Capitals Framework (CCF) and GI potential product, and conduct a comprehensive mapping and identification of both tangible and intangible resources within the coffee community. This research contributes to a greater comprehension of the communal assets possessed by Liberica coffee producers as part of efforts to develop the application of geographical indications.

2. Methods

The research conducted in Kalipuro District, Banyuwangi, from February to April 2023, located at 8.1782 degrees South and 114.3777 degrees East, covering 310.03 km² with nine villages and 4,397 Ha. used for coffee cultivation area. Information regarding specific research locations provide in figure 1. Qualitative descriptive methods were employed for data extraction, including field observations, interviews, and document tracing. A structured list of queries was used to investigate various aspects of Liberoids coffee cultivation in Banyuwangi, with respondents selected through the snowball sampling technique. Data collection also involved documentation techniques, capturing field evidence through pictures and photos. The Community Capitals Framework (CCF) approach was adopted to understand and analyze community development, comprising natural, cultural, human, social, political, financial, and building capitals. Triangulation methods were used for qualitative and descriptive quantitative analysis of the data, ensuring comprehensive insights for the development of Geographical Indication (GI) for Liberica coffee.

2.1. Data Collections

This research employs qualitative descriptive methods, involving field observations, interviews, and document tracing, to comprehensively explain the phenomenon under investigation (Dwiastuti, 2017). A field survey was conducted to observe Banyuwangi coffee producers' liberica coffee plantations, identifying key figures for in-depth interviews. Figure 1 illustrates the Research Area and Land Use in Kalipuro District, offering a geographical context. Semi-structured questionnaires and interviews were used to gather critical aspects related to the environment, knowledge and skills of farmers, economic resources, infrastructure, social support, cultural heritage, and political aspects (Crabtree & Miller, 2023). The snowball sampling technique was utilized to select respondents, allowing for a more comprehensive and in-depth understanding through diverse perspectives (Adams, 2015). Additionally, documentation techniques, such as photographs, served as valuable evidence for subsequent research or scientific publications (Dwiastuti, 2017; Crabtree & Miller, 2023).

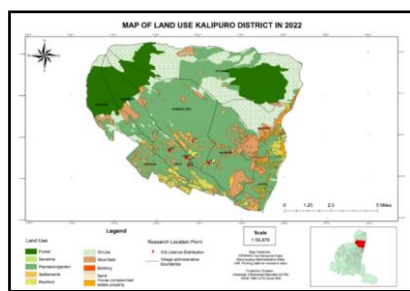


Figure 1. Map of research area and land use in Kalipuro District

2.2. Method and Analyzed

This research uses the Community Capitals Framework (CCF) approach as a conceptual framework to understand and analyze important aspects of community development. The framework defines seven primary dimensions or "capital" that play a role in facilitating sustainable community development: natural capital, cultural capital, human capital, social capital, political capital, financial capital, and building capital. (Flora, 2011; Mattos, 2015; Panzarella et al., 2023). Figure 2 depicts the visualization of the Community Capitals Framework, illustrating the interplay and interconnectedness of these seven capitals in the context of community development. By considering these connected dimensions, the concept of CCF presents a comprehensive viewpoint that facilitates understanding and enhancement of society's overall welfare and adaptability. This framework is highly beneficial for research and practical implementation in endeavors related to community development. The present study employed triangulation methods for qualitative data analysis and descriptive quantitative analysis for the quantitative data. The study uses triangulation techniques, namely source triangulation, method triangulation, and time triangulation (Dwiastuti, 2017).



Figure 2. The Community capital Framework comprising of seven dimensions

3. Result and Discussion

Community capital framework-based communal asset mapping of liberica coffee farmers is used to identify, categorize, and analyze communal assets owned by liberica coffee farming communities. In

this framework, community capital refers to various forms of capital owned by the community, both in the form of environmental, infrastructure, socio-cultural, human, political, and economic capital, which collectively contribute to the development and sustainability of farming communities. Figure 3 illustrates the asset mapping of Liberica coffee in Banyuwangi using the Community Capital Framework. The analysis and categorization of communal assets about Liberica coffee farmers in Banyuwangi were conducted, generating detailed results in Table 8. The Community Capitals Framework (CCF) is a conceptual framework that has been created as a means to systematically and comprehensively identify community assets. The CCF acknowledges that community assets include material resources like physical infrastructure, natural resources, and economic factors and intangible assets such as social connections, cultural values, local knowledge, and political practices. The CCF recognizes the importance of considering the interaction and synergy between tangible and intangible assets. The objective is to generate a favorable cycle of development that facilitates the creation of additional capital and enhances the capacity of the community to maintain its operations continuously. Achieving sustainability includes a community's capacity to obtain accessible resources and take the initiative in generating supplementary forms of capital. Communities that effectively attain sustainability can proficiently leverage their natural, cultural, human, social, political, financial, and infrastructural assets to enhance their situation to sustainably. (B. C. Flora, 2011; Mattos, 2015; Panzarella et al., 2023). Figure 4 presents the communal assets of Liberica coffee cultivation in Banyuwangi, liberica coffee, agroforestry landscape, and traditional harvest management practices, which collectively contribute to the sustainability and quality of the coffee.



Figure 3. Asset mapping on liberika coffee of banyuwangi using community capital framework

Table 1. The Communal Assets of smallholder liberoid coffee farmers in Kalipuro Sub-regency towards coffee IG development

Asset Type	Category	Information
Environment	Sub-district area	The Kalipuro District encompasses a total land area of 310.02 km ² ; the region has been known as a center for coffee producers.
	Rainfall	In the year 2021, the mean precipitation amounted to 184.72 mm. Precipitation exceeding 100 mm was recorded in January, February, March, April, June, September, November, and December.
	Climate	Minimum temperature 22.3°C; Maximum temperature 34 °C; Average temperature 26.9 °C; Average humidity 79.9% Average maximum wind speed (m/s) 5.25; Duration of solar irradiation: 11 Hours (maximum), 0.3 Hours (minimum). These climate aspects support coffee production.
	Geographical Position	Kalipuro District has located about 5 km from the urban center of Banyuwangi. The highest point of the sub-district is located in Bulusari, 500 meters above sea level (masl), and the lowest is in Ketapang 5 masl. Meanwhile, several other areas are noteworthy, Telemung (350 masl); Pesucen (165 masl); Gombengsari (165 masl); Kelir (125 masl); Kalipuro (110 masl); Klatak (7 masl); Bulusan (6 masl). The varying elevation levels may contribute to flavor profiles and unique attributes.
	Natural Resources	Plantation crops: copra (4731 tons), coconut deres (1036 tons), coffee (4726 tons), cloves (41 tons), tobacco (6.9 tons)

Asset Type	Category	Information
Human	Landscape	Fruit crops: mangosteen (9357 tons), durian (2325 tons), banana (9540 tons), mango (231 tons), papaya (95 tons), stink bean (130 tons) Kalipuro is passed by several rivers such as Sukowidi, Brak, Klatakan, Penawar, Angkerik, Kalongan, Tarongseng, Taretas, and Bulusan. The presence of multiple rivers signifies the influence of water sources.
	Aesthetic	The practice of intercropping fruit, coconut, and Pete plants through intercropping in agroforestry systems results in a shading effect that contributes to the cool microclimate of coffee gardens.
	Knowledge	Knowledge of Production Aspects: An understanding of the different varieties of coffee, the process of growing and maintaining coffee plants, the proper use of fertilizers and pesticides, and how weather, climate, and soil affect coffee growth. This knowledge support for coffee production. Farmers attend various training programs and workshops and receive guidance from experienced farmers and agricultural experts in Banyuwangi Regency.
	Skills	Coffee farmers develop practical skills related to coffee production. These skills start from coffee seeding skills, planting coffee, Coffee Pruning; Making Organic Pesticide; Weeding weeds, coffee cuttings; Coffee harvesting. Farmers also understand optimal harvest times, the best techniques for processing coffee beans (post-harvest process to winemaking), and how to store coffee beans to guarantee their quality.
	Competence	The principal competencies possessed by banyuwangi coffee farmers include Technical Cultivation; Troubleshooting; Decision; Communication; Time management. This knowledge is important for coffee production. These competencies can develop through training, education, and hands-on experience. Some farmers have had the opportunity to program training, workshops, and mentoring with experienced farmers or agricultural experts to develop these competencies. The challenge in the field is that massive application still requires a process for awareness and empowerment for competency implementation.
	Workshop	Field School of Pest and Disease Control on Coffee; production of organic fertilizers; Coffee Organic Farming; Coffee Industry Virilization
	Generation	The current generation of coffee farmers is the second generation. The first generation of coffee farmers had a psychological attachment to the coffee they planted because they wanted to survive. The second generation began to take advantage of the family's inherited coffee plantations to improve the family's standard of living. The third generation started to get involved in coffee cultivation. These provide a challenge to coffee production.
Economy	Income	Selling Price of Liberica Coffee Wet coffee cherries: Rp. 5,000 – 7,000 / kg; Green Bean Coffee Liberica: Rp. 35,000 – 42,000/kg; Roasted Bean Coffee Liberica: Rp. 110,000/kg; Ground Liberica Coffee: Rp. 65,000/ 250 grams Marketing: The majority of farmers market their products to intermediaries. Other Commodities: coconuts with a selling price of around Rp. 2,500 per coconut with a harvest period every 40 days and bananas every two weeks. For incidental income, farmers rely on goats for sale.
	Financial capital	Most farmers derive working capital from the legacy of the first generation of productive coffee plantations. Some farmers have worked with other professions to raise capital. Some farmers also have dual professions to fulfill life, such as ranchers, farm laborers, construction

Asset Type	Category	Information
		workers, sellers, and teachers. This capital is important for coffee production.
	Loan/ Credit	Farmers can access micro credit program (KUR) from state-owned banks with an interest rate of 0.6% per month or 7.2% per year with a loan size of 25-50 million, depending on the profile and guarantee provided by farmers. Farmers card (Kartani) has also registered farmers for loan applications and fertilizer subsidies.
	Investment	It is rare for farmers to get investment from other parties. One of the farmers received investment in a drying place and a large-scale storage warehouse to process coffee from around the Kalipuro area. One of the collectors also invested in leasing a rice mill to dry coffee to accommodate large amounts of coffee for the drying process.
	Grant	Farmers have received grants through farmer group bases from several government institutions- regional, provincial, and national agencies— assistance in coffee cultivation infrastructure such as seeds, fertilizers, pesticides, and livestock seeds. In addition, several groups also received assistance from coffee post-harvest equipment such as hullers, pulpers, roasteries, grinders, and powder packing. Some groups also received assistance in the form of café infrastructure for coffee virilization.
Infrastructure	Facilities & Infrastructure	Cultivation and land processing facilities are available (hoes, twig scissors, sickles, etc.), and coffee processing machines are available in the center of the group center. Every farmer has a pooled storage warehouse, but no large warehouse is managed together, so the storage standards still need to be revised. These support for coffee agro-industry.
		Village roads and agricultural enterprises are readily available; some are paved and good, but most need improvement. A bridge has connected every area crossed by the river. Coffee-producing villages already have access to electricity. Village centers can access telephone and internet signals. The existence of social media technology (Whatsapp, Facebook) helps farmers find alternative markets other than intermediaries.
	Supporting Facilities	Supporting facilities include BMKG Meteorological Station Class III Banyuwangi; Ijen Geopark; East Java Agricultural Technology Study Center (BPTP), and Coffee and Cocoa Research Center.
Social	Connection	Green bean collectors in Banyuwangi (Songgon and Kalibaru warehouses); Green bean collectors in Malang (Dampit Coffee Warehouse)
		Exporter of processed coffee (wine, natural honey, etc.); University in East Java Province; National Banyuwangi Family Association (Ikawangi); Ministry of Agriculture; Provincial Plantation Service. East Java; Regional Tourism Network (Batara Village; Kemiren Traditional Village; Indonesian Tourist Association; Ijen Geopark). Various stakeholders' involvement is important for support from different sectors in developing coffee.
	Norm	Mutual Aid; Deliberation; Increased coffee production; Increased Coffee Prices
	Internal Relations	Farmer groups in Kalipuro District; Agricultural Extension Center of Kalipuro District; Coffee Traders around Kalipuro District Agricultural Input Suppliers (Farm Shops etc.); Society for Protection of Geographic Indications (MPIG) Banyuwangi; Village and District Institutions; Take down every village
	External Relations	Government of Banyuwangi District; Roastery in Banyuwangi District; Café and Restaurant in Banyuwangi District; Coffee Collector of Banyuwangi District; Plantation Company in Banyuwangi District;

Asset Type	Category	Information
Culture	Value	Higher Education Institutions around Banyuwangi; State-owned enterprises (Perhutani & PTPN XII) Coffee as a medium of friendship; Once we brew coffee, we are brothers (<i>Sak Corot dadi Seduluran</i>)
	Belief	The majority of coffee farmers in Kalipuro District are from rural Muslim communities. So that the communal culture of rural Muslims is very thick such as <i>tahlilan</i> , <i>slametan</i> , <i>muludan</i> , to recitation. The distribution of coffee at the beginning of the first generation of one of the media is the delivery of the potential of coffee farming in surau, musholla, and mosques around settlements. The role of religious leaders significantly contributing to promoting coffee farming is also recorded from in-depth interviews. Coffee is also seen as the main drink of the ancestors, so in every traditional ritual, bitter coffee (coffee without sugar) is always served as an offering.
	Tradition	<i>Slametan Syuro</i> ; <i>Slametan Sapar</i> ; <i>Augustan</i> ; Gombengsari Coffee Festival; <i>Ngopi Sepuluh Ewu</i> Festival; Traditional rituals <i>Ider Bumi Kemiren</i> ; Traditional rituals <i>Seblang Olehsari</i>
	Symbol	Gandrung Dance: A Form of Agricultural Harvest Gratitude, Gombengsari Coffee Dance: Coffee Harvest Culture Modification Dance, Lesung: Traditional coffee and rice masher, Roasted Kopai: Roasting coffee with Traditional Methods, Batik: There are two batik motifs, namely: coffee motif, broken coffee motif
Politics	Language	Osing; Madura; Javanese
	Community Institutions	Farmer Group; Association of Farmer Groups; Forest Village Community Institution (LMDH); Coffee Growers Association; Society for Protection of Geographic Indications (MPIG); Tourism Awareness Group (Pokdarwis). These connections are for coffee agro-industry institutions.
	Cooperation	Local and Regional Middlemen and Collectors; Universities in East Java; Cafe and Roastery in Banyuwangi City; East Java Agricultural Technology Study Center (BPTP); Coffee and Cocoa Research Center. These support coffee agro-industry institutions.
	Decision-Making Process	<ul style="list-style-type: none"> ○ The importance of coffee development to become an icon of Banyuwangi Regency is strongly influenced by the policies of the Regional Government leadership. This is closely related to political issues that are the focus of the incumbent regent and are reduced to the work program of the Agriculture Office of Banyuwangi District. ○ The community is essential to build the basis of the independence of the upstream to the downstream coffee industry so that it does not depend on local government policies that frequently change according to the leadership period every five years. ○ The decision on how to manage coffee plantations is decided according to the land owner/land processor based on recommendations from groups or experts around the area. Farmer group decisions often do not have a solid implementation base and only stop at the administrative level. ○ The role of agricultural experts, coffee collectors, and religious leaders tends to quickly influence farmers' decision-making to change or improve their coffee plantations.



Figure 4. Communal asset; a. liberica coffee of Banyuwangi; b. agroforestry landscape; c. local harvest management

3.1 Environment Capital

The Community Capitals Framework (CCF) comprises seven interconnected assets within community growth and development. Environmental assets, for instance, are crucial in providing favorable growing conditions for liberica coffee plants. The liberica coffee plant's growth depends upon various environmental assets such as geographical position, climate, rainfall, area, landscape, and aesthetics. The presence of extensive land masses and favorable climatic conditions, characterized by adequate precipitation and optimal temperature ranges, facilitate a conducive atmosphere for the cultivation and production of coffee, as supported by local people's information in Table 1. Furthermore, the favorable geographic location of Kalipuro District near the urban hub of Banyuwangi facilitates convenient accessibility for disseminating and commercializing coffee commodities. The production of Liberia coffee is enhanced by the ecological sustainability and aesthetic appeal afforded by the agroforestry crop patterns and the landscape shaped by the region's rivers. (Hakim, 2021; Hakim et al., 2022; Hariyati et al., 2022). The CCF framework suggests that solid environmental assets are pivotal in bolstering other forms of capital, including social, economic, and human capital. These various forms of capital are mutually reinforcing and interact synergistically to promote sustainable community development in the Kalipuro District. (Flora 2011; Lamm et al., 2022).

3.2 Human Capital

In addition to environmental capital, human resources (HR), including local ecological knowledge and farmers' abilities, are important factors in cultivating Liberika coffee plants in Banyuwangi Regency. A farmer's understanding of environmental factors such as climate, soil, and cultivation techniques appropriate to local conditions is essential to developing the Liberica coffee plant. Identifying local ecological knowledge is vital to develop farmer knowledge in Liberica coffee cultivation practices. Furthermore, farmers' competence in cultivation, problem-solving, decision-making, communication, and time management also significantly contributes to managing coffee cultivation businesses effectively and sustainably, as comprehensive information on the significant role of the human capital of Liberica coffee cultivation in Table 1. Based on this, the human capital dimension in CCF reflects the importance of increasing farmers' knowledge, skills, and competencies as substantial capital in achieving the community development goals and sustainability of liberica coffee cultivation (Beaulieu, 2014). Previous studies have found that farmers' local ecological knowledge is essential in implementing biodiversity conservation practices and agricultural development. This knowledge involves an in-depth understanding of environmental factors such as climate, soil, and cultivation practices appropriate to local conditions. The knowledge and experience of farmers in managing the environment become valuable assets in achieving sustainable development of agroforestry cultivation and conservation businesses and biodiversity in coffee plantations (Charnley et al., 2007; Joa et al., 2018; Judge, 2021)

3.3 Culture Capital

The unwavering adherence to the culture passed down from generation to generation by coffee farmers in the Kalipuro sub-district reflects the importance of social and cultural capital in the community. The initial explanation mentioned that most coffee farmers in the region are from rural Muslim communities, as detailed information providers in Table 1. The solid communal culture in the community, including religious practices such as *tahlilan*, *slametan*, *muludan*, and *pengajian*, became an inseparable part of the daily life of coffee farmers. Adherence to this inherited culture strengthens social

networks and solidarity among coffee farmers. Producers share knowledge, experience, and coffee cultivation practices passed down for generations. Possession of equal knowledge and participation in cultural rituals created strong social bonds between them. This enables information exchange, collaboration in agricultural businesses, and mutual support in facing coffee farmers' challenges in Kalipuro District. Regarding cultural capital, adherence to culture passed down from generation to generation shows appreciation and a sense of identity toward local culture. Coffee farmers still maintain traditional knowledge and practices in coffee cultivation, such as conveying the potential of coffee farming in surau, musholla, and mosques around settlements. Traditional ritual practices involving coffee, such as the dishing of bitter coffee in each offering, also reflect the importance of coffee in the context of local culture. Cultural symbols such as the Gandrung dance, Gombengsari Coffee Dance, mortar, and the traditional method of coffee roasting are also an inseparable part of the local coffee community's local culture. A collaborative culture, the role of religious leaders, cultural symbols, and respect for local cultural assets are interrelated elements that strengthen social and cultural capital in coffee farming communities. Through the Community Capital Framework approach, the maintenance and utilization of local cultural assets are also linked to sustainable development strategies, community identity, and closer relationships between farmers and local coffee agro-industry institutions. Thus, understanding communal culture and utilizing local cultural assets in Liberica coffee cultivation has strong relevance in the context of the Community Capital Framework. It was identified as supporting the sustainability of Liberica coffee cultivation through appreciation of cultural diversity and promoting cultural values that contribute to the long-term success and well-being of society (Durand & Fournier, 2017; Duffy et al., 2017; Campera et al., 2021; Lazuardi et al., 2021).

3.4 Social Capital

As depicted in Table 1, social factors, including networks and partnerships with various stakeholders, mutual aid, deliberation, and internal and external relations, contribute to the development and resilience of Liberica coffee cultivation. Social factors also play an essential role in the development of coffee cultivation in Kalipuro District. Social assets enable Liberica coffee farmers to build strong networks and partnerships with fellow farmers, coffee processors, traders, government, and other stakeholders. This connection consists of networks and partnerships between various stakeholders, such as collectors, processed coffee exporters, universities, banyuwangi family ties, ministries, and related agencies, to regional tourism networks. Through these connections, there is an exchange of knowledge, collaboration, and support as needed. Social norms such as mutual aid and deliberation also play a role in the development of coffee cultivation. Going royong, which involves cooperation between farmer groups and village/sub-district institutions, provides support and assistance in various aspects of coffee cultivation. Meanwhile, deliberation is used as a participatory mechanism to reach agreements, overcome challenges, and make decisions about increasing coffee production and prices. Social assets are also a critical element in achieving *Climate Resilient Community resilience* in the context of the coffee industry, especially for Liberica coffee farmers. Furthermore, the relationship between internal and external communities also has a vital role in the development of coffee cultivation. Cooperation and collaboration between parties in internal relations enable the implementation of effective cultivation practices, increased access to resources, and capacity building of farmers in coffee cultivation. Meanwhile, external relations can provide policy support, market access, marketing, and utilization of resources needed for liberica coffee development (Kais & Islam, 2016; Mulyani et al., 2022).

3.5 Economy and Politic Capital

Economic and political assets are vital for the sustainability and welfare of Liberica coffee farmers. Economic assets include selling prices of Liberica coffee, varying based on type and processing level. Farmers market their products to local intermediaries, while large middlemen export green beans to other regions. Additionally, farmers rely on other commodities like coconuts, bananas, and goat sales for income. Working capital is sourced from inheritance, savings, dual professions, and micro-credit loans

(KUR). In the political context, various organizations and institutions, including Farmer Groups, Farmer Group Associations, and Geographical Indication Care Communities, collaborate in coffee development. Cooperation extends to intermediaries, collectors, cafes, academics, and research centers. Local government policies influence decision-making in the coffee industry, with community involvement and input from experts, collectors, and religious leaders impacting farmers' decisions.

As indicated in Table 1, economic and political assets contribute significantly to the resilience and sustainability of Liberica coffee farmers in Kalipuro District. Economic assets involving selling prices, income, capital, investment, and grants, and political assets involving community organizations and institutions, cooperation, and decision-making processes are essential to achieve resilience and sustainability. Governments play an important role in strengthening economic assets through policies and programs that support access to capital and related training. Affordable and sustainable financing programs, such as farmer micro business credit (KUR Tani), microloans, or agricultural project funding, assist coffee farmers in meeting farmers' capital needs (Sasongko, 2018; Ihsaniyati et al., 2022). The importance of economic capital is also reinforced by studies on *psycho-behavior*, explaining that economic benefits, farmer knowledge, and behavioral control are among the primary considerations for farmers to adopt geographical indications in Indonesia (Laksono et al., 2022). Political assets include the power of peasant organizations and their ability to influence decisions that affect their lives. In this case, farmer associations, observers, and agricultural organizations can be a forum for farmers to unite, advocate for common interests, and participate in negotiations with related parties, such as the government, producers, and traders. Through collaboration and political influence, coffee farmers can achieve beneficial changes, such as increased coffee selling prices, better market access, and policies that support sustainable agriculture. To strengthen political assets, it is important to encourage dialogue and involvement of farmers in decision-making processes related to agricultural policy. This can be done through discussion forums, consultative meetings, or through farmer representatives in relevant committees can be a means to realize farmers' participation in decision-making that impacts their lives (Mattos 2015; Mueller et al., 2020; Sacramento 2020). Figure 5 illustrates the community development aspects of Liberica coffee cultivation, highlighting the importance of social connections, community meetings, and discussions about Liberica coffee.

3.6 Infrastructure Capital

Infrastructure assets are essential in facilitating coffee farmers to optimize various other assets. Good facilities, infrastructure, and supporting facilities connect farmers with markets, processing facilities, and distribution centers (Flora, 2011; Lamm et al., 2022). Technical cultivation tools such as hoes, twig scissors, and sickles are available to individual farmers. As shown in Table 1, infrastructure assets are crucial in enhancing the efficiency and productivity of Liberica coffee farmers in Kalipuro District. These infrastructural elements enable farmers to improve post-harvest processes, maintain quality standards, and access important information and technical support. Figure 5 illustrates the community development aspects of Liberica coffee and the role of infrastructure capital in supporting the development of the coffee community.

Coffee processing machines provided by various agencies face obstacles due to their immobility, requiring farmers to transport their harvest to group centers. To reduce costs and time, mobile and adjustable equipment should be considered, with farmers' involvement in equipment specifications and field conditions. Storage sheds managed individually by farmers lead to variations in storage standards, impacting coffee bean quality and durability. Some groups have organic fertilizer facilities, beneficial for environmentally friendly coffee cultivation. Livestock drums contribute to shrimp fertilizer provision and Kandang fertilizer from livestock manure provides essential nutrients for coffee plants. Improvements are needed, such as suitable coffee drying places to enhance consistency and quality (Shriver et al., 2015; Fadhil et al., 2018).

However, there are still areas for improvement in the infrastructure that supports coffee cultivation activities. For example, no good coffee drying place exists, so each group still dries

independently. The availability of adequate drying places will improve the consistency and quality of drying coffee beans. Available infrastructure, village roads, and agricultural enterprises require improvement. All river-crossing areas are connected with bridges, and coffee-producing villages have electricity and communication access, facilitating market exploration through social media platforms like WhatsApp and Facebook. Supporting facilities, including BMKG Meteorological Station Class III Banyuwangi, Ijen Geopark, East Java Agricultural Technology Study Center (BPTP), and the Coffee and Cocoa Research Center, offer relevant services and information for local coffee farmers (Bateman & Mace, 2020; Lamm et al., 2022; Mueller et al., 2020). Such developments encourage economic growth, attract investments, generate job opportunities, enhance farmers' welfare, and reduce urban-rural economic disparities.



Figure 5. Community development; a. social connection; b. community meeting and discussion about liberica coffee; c. infrastructure capital

3.7 Promoting Geographical Indication

The Community Capitals Framework (CCF) can be applied to promote the geographical indication (GI) of liberica coffee as an effective diversity of work to consider the community capital that plays a role in the process towards GI protection. CCF identifies seven main capitals, namely environmental, human, economic, infrastructure, social, cultural, and political capital, that collectively form community capital that can affect growth, economic sustainability, and sustainable development (Mueller et al., 2020; Mulyani et al., 2022). In protecting GI Liberica coffee, holistically engaging the community and considering community capital becomes clear. Geographical Indications are significant in protecting the reputation and uniqueness of products from a particular geographical area. GI guarantees the quality of Liberica coffee to consumers, and its unique characteristics are linked to traditional agricultural practices and local knowledge of how to cultivate to post-harvest processing. Therefore, by promoting GI, the cultural heritage associated with Liberica coffee can be preserved, traditional farming methods can be maintained and optimized, and improved coffee quality can be achieved. Traditional coffee cultivation practices and local ecological knowledge related to Liberica coffee production contribute to its unique characteristics (Damary and Riyaldi 2018; Direktorat Jenderal Kekayaan Intelektual, 2019).

The importance of implementing CCF in developing the Liberica coffee sector in Banyuwangi is also related to the capacity development of farmers and existing infrastructure. Human capital in CCF includes training and education focused on good coffee plantation management, technology utilization, and post-harvest handling. Improving farmers' knowledge and skills can improve coffee productivity and quality. Strict quality control in processing facilities is essential for maintaining coffee quality along the value chain. Implementing good garden processing standards and post-harvest processing processes that meet quality standards are essential factors in ensuring the final quality of coffee (Fadhil et al., 2018). In this regard, infrastructure capital in CCF needs attention, including investment in physical and non-physical infrastructure that creates a conducive environment for coffee farmers. This step will encourage sustainable growth in the coffee sector and provide more significant economic benefits for farmers. In the socioeconomic and political context, commitment from the government, relevant institutions, and stakeholders are significant in supporting the development of Liberica's coffee sector. Investments aimed at infrastructure and policies that support the coffee sector will create a conducive environment for coffee farmers to thrive and compete in the domestic market. In the long run, this will improve the welfare of farmers and support socio-economic development in the area (Mulyani et al., 2022)

In addition, social capital in CCF is also essential for the successful development of Liberia's coffee sector. Collaboration between governments, research institutions, farmers' associations, and local communities is needed to facilitate the exchange of knowledge, experience, and best practices in coffee cultivation and processing. Establishing farmer groups and cooperatives can also strengthen social capital by facilitating cooperation, mutual assistance, and resource-sharing between farmers. In addition, building strong networks and relationships between farmers and coffee industry players, such as collectors, exporters, and marketers, can also improve farmers' access to markets and provide them with better bargaining power (Ihsaniyati et al., 2022; Mulyani et al., 2022). In a cultural context, preserving the cultural heritage related to Liberica coffee is important. GI can help maintain traditional agricultural practices and unique local knowledge in coffee cultivation and processing (Joa et al., 2018). This involves an appreciation of cultural values and sustainable cultivation practices, which in turn can increase the appeal of Liberica coffee products to consumers who are aware of the authenticity and uniqueness of the product. Through GI promotion, the cultural heritage associated with Liberica coffee can be preserved and linked to solid local values. Retaining traditional cultivation practices and local ecological knowledge associated with Liberica coffee production also contribute to its unique characteristics.

Environmental aspects are crucial in developing the Liberica coffee sector, focusing on preserving natural resources and biodiversity in coffee-growing regions. Promoting sustainable practices like agroforestry, sustainable soil and water management, organic fertilizers, and natural pest control supports environmental sustainability (Fadhil et al., 2018; Hakim et al., 2022). Political commitment and support from the local government are vital in facilitating sector development, implementing policies supporting GI, providing incentives, financing access, and regulating and protecting GI (Fadhil et al., 2018). Active stakeholder participation, including farmers, associations, academics, and local communities, ensures sustainable sector development (Fadhil et al., 2018). Overall, implementing CCF and GI promotion in the Liberica coffee sector can increase market value, competitiveness, and economic sustainability. By considering human, economic, social, cultural, environmental, and political aspects within the CCF framework, capacity-building, infrastructure investment, strong social capital, cultural preservation, and environmental sustainability contribute to Liberica coffee's superior reputation (Mulyani et al., 2022). CCF becomes a valuable framework for sustainable economic growth in Banyuwangi's coffee-producing community.

Promoting geographical indications (GI) for Liberica coffee allows producers to differentiate their products, improve quality, command better prices, and expand their consumer base, providing economic incentives and increasing revenue in Banyuwangi district (Bateman and Mace, 2020; Hakim et al., 2022). This aligns with sustainable development principles by encouraging environmental management and preserving natural resources and biodiversity in coffee-growing regions. GI promotes sustainable agricultural practices and responsible land management, ensuring long-term Liberica coffee production with agroforestry systems while minimizing negative environmental impacts. The Community Capital Framework (CCF) supports GI by addressing environmental, human, economic, infrastructure, social, cultural, and political assets (Panzarella et al., 2023). To develop the Liberica coffee sector, focusing on farmer capacity and infrastructure is crucial. Farmer training and education in coffee plantation management, technology utilization, and post-harvest handling will maximize infrastructure benefits and improve productivity and quality. Strict monitoring and quality control in processing facilities will maintain coffee quality along the value chain. Implementing good garden processing standards for post-harvest processes will enhance coffee quality (Hakim et al., 2022; Mulyani et al., 2022).

Continuing from the previous discussion, the promotion of the geographical indication (GI) of Banyuwangi Liberica coffee through the application of the Community Capital Framework (CCF) offers presents a comprehensive and interdisciplinary approach that addresses global concerns, including the protection of biological conservation and the recovery of global warming (Mattos, 2015; Neilson et al., 2018; Ihsaniyati et al., 2022). By recognizing the unique characteristics and environmental assets associated with Liberica coffee production, this initiative contributes to broader ecological preservation and climate change mitigation objectives. Regarding biological conservation, promoting the GI of

Banyuwangi Liberica coffee contributes to preserving biodiversity in coffee-growing regions (Hakim et al., 2022). Banyuwangi's coffee plantations are crucial habitats for diverse flora and fauna, vital in maintaining ecosystem balance. Adopting sustainable agricultural practices, including agroforestry systems, organic fertilizers, and natural pest control methods, helps minimize the negative impacts of coffee production on local ecosystems. Through agroforestry, coffee farmers integrate shade trees into their plantations, creating a symbiotic relationship supporting the well-being of coffee plants and surrounding biodiversity. The shade trees provide a habitat for birds, insects, and other organisms, promoting ecological diversity and ensuring the conservation of native species. Such sustainable practices foster environmental stewardship and align with academic research on preserving ecological integrity and protecting fragile ecosystems. Cultivating coffee within agroforestry systems presents an effective strategy to mitigate climate change. Such systems involve intercropping coffee plants with shade trees, creating a microclimate conducive to coffee growth while sequestering atmospheric carbon dioxide (Hakim, 2021; Hariyati et al., 2022).

Further research is essential to delve deeper into each Community Capital Framework (CCF) dimension and thoroughly examine the specific conditions and factors at play (Walzer et al., 2020). This in-depth analysis will provide valuable insights and strategic guidance for promoting the potential geographical indication (GI) of Banyuwangi Liberica coffee. Conducting comprehensive research that explores the intricacies of the local ecosystems, cultural heritage, and economic dynamics can serve as a guide for conducting comprehensive investigations that yield strategic instruments to actualize the protection of geographical indications for Liberica coffee (Emery and Flora, 2020; Salmon and Akimowicz, 2022). Conducting in-depth academic research within the CCF framework is crucial for promoting the potential geographical indication of Banyuwangi Liberica coffee. By exploring each dimension of the CCF, we can gain comprehensive insights into the coffee industry's ecological, social, cultural, and economic aspects (Drexler, 2022). This knowledge will guide the development of strategic instruments and policies that foster environmental sustainability, cultural preservation, and economic growth (Walzer et al., 2020). Through interdisciplinary collaborations and knowledge exchange, the academic community can contribute to the broader understanding and appreciation of geographical indications as powerful tools for addressing global challenges and promoting sustainable development in coffee-producing communities.

4. Conclusions

Implementing the Community Capitals Framework in promoting the Geographical Indication of Liberica coffee has the potential to increase the development of the coffee sector in Banyuwangi. CCF involves seven major capitals covering environmental, human, economic, infrastructure, social, cultural, and political; a comprehensive approach can be applied in formulating the Liberica coffee development strategy towards geographical indications. Using the CCF as a comprehensive framework, the seven significant capitals can be well integrated, thus enabling the development of sustainable strategies. GI promotion assures the quality of Liberica coffee. It protects product reputation so Liberica coffee producers can increase market value, environmental sustainability, competitiveness, and the community's overall economy. Thus, integrating CCF and GI promotion opens opportunities to strengthen the Liberica coffee sector in Banyuwangi through sustainable development and increased product competitiveness.

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References

- Barrera, Angela Giménez. 2020. Geographical indications for UN sustainable development goals: intellectual property, sustainable development and M&E systems. *International Journal of Intellectual Property Management* 10 (2): 113.
- Bateman, Ian J, and Georgina M Mace. 2020. The natural capital framework for sustainably efficient and equitable decision making. *Nature Sustainability* 3 (10): 776–83.
- Beaulieu, Lionel J. 2014. Promoting Community Vitality & Sustainability the Community Capitals Framework. Purdue University.
- Campera, Marco, Budiadi Budiadi, Esther Adinda, Nabil Ahmad, Michela Balestri, Katherine Hedger, Muhammad Ali Imron, Sophie Manson, Vincent Nijman, and KAI Nekaris. 2021. Fostering a Wildlife-Friendly Program for Sustainable Coffee Farming: The Case of Small-Holder Farmers in Indonesia. *Land* 10 (2): 121.
- Charnley, Susan, A Paige Fischer, and Eric T Jones. 2007. Integrating traditional and local ecological knowledge into forest biodiversity conservation in the Pacific Northwest. *Forest Ecology and Management* 246 (1): 14–28.
- Damary, Peter, and Riyaldi. 2018. Modul Pelatihan Indikasi Geografis. Indonesia-Swiss Intellectual Property Project.
- Davis, Aaron P, Catherine Kiwuka, Aisyah Faruk, Mweru J Walubiri, and James Kalema. 2022. The re-emergence of Liberica coffee as a major crop plant. *Nature Plants* 8 (12): 1322–28.
- Direktorat Jenderal Kekayaan Intelektual. 2019. Modul Kekayaan Intelektual bidang Merek dan Indikasi Geografis (Edisi 2019). Kementrian Hukum dan HAM RI.
- Drexler, Kristin. 2022. A Community Capitals Assessment of Climate Adaptations to Traditional Milpa Farming Practices in Mayan Communities of Southern Belize. *Climate* 10 (11): 176.
- Duffy, Lauren N, Carol Kline, Jason R Swanson, Mechelle Best, and Hunt McKinnon. 2017. Community development through agroecotourism in Cuba: an application of the community capitals framework. *Journal of Ecotourism* 16 (3): 203–21.
- Durand, Claire, and Stéphane Fournier. 2017. Can Geographical Indications Modernize Indonesian and Vietnamese Agriculture? Analyzing the Role of National and Local Governments and Producers' Strategies. *World Development* 98: 93–104.
- Dwiastuti, Rini. 2017. Metode penelitian sosial ekonomi pertanian : dilengkapi pengenalan metode penelitian kuantitatif, kualitatif, dan kombinasi kuantitatif-kualitatif. Malang: UB Press.
- Emery, Mary, and Cornelia Flora. 2020. Spiraling-Up: Mapping Community Transformation with Community Capitals Framework. Chapter Book 50 Years of Community Development Vol I. Vol. 1.
- Fadhil, Rahmat, M Syamsul Maarif, Tajuddin Bantacut, and Aji Hermawan. 2018. Situational analysis and intervention strategy for Gayo coffee agroindustry institution in Indonesia.
- Flora, Burter Cornelia. 2011. Mobilizing Community Capitals to Support Biodiversity. In *The Importance of Biological Interactions in the Study of Biodiversity*, ed. Jordi Lpez-Pujol. InTech.
- Hakim, Luchman. 2021. Agroforestri Kopi: Mendorong Taman Hayati dan Wisata Kopi. Cetakan Pertama. Vol. 1. 1 vols. Malang, Indonesia: Media Nusa Creative.
- Hakim, Luchman, Nila Ratih Pamungkas, Karuniawan Puji Wicaksono, and Soemarno Soemarno. 2018. The Conservation of Osingnese Traditional Home Garden Agroforestry in Banyuwangi, East Java, Indonesia. *AGRIVITA Journal of Agricultural Science* 40 (3).
- Hakim, Luchman, Brian Rahadri, Dodit Ari Guntoro, and Naila Izzatul Mukhoyyaroh. 2022. Coffee Landscape of Banyuwangi Geopark: Ecology, Conservation, and Sustainable Tourism Development. *Journal of Tropical Life Science* 12 (1): 107–16.
- Hariyati, Jehan Ramdani, Dian Siswanto, Endang Arisoelaningsih, and Luchman Hakim. 2022. Diversity and Estimated Above Ground Biomass of Shade Trees in Some Coffee-based Agroforestries, Banyuwangi Regency: In . Yogyakarta, Indonesia.

- Ihsaniyati, Hanifah, Nuning Setyowati, and Pardono. 2022. Factors Motivating the Adoption of Geographical Indication-Based Quality Standards among Robusta Coffee Farmers in Indonesia. *International Journal of Business and Society* 23 (1): 207-25.
- Joa, Bettina, Georg Winkel, and Eeva Primmer. 2018. The unknown known – A review of local ecological knowledge in relation to forest biodiversity conservation. *Land Use Policy* 79: 520-30.
- Kais, Shaikh, and Md Islam. 2016. Community Capitals as Community Resilience to Climate Change: Conceptual Connections. *International Journal of Environmental Research and Public Health* 13 (12): 1211.
- Laksono, Pandu, Irham, Jangkung Handoyo Mulyo, and Any Suryantini. 2022. Farmers' willingness to adopt geographical indication practice in Indonesia: A psycho behavioral analysis. *Heliyon* 8 (8): e10178.
- Lamm, Kevan W, Alyssa Powell, Abigail Borron, Keith Atkins, and Stephanie Hollifield. 2022. Insights into Rural Stress: Using the Community Capitals Framework to Help Inform Rural Policies and Interventions. *Agriculture* 12 (5): 694.
- Lazuardi, Pramudya, Ariya Jati, and Rifka Pratama. 2021. Sustainability of Wonosobo's Coffee Agriculture and Industry from Community-Based Conservation Perspective. Ed. T.R. Soeprbowati, B. Warsito, and T. Triadi Putranto. *E3S Web of Conferences* 317: 01097.
- Mattos, Daniela. 2015. Community Capitals Framework as A Measure of Community Development. *Cornhusker Economic*.
- Mueller, Daniel, Season Hoard, Kelli Roemer, Christina Sanders, and Sanne AM Rijkhoff. 2020. Quantifying the community capitals framework: Strategic application of the community assets and attributes model. *Community Development* 51 (5): 535-55.
- Mulyani, Puji Wahyu, Yuliana Kansrini, and Dwi Febrimeli. 2022. Strategy for strengthening social capital for the geographical indication protection community of Arabica coffee: A case study in the South Tapanuli Regency, Indonesia. *Jurnal Ilmiah Pertanian* 19 (2).
- Neilson, Jeffrey, Josephine Wright, and Lya Aklimawati. 2018. Geographical indications and value capture in the Indonesia coffee sector. *Journal of Rural Studies* 59: 35-48.
- Panzarella, Federica, Catrinel Turcanu, Bieke Abelshausen, and Valérie Cappuyns. 2023. Community capitals and (social) sustainability: Use and misuse of asset-based approaches in environmental management. *Journal of Environmental Management* 329: 117122.
- Sacramento, Noe John Joseph Endencio. 2020. Local Government Initiatives and Prospects for Mango Farming Community Capital Enhancement in Guimaras Province, Philippines. *Journal of Local Government Issues* 3 (2).
- Salmon, Sherine, and Mikaël Akimowicz. 2022. Commodification vs. patrimonialisation A community capitals framework for assessing digital technologies. The case of Southern Rural Manitoba, Canada. *International Journal of Sustainable Agricultural Management and Informatics* 8 (1): 3.
- Sasongko, Wahyu. 2018. Geographical Indications Protection under The New Regulation In Indonesia. *Journal of Social Studies Education Research* 9 (4): 403-19.
- Shriver, Jefferson, Jimmy Largaespada, and Martha Estela Gutiérrez. 2015. Sustainable Good Agriculture Practices Manual, To Improve Yields Of Organic Coffee And Control Coffee Rust. Nicaragua: Catholic Relief Services.
- Walzer, Norman, Rhonda Phillips, and Robert Blair (editors). 2020. 50 Years of Community Development Vol I: A History of its Evolution and Application in North America. 1st ed. Routledge.