



Participatory Social Mapping For Cocoa Farming Development Interventions in Polewali Mandar, Indonesia

Muthia Natasya Kautsar*, Sainab

Agribusiness, Institute Technology and Business Muhammadiyah Polewali Mandar, Polewali Mandar, Indonesia

✉ muthia@itbmpolman.ac.id

Received : June 8, 2025

Revised : June 23, 2025

Published: June 30, 2025

Corresponding Author: Muthia Natasya Kautsar, Institute Technology and Business Muhammadiyah Polewali Mandar, Email: muthia@itbmpolman.ac.id

ABSTRACT

Modern agricultural development requires not only technological innovation but also a deep understanding of social and institutional dynamics. This study employs Participatory Social Mapping (PSM) to analyze social structures and actor networks within cocoa farming communities in Polewali Mandar. Using purposive sampling, five key informants were selected: four leaders of cocoa farmer groups who are still active in cocoa cultivation and one local cocoa enterprise, PT. Indonesia Hijau. Data were examined through qualitative descriptive analysis combined with Social Network Analysis (SNA) to map relationships and identify central actors. Results show that cocoa farmers form strong, multi-layered networks. Internally, interactions occur within farmer groups in Luyo, Tutar, Mapilli, and Tapango, serving as hubs for knowledge sharing. Externally, farmers are linked with supporting institutions such as PT. Mars (development), Barry Callebaut (seed supply), PT. Indonesia Hijau (collaboration), and the UIH Cooperative (distribution and marketing). These networks are marked by openness and collaboration, with farmers as central actors. Despite geographical constraints, communication is sustained both physically and virtually. The UIH Cooperative emerges as the most connected and influential actor due to its daily engagement in farmers' socio-economic activities. Supporting institutions contribute to innovation, sustainability, and input provision. The study highlights the critical role of social capital and institutional connectivity in advancing sustainable cocoa farming and effective agricultural extension.

Keywords: Cocoa, Farmer groups, Social Mapping, Institutional, Social interaction

INTRODUCTION

Indonesia is known as an agrarian country, approximately 60% of its population works in agriculture (Otto et al., 2022). Agriculture has an important role in the economy of the Indonesian nation. One of the agricultural fields that has an important role in the food sector is cocoa trees. Cocoa is a leading commodity in plantations that has a vital role in the Indonesian economy (Syafaruddin, S., Dambe, J., & Hamsah, 2024). The existence of cocoa in several regions has been the lifeblood of cocoa farmers and their families for decades (Yulianty et al., 2025). Although cocoa is a plantation crop with an uncertain harvest cycle, the price of cocoa is currently the highest compared to other crops, causing many farmers to focus more on increasing cocoa production on their farmland. The cocoa prices displayed in Trading Economics are based on over-the-counter (OTC) financial instruments and contracts for difference (CFDs) with the highest price of 12 906.00 USD and the smallest 211.00 USD in 2025. The largest cocoa producers are Ivory Coast and Ghana which together account for more than 60% of the world's output. Other major producers include: Indonesia, Nigeria, Cameroon, Ecuador, and Brazil. Although cocoa is one of the smallest soft commodity markets in the world, it has global implications for food and candy producers, as well as the retail industry.

Cocoa is one of the mainstay commodities of West Sulawesi Province. West Sulawesi is included in the five largest cocoa bean producing provinces in Indonesia. The production of cocoa seed plantations in the village

of West Mapilli, West Sulawesi, is an important part of the cocoa industry in the area. Usually, the production of cocoa seeds is carried out by farmers or cocoa plantation companies as the first step in the cocoa cultivation process. High-quality cocoa seeds will provide optimal yields so as to increase productivity and quality of the cocoa beans produced (Arsyad et al., 2023). One of the cocoa centers in West Sulawesi Province is Polewali Mandar Regency. Cocoa is cultivated in almost all sub-districts with a total of 48,930 hectares of cocoa plantation land in 2020 in Polewali Mandar Regency involving 46,554 farmers (KK) (Directorate of General Plantations 2022). Although cocoa production levels are relatively high, farmers in Polewali Mandar still face significant challenges related to weak institutional coordination. This is evident in the lack of synchronization between farmer groups, cooperatives, and supporting institutions such as the agricultural department and partner companies. For example, training programs organized by local governments are often unknown to farmer groups due to the absence of active communication channels. Furthermore, the distribution of aid—such as high-quality seeds or subsidized fertilizers—is frequently mistargeted due to poor data coordination between institutions. Previous studies (Raharjo et al., 2017) have analyzed stakeholder networks but have overlooked the use of participatory methods to validate the direct perspectives of local actors. This limits the understanding of complex social dynamics at the grassroots level. Therefore, a more inclusive and participatory approach is needed to develop strategies that are both relevant and applicable to sustainable cocoa farming development.

Cocoa productivity in Polewali Mandar in 2022-2023 experienced an increase in production of 650.6 thousand tons (BPS 2023). This figure shows a significant contribution from the agricultural sector in meeting domestic food needs and the potential to be exported to the international market. With a stable increase in production, it is expected to have a positive impact on economic growth and community welfare (Syafaruddin, S., Dambe, J., & Hamsah, 2024). From increasing production, it also provides the government's efforts to increase cocoa productivity by providing assistance in the use of technology to improve cocoa quality in order to provide real benefits for the sustainability of cocoa farming economic growth. The production of cocoa plantations in Polewali Mandar Regency can be seen in the following table 1.

Table 1. Total Production of People's Plantation Crops (Tons) per year

District	Cocoa	
	2022	2023
Tinambung	435,70	203,35
Balanipa	2 731,60	148,68
Limboro	2 864,96	1 125,08
Tubbi Taramanu	778,77	5 559,76
Alu	98,01	1 014,86
Campalagian	4 725,04	1 071,52
Luyo	3 053,38	4 600,29
Wonomulyo	4 632,53	98,01
Mapilli	3 454,31	3 458,45
Tapango	4 586,35	4 759,26
Matakali	5 558,04	781,77
Bulo	1 071,47	4 647,46
Polewali	148,68	435,7
Binuang	203,35	2 731,87
Anreapi	1 125,08	2 870,70
Matangnga	1 014,83	3 057,05
Polewali Mandar Regency	36 482,11	36 563,18

Source: BPS Polewali Mandar Regency (2024)

Based on the table above, it shows the number of cocoa plantation production businesses located in West Mapilli Village, Polewali Mandar Regency, in 2022 of 3 053.38, then experienced a significant amount of cocoa production in 2023 of 4 600.29, this is a business engaged in plantations and shows an increase in cocoa production from 2022 to 2023.

Despite its promising agricultural development potential, cocoa productivity in this region still faces various challenges stemming from social and institutional problems at the farmer level. Many cocoa farmers operate in poorly organized social structures, a lack of collaboration between farmers, and a weak role of local institutions such as farmer groups or cooperatives in supporting access to technology, markets, and financing.

The social problems that arise are not only limited to the low participation of farmers in farmer groups, but also in the form of inequality in access to training and counseling, as well as low trust between actors in the cocoa

supply chain. Often, existing agricultural support institutions have not run optimally as a driver of socio-economic change for farmers. These weak agricultural institutions have an impact on the limited intervention of development programs, which are supposed to be based on local social realities. (Lisyati Dewi, Agus Wahyudi, 2014) The weak institution of cocoa farmers, makes the bargaining position of farmers weak in the face of a market system that tends to be technological, the institution of farmer business groups at the farmer level has a very strategic role and function in the development of cocoa in Polewali Mandar. Both in terms of agricultural sub-systems, processing sub-systems and marketing sub-systems. So that the performance of farmer groups in improving farmer knowledge such as technological innovation, pest and disease control, and post-harvest handling is able to maintain the quality of cocoa beans in Polewali Mandar (Yamin Pagala et al., 2023).

Therefore, social mapping is an important approach as a basis for designing agricultural development interventions. Social mapping allows the disclosure of social structures, power relations, the role of community leaders, as well as information networks and social capital owned by cocoa farming communities. Through this approach, the government and agricultural development stakeholders can understand the social characteristics of the community in depth, so that the intervention strategies carried out become more contextual, participatory, and sustainable (Rela, 2023). The success of this mapping does not only depend on its technicality, but also on the active involvement and participation of communities/farmers in the process (Fadhli & Annisa, 2024).

The development of modern agriculture demands an approach that is not only technology-based, but also considers social and institutional aspects as a whole. In this context, *participatory social mapping* has developed into an important method in understanding the social structure, network of actors, and the dynamics of relationships between farmers and supporting institutions. Various studies have shown that the involvement of farmers in the process of identifying actors, roles, and social relationships can increase the effectiveness of development interventions. Where, research by Asia et al. (2019) underscores the importance of participatory communication in supporting cocoa certification in Polewali Mandar, which strengthens the capacity of farmer groups through community dialogue and collective action. Meanwhile, (Raharjo et al., 2017) used the *Social Network Analysis* (SNA) approach to assess cocoa marketing communication networks, which shows that the central position in the network greatly affects the flow of information and product distribution. In addition, a study by (Arman et al., 2023) found that farmers' perceptions of institutional roles are very positive, especially in the aspects of training and technical assistance. This is reinforced by findings (Wahyu Maulid Adha et al., 2023) which show that the cocoa bean quality certification program directly contributes to increasing farmers' incomes.

However, there are still gaps in research that explicitly integrates participatory social mapping as a basic framework for agricultural development intervention planning, particularly in the context of cocoa in the Polewali Mandar area. Therefore, this study aims to fill this gap by developing a social map of the main actors in the cocoa farming ecosystem, as well as analyzing their interaction patterns to strengthen local institutional systems that support the sustainability of cocoa farming.

Social mapping is not only a tool to identify the social weaknesses of communities, but also to bring out local potentials that can be optimized in the development of cocoa farming. Therefore, this study aims to identify the role of cocoa farmer groups, patterns of social interaction, and institutional networks using participatory social mapping developed into Social Network Analysis (SNA) to understand the relationship between actors in the cocoa farmer community Mapping the social conditions of the cocoa farming community in Polewali Mandar as the basis for formulating a more effective and socially equitable agricultural development intervention strategy.

RESEARCH METHODS

This research is a qualitative study supported by quantitative data and utilizes a descriptive method approach. The study will be conducted in Mapilli District from February to April 2025. The technique used to determine informants is purposive sampling. Purposive sampling is a technique for selecting data sources based on specific considerations. These considerations may include individuals who are believed to have the most knowledge about the topic of interest or those who hold key roles that can facilitate the researcher in exploring the social object or situation being studied (Sugiyono, 2013). In this context, informants are sources of information who are considered to have the most understanding of the research topic and are therefore selected based on their relevance and expertise. A total of five informants were selected for this study, consisting of four heads of cocoa farmer groups who are actively engaged in cocoa development, and one cocoa producer, namely PT. Indonesia Hijau. These informants provided relevant data to support the research. **The types of data used** include primary and secondary data. Primary data were obtained through direct field observations, in-depth interviews with informants, and the use of a pre-prepared list of guiding questions. Meanwhile, secondary data were collected through literature reviews, scientific publications, journals, and other related sources relevant to the research topic. **The data analysis method used** in this study is qualitative descriptive analysis, which aims to explain or identify

the roles of cocoa farmer groups, patterns of social interaction, and institutional networks by applying Participatory Social Mapping (PSM) to understand the relationships among actors in cocoa farming communities.

RESULTS AND DISCUSSION

The Role of Local Institutions in Cocoa Farming

Local institutions such as farmer groups and cooperatives have an important role in supporting cocoa farming. Farmer groups are a combination of several farmers who have the same goals, the same environmental conditions, both social and economic. The farmers who are members of the farmer group are formally bound (Lestari & Idris, 2019). The existence of cocoa farmer groups will make it easier for farmers to help cocoa farmers carry out their farming activities. The farmer groups in this study are cocoa farmer groups in Tutar, Luyo, Tapango and Mapilli. There are 4 groups of cocoa farmers in this agroindustry that are still playing an active role.

The farmer groups that have been formed have a role as a forum for various information, production units and cooperation between farmers. Farmer groups that can provide information that can be obtained from parties who understand cocoa. This information is in the form of cocoa seeds with superior varieties, cocoa maintenance, handling cocoa pests and diseases and also cocoa development to increase cocoa production by developing 2 types of cocoa growing on one tree. From this information side, discussions can be held for this information. In this case, farmer groups collaborate with several parties to overcome existing problems such as creating discussion forums in cultivating cocoa appropriately to avoid pests and diseases in order to increase cocoa productivity. Parties that work with farmer groups in Lampa sub-district include the government, cooperatives UIH dan PT. Indonesia Hijau. Farmer groups cooperate with the government in terms of obtaining fertilizers, while PT. Indonesia Green farmer groups collaborate in providing superior variety seeds and also as buyers of cocoa agricultural products. In addition, farmer groups also collaborate with several parties in adding insight as well as in planting cocoa seeds and maintaining cocoa in pruning so that it can grow well. In addition to cutting cocoa planting, farmer groups are also carried out with members because cocoa planting requires proper pruning and spacing so that farmers do not carelessly plant cocoa. In accordance with research (Arman et al., 2023) the cooperation of farmer groups in Binuang District can be said to be relatively good because most of the farmers who are members of farmer groups have established good relationships between members, both within the group and outside the group. In addition, members always play a role in every group activity, with the establishment of a good relationship between members and the role of members in each activity, good cooperation between members is created based on the group's goals. Farmer groups as production units have a real influence on the productivity of farming. In general, the poktan institution has carried out its role well in efforts to increase agricultural production and income. (Farmia, A. 2021)

Social Interaction Patterns

Social interaction is a social process that involves reciprocal relationships between individuals, groups, and individuals and groups. Social interaction is the main requirement for social activities, considering that in addition to the social interaction, in addition to its very wide scope and dynamic form (Asniar, 2019) A social interaction can occur when one individual performs an action so that it can cause a reaction for other individuals. As social beings, humans can never live alone. Wherever and whenever humans are in need of cooperation with others. Humans form social grouping among others in order to maintain life and develop life.

1. Social interaction with the Company PT. Mars and PT. Papandaya Cocoa Industri

Partnerships between cocoa farmer groups and companies such as PT. Mars and PT. Papandayan Cocoa Industri (PCI) is a form of institutional interaction based on long-term collaboration. This interaction is not only economic, but also touches on social, educational, and environmental aspects through the sustainability approach carried out by the Rainforest Alliance program.

The form of interaction is such as:

a. Training and Mentoring

Cocoa farmer groups will receive training on Good Agricultural Practices (GAP), which is to ensure that agricultural products will be free from chemicals or from materials that can damage crop yields, carry out cocoa fermentation techniques in accordance with recommendations to get maximum yields and land and water conversion. Field extension workers from PT. Mars and PT. Papandaya Cococa Industri is regularly present to guide and monitor the development of cocoa farmers. In accordance with research (Tiring, D. N. 2023) that the land productivity of certified cocoa farmers is higher than that of non-certified cocoa farmers because it is in line with the GAP (Good Agriculture Practice) cultivation method.

b. Implementation of Certification Standards

Cocoa farmer groups are fostered to meet the Rainforest Alliance standards on sustainable access to

international markets, added value to products, protection of the environment and workers and increase cocoa yields in the long term. Products produced by the Rainforest Alliance will feature the green frog logo, a sign that it is produced according to strict sustainability standards. Based on research (Erviza Feby Triana, Tubagus Hasanuddin, 2019) that the benefits of the social dimension felt by farmers with the Rainforest Alliance certification program have many benefits, namely coaching and guidance from company extension workers (ICS) in solving problems in the plantation. With the Rainforest Alliance certification program, farmers often interact with their friends and farmer group members, company extension workers (ICS) and agricultural extension workers to just exchange ideas about coffee farming.

2. Social interaction with Barry Callebaut

Barry Callebaut is one of the largest chocolate companies and cocoa producers in the world involved in the cocoa supply chain from upstream to downstream, including in Indonesia. As part of its sustainability commitment through programs such as Forever Chocolate, Barry Callebaut actively nurtures cocoa farmers through the provision of superior seeds, sustainable cultivation training, and other technical support. The pattern of interaction is the provision of cocoa seeds. Barry Callebaut collaborates directly with farmer groups and cooperatives in distributing superior cocoa seeds that are pest-resistant and highly productive. According to research (Depparaba & Karim, 2019) that the Barry Callebaut Group (BCG), the world's largest producer of cocoa and cocoa bean products, once revealed that 2020 will foster cocoa farmers in Indonesia, a promising hope that is expected in efforts to improve the future of national cocoa. Because we know that superior seeds will increase the productivity of cocoa agricultural products. According to (Widyastuti, 2021), one of the causes of low cocoa productivity in people's plantations is that they have not used seeds from clones or superior varieties or are still using random seeds. The production and productivity of cocoa plants are largely determined by the plant's genetic factors. Superior cocoa clones have high yield potential, are resistant to pest and disease attacks, are responsive to fertilization, and other superior characteristics.

The social interaction between cocoa farmers and Barry Callebaut shows a positive, productive, and sustainability-oriented pattern. The provision of superior seeds accompanied by technical training shows that the company is not only acting as an input provider, but also as a strategic partner in increasing the capacity of farmers. In the future, it is necessary to strengthen local institutions and expand the reach of programs so that the benefits can be felt more widely.

3. Social Interaction with PT. Indonesia Hijau

PT. Indonesia Hijau It is a partner company that collaborates with the cocoa farmer group in a scheme to purchase crops directly (off-takers). This collaboration aims to create market certainty for farmers and improve the quality and selling value of cocoa beans. The interaction between farmer groups and companies is not only economic, but also forms social patterns that affect the dynamics of institutional relations and farmer participation. According to (Natasya Kautsar et al., 2024) that PT. Indonesia Hijau which is an agroindustry whose production activities are upstream to downstream from the agricultural process to produce cocoa products such as chocolate powder, chocolate bars, butters and pastes that are in accordance with quality standards.

Agroindustri cocoa PT. Indonesia Hijau Using cocoa beans obtained directly from farmers around the company and also this agroindustry has cocoa plantations. Because this company processes cocoa beans, if there is a market demand, this raw material will be stored first in a storage warehouse until this raw material is ready to be processed into chocolate products. It is then used to produce several types of cokelat yang terbuat dari cacao. *"When it is harvested, we inform the coordinator, later he will take care of scheduling it to send it to the warehouse PT Indonesia Hijau,"* — Chairman of Farmer Group.

Interaction patterns as coordination or partners that farmers rely on PT. Indonesia Hijau to sell crops at a more stable price than middlemen. PT. Indonesia Hijau Relying on farmers to maintain the quality of cocoa beans to meet export standards. Social interaction between farmer groups and PT. Indonesia Hijau It is reciprocal, collaborative, and long-term oriented. The company is not only a buyer, but also a social actor that forms a more empowered cocoa farming ecosystem. The challenge of maintaining continuity and equitable distribution of benefits among farmers remains a major concern in the sustainability of this partnership.

4. Cooperative social interaction UIH (Untuk Indonesia Hijau)

In the context of cocoa farming development, the role of cooperatives is very important as an institution that bridges the interests of farmers with the market, providers of production facilities, and access to other supporting institutions. One of the growing models is outsourcing partnerships with cooperatives, such as those carried out by cooperatives UIH (Untuk Indonesia Hijau), which acts as a management partner, a buyer of crops, and a provider of technical services to cocoa farmers. According to (AM Daud, 2024) that

cooperatives UIH It is also a means of selling cocoa agricultural products, both non-fermented beans and fermented beans. Cooperatives that offer partnership patterns for farmers provide many advantages because they can control the fermented cocoa trade on emerging issues related to the price, volume, and quality of cocoa beans, especially for the trade in fermented cocoa beans (Hardjanto et al., 2024). Bizikova et al. (2020) explained that farmers who join organizations such as farmer cooperatives feel a positive impact related to income, crop yields, and production quality. The pattern of social interaction between farmer groups and UIH cooperatives as outsourcing is economic, institutional and technical, which includes several forms of relationships such as:

- a) The price is set based on the initial agreement of the contract.
- b) Cooperatives provide grading facilities and quick payments, thus creating mutually beneficial relationships.
- c) The UIH cooperative formed a farmer working group as a technical implementation unit, where farmers interacted with each other and shared information.

Social Mapping

The social interaction between cocoa farmers and the UIH Cooperative as an outsourcing reflects the form of institutional relations that are not only economic, but also social and educational. Cooperatives have succeeded in building social networks that strengthen solidarity between farmers, although there is still room to increase transparency and farmers' participation in strategic decision-making.

Table 2. Sosial Mapping

No.	Name of the Institution	Type of Actor	Role for Cocoa Farmers	Frequency of Interaction	Emotional Closeness	Farmer Comments
1	Luyo, Tutar, Mapilli, Tapango Farmers Group	Internal (Local)	Training, group discussions, and information sharing	Weekly	High (Community-based)	Very helpful
2	PT. Mars	NGO	Assistance to farmer groups through the Rainforest Alliance program	Monthly	Medium (Professional)	Very helpful
3	PT. Papandayan Cocoa Industri / Barry Callebaut	NGO	Seed provider	Weekly	Medium-High	Very helpful
4	UIH Cooperative	Private / Cooperative	Outsourcing and marketing	Weekly	High	Very helpful
5	PT. Indonesia Hijau	Individual	Collaborative partner	Weekly	High	Very helpful

Source: Seconder Data processed, 2025

Based on the table above, it can be concluded that most institutions interacting with cocoa farmers in Polewali Mandar maintain weekly communication and build high emotional closeness, particularly local institutions such as farmer groups and cooperatives. This closeness indicates a strong social relationship and the active role of these institutions in directly supporting farmers' activities. Meanwhile, non-governmental organizations such as PT. Mars have monthly interaction frequency and moderate emotional closeness, reflecting a more programmatic and scheduled involvement. This highlights that local actors and direct partners play a central role in farmers' daily lives, both in terms of production and marketing.

Social mapping in cocoa farming communities is carried out to understand the dynamics of social relations, the level of interaction, and the role of various actors involved in supporting the sustainability and development of cocoa farming. Based on the results of the identification, there are five main actors/institutions that have a close relationship with cocoa farmers, namely: local farmer groups, private companies, cooperatives, and NGOs that play a role in assisting and providing production facilities.

1. Farmer Group (Luyo, Tutar, Mapilli, Tapango)

As local internal actors, farmer groups are the closest interaction nodes of farmers. They play an important role in technical training activities, group discussions, and the dissemination of information about cocoa farming. Relationships with this group are intense (Weekly) and emotional (High (Community-based)). Farmers consider the existence of farmer groups to be very helpful in increasing their capacity.

2. PT. Mars

The company acts as an NGO in the context of assisting farmer groups through the Rainforest Alliance program. Interactions occur periodically (Monthly) but are considered meaningful because of the close emotional connection. Farmers feel helped because the approach used is not only technical but also pays attention to social and environmental aspects.

3. PT. Papandayan Cocoa Industri / Barry Callebaut

As an NGO as well as a provider of cocoa seeds, this company performs an important function in the sustainability of cocoa farming. The frequency of interactions with farmers is relatively frequent, reflecting active involvement in the field. Emotional closeness is also high, because the help provided is direct and concrete.

4. UIH Cooperative

This cooperative serves as an outsourcing partner for cocoa farmers, facilitating market access and distribution of agricultural products. Interactions between cooperatives and farmers occur regularly, and the relationship that is established is close. The role of cooperatives is highly appreciated by farmers because it can bridge the gap between farmers and the cocoa processing market/industry.

5. PT. Indonesia Hijau

As an individual or corporate partner, PT. Indonesia Hijau establish frequent and close relationships with farmers. Its role as the main liaison with other cooperatives and companies makes this entity important in the institutional network of cocoa farmers.

Based on the results of social mapping, it can be seen that cocoa farmers have a strong and collaborative social network with various external and internal actors. Emotional closeness and frequency of interaction are important indicators in measuring the effectiveness of the relationship. All the institutions involved were considered "very helpful" by the farmers, indicating that the social and institutional structures formed were quite healthy and conducive to the sustainable development of cocoa farming.

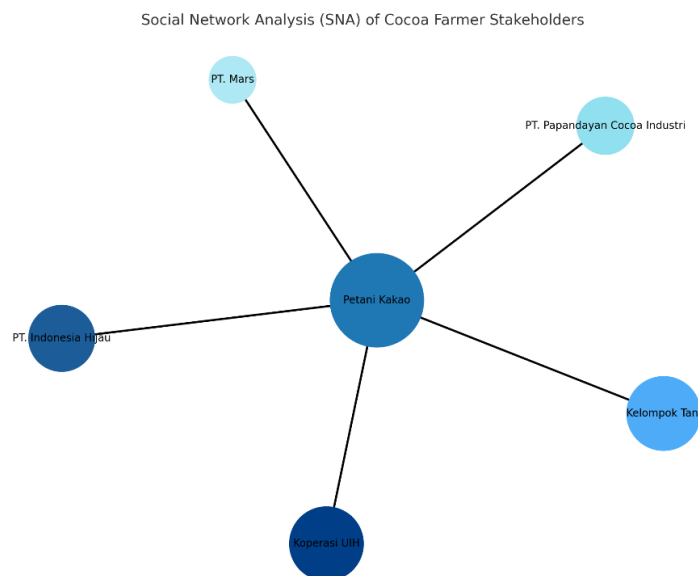


Figure 1. Participatory Venn Diagram: Cocoa Farmers' Social Relationships
Source, 2025

The image above shows a social network visualization (SNA) that illustrates the relationship between cocoa farmers in Polewali Mandar and various institutions and supporting actors in the cocoa farming ecosystem. On the graph, Cocoa Farmers are shown as the largest central node, reflecting the highest level of centrality in the network. **The size of the node reflects the level of centrality (the larger = the more central the role).** This shows that cocoa farmers are the main actors who interact directly with various other stakeholders.

Cocoa farmers are a central actor in this diagram. All social and institutional relationships surround farmers as network hubs. Each institution is linked based on its role, function, and level of involvement.

1. Highly Influential Actors

a. Farmer Group (Luyo, Tutar, Mapilli, Tapango)

Connect directly with farmers as part of the internal structure. High emotional closeness and weekly interaction make farmer groups an important node in knowledge sharing, training, and coordination of daily activities.

- Role: A forum for discussion, training, and dissemination of technical information in person.
- Frequency of Interaction: Very frequent.
- Social Proximity: High due to the relationship between fellow farmers and common interests.
- Influence: Very influential, because it is the main focus in increasing the capacity of farmers technically and socially.

b. UIH Cooperative

It has a very strategic position with a large node size. This cooperative plays a role in the outsourcing and marketing process of cocoa products, as well as being a link between farmers and the market. Intense (weekly) interactions indicate close social and functional relationships with farmers.

- Role: Bridging between farmers and the market/industry as an outsourcing partner.
- Frequency of Interaction: Routine and structural.
- Proximity: High, because cooperatives are the economic organization of the peasants themselves.
- Influence: Highly influential, especially in the marketing and distribution aspects of cocoa products.

2. Medium Influential Actors

a. PT. Mars

Connect with farmers through the Rainforest Alliance program. The position of smaller nodes indicates a lower frequency of interactions (monthly), reflecting their role of being programmatic and not directly involved in the farmer's daily activities.

- Role: Mentoring through *the Rainforest Alliance* program.
- Frequency of Interaction: Occasionally.
- Impact: Influential, especially in improving aspects of sustainability and certification, but not every day present in the field.

b. PT. Cocoa Industries / Barry Callebaut

Acting as a provider of cocoa seeds. Although not a local institution, their relationship is quite active and contributes directly to the productivity of farmers.

- Role: Provider of quality seeds and production technology.
- Frequency of Interaction: Frequently.
- Influence: Influential, in improving the quality of planting materials, but not much involved in the social aspects of farmers.

c. PT. Indonesia Hijau

Presented as a direct partner of farmers. Although it is individual, the company's collaborative role in supporting farming activities makes it one of the important actors in the network.

- Role: A partner who bridges the cooperative's relationship with the company or market.
- Frequency of Interaction: Frequently.
- Influence: Influential, although more operational in partnership systems.

Social Map of Physical Location

Social mapping not only includes relationships between individuals or institutions, but also pays attention to the spatial context or physical location of the actors, which greatly influences the intensity, form, and patterns of social interaction.



Figure 2. Social Map

Source, 2025

Cocoa land owned by farmers is generally spread in rural areas that are quite far from facilities owned by Barry Callebaut (PT. Papandayan Cocoa Industry). This causes the frequency of direct physical interaction between farmers and Barry Callebaut to be not very high. Nevertheless, the relationship is maintained through scheduled meetings, such as technical discussions, program socialization, or group meetings that are deliberately held at the Barry Callebaut location, because the place has more complete and representative facilities for meeting activities.

Social Interpretation: Despite being geographically far apart, Barry Callebaut still plays an important role as a facilitator and provider of superior seeds, as well as being a strategic place for information exchange and technical training.

In practice, communication between farmers and the UIH Cooperative takes place directly by phone, especially during the harvest season. This coordination includes:

1. Harvest harvest pick-up schedule,
2. Available production volume,
3. Provisional price,
4. Distribution logistics.

Social Interpretation: Although there are not always physical meetings, the relationship between farmers and UIH cooperatives remains strong and intense thanks to the ease of communication. It demonstrates an effective and trust-based form of remote social interaction.

Social activities of cocoa farmers, such as:

1. Group discussions,
2. Deliberation or informal meetings,
3. Small coordination meetings,

Social activities of cocoa farmers, such as:

- a. Farmer Group (local village location) — routine and internal.
- b. Barry Callebaut — for external activities that require logistical support or technical facilitators.

CONCLUSION

In efforts to support sustainable cocoa farming development, Participatory Social Mapping (PSM) serves as a crucial tool for understanding the relationships between actors, institutional roles, and the dynamics of social interactions that influence the effectiveness of local agribusiness systems.

Cocoa farmers in Polewali Mandar maintain strong and layered social networks. Internal interactions occur within farmer groups in Luyo, Tutar, Mapilli, and Tapango, which function as centers for learning and coordination. External connections involve PT. Mars (provides training), Barry Callebaut (seed supplier), PT. Indonesia Hijau (working partner), and the UIH Cooperative (distribution and marketing partner). These interactions take the form of face-to-face meetings, phone calls during harvest, and structured program-based

collaborations.

Farmer groups and the UIH Cooperative emerge as the most influential actors due to their direct engagement in farmers' daily socio-economic activities. Farmers frequently interact with the UIH Cooperative via telephone for harvest coordination. Barry Callebaut, PT. Mars, and PT. Indonesia Hijau serve as supporting actors with medium-to-high influence, particularly in providing agricultural inputs, innovation support, and sustainability programs.

The mapping reveals an open and collaborative network structure, with farmers as central actors. Despite geographical challenges—such as the distance from Barry Callebaut facilities—relationships remain effective due to adaptive communication mechanisms and strong social trust. The visual relationship diagram illustrates the distribution of roles and influence, which can be further developed through Social Network Analysis (SNA) to identify relationship strength, key nodes, and areas for network improvement.

Farmers have adopted telephone-based communication with the UIH Cooperative as an effective means of coordination without requiring physical presence. Discussions and training sessions hosted at Barry Callebaut underscore the need for access to representative interaction spaces, even in remote areas. As central actors, farmer groups and cooperatives must continue to strengthen their capacity through training, management support, and access to markets, positioning them as hubs for sustainable empowerment.

Develop a digital platform to facilitate real-time communication between farmers and Barry Callebaut, minimizing geographical barriers. Mandate the UIH Cooperative to include farmer representatives in governance structures to improve transparency and alignment. Encourage partner companies (Barry Callebaut, PT. Mars, PT. Indonesia Hijau) to expand support through technical training, quality input provision, and inclusive sustainability programs.

Companies such as Barry Callebaut, PT. Mars, and PT. Indonesia Hijau are expected to expand their support through technical training, provision of quality inputs, and the development of more inclusive sustainability programs. Local governments should integrate Participatory Social Mapping (PSM) into agricultural planning to prioritize interventions that align with farmers' identified needs—for example, improving access to quality seeds rather than focusing solely on certification schemes. Follow-up studies using the Social Network Analysis (SNA) approach can be conducted to quantitatively assess the strength of actor relationships and identify weak points within institutional networks in the cocoa farming system.

The findings of this study may not be generalizable beyond Polewali Mandar due to the local and contextual nature of the sampling. Future research using quantitative SNA is recommended to validate relationship strength and identify institutional network vulnerabilities in broader cocoa farming systems.

REFERENCES

- Arman, M., Pagala, Y., Nuraliyah, S., & Saleh, M. (2023). The Role and Function of Cocoa Farmer Groups in Polewali Mandar. *Agricultural Extension*, 8(1), 215–220. <https://journal.lppm-unasman.ac.id/index.php/agrovital/article/download/3976/pdf>
- Arsyad, W., Mardiyanti, S., Nadir, N., Nailah, N., & Molla, S. (2023). Risks of Production and Income of Cocoa Farming in Kuajang Binuang Village, Polewali Mandar Regency. *Agricultural Socio-Economic Empowerment and Agribusiness Journal*, 1(2), 76. <https://doi.org/10.20961/agrisema.v1i2.64433>
- Asia, N (2019) Participatory Communication in the Application of Cocoa Certification Standards in Farmer Groups in Polewali Mandar Regency (Doctoral dissertation, Bogor Agricultural University (IPB)). <https://repository.ipb.ac.id/jspui/handle/123456789/79/>
- Asniar, A. (2019). Social Stratification of the Clove Farming Community in Kindang Bulukumba. *Journal of Social and Cultural Studies*, 1–10. <http://www.ejournal.tebarscience.com/index.php/JKSB/article/view/66>
- Bizikova, L., Nkonya, E., Minah, M., Hanisch, M., Lord, R. M. R., Speranza, C. I., ... & Timmers, B. (2020). A review of the scope of the contribution of farmer organizations to smallholder agriculture. *Nature Foods*, 1(10), 620-630. <https://www.nature.com/articles/s43016-020-00164-x>
- Chambers, Robert. 1994. "Participatory Rural Appraisal (PRA): Analysis of Experience." *World Development* 22 (9): 1253–68
- David, A. M. (2024). Analysis of the Cocoa Supply Chain of Agroindustry Pt. Indonesia Hijau in Polewali Mandar Regency (Doctoral dissertation, Hasanuddin University). <http://repository.unhas.ac.id/id/eprint/37321/>
- Depparaba, F., & Karim, H. A. (2019). National Cocoa Prospects in Policy Perspectives. *AGROVITAL : Journal of Agricultural Sciences*, 3(1), 14. <https://doi.org/10.35329/agrovital.v3i1.215>
- Erviza Feby Triana, Tubagus Hasanuddin, I. N. (2019). Coffee farmers' perception of the Rainforest Alliance Coffee (Rfa) certification program in Pulau Panggung District, Tanggamus Regency. *Jaia*, 7(3), 306–313.

- <https://jurnal.fp.unila.ac.id/index.php/JIA/article/view/3779>
- Fadhli, M., & Annisa, Y. (2024). COMMUNITY PARTICIPATION IN SOCIO-ECONOMIC MAPPING. 9(1), 117–134. <https://ejournal.uin-suska.ac.id/index.php/jmm/article/view/29265>
- Hardjanto, A., Jhuny, L. C., & Sehabudin, U. (2024). Cooperative Development Strategy to Improve the Production and Quality of Cocoa Beans in the Masagena Farmers Cooperative in North Luwu Regency. 3(2), 76–89. <https://journal.ipb.ac.id/index.php/ijaree/article/download/56651/29862/>
- Lestari, U., & Idris, M. (2019). The Role of Farmer Groups in Cocoa Farming Activities in Ketulungan Village, Sukamaju District, North Luwu Regency. Indonesian Journal of Agribusiness, 7(2), 92–101. <https://doi.org/10.29244/jai.2019.7.2.92-101>
- Lisyati Dewi, Agus Wahyudi, A. M. H. (2014). Institutional Strengthening to Improve Bargaining Position. 1(1), 15–28. <https://media.neliti.com/media/publications/141835-ID-penguatan-kelembagaan-untuk-peningkatan.pdf>
- Natasya Kautsar, M., Arsyad, M., & Nixia Tenriawaru, A. (2024). Existing Performance of Cocoa Agroindustry: Learn From Pt. Indonesia Hijau, Polewali Mandar, Indonesia. BIO Web of Conferences, 96, 1–13. <https://doi.org/10.1051/bioconf/20249607012>
- Otto, R. M., Pagala, M. A. Y., & Kusmiah, N. (2022). The Influence of Production Factors on the Increase in Cocoa Production in Kunyi Village, Anreapi District, Polewali Mandar Regency. Journal of Integrated Agrotechnology, 1(2), 166. <https://doi.org/10.35329/ja.v1i2.3331>
- Raharjo, A., Muljono, P., & Matindas, K. (2017). Cocoa Marketing Communications Network at District of Anreapi, Polewali Mandar, West Sulawesi. Journal of Development Communication, 15(2), 1–14. <https://journal.ipb.ac.id/index.php/jurnalkmp/article/view/22763>
- Rela, I. Z. (2023). Social mapping and stakeholder participation in community empowerment program planning. Scientific Journal of Counseling and Community Development, 3(1), 1. <https://doi.org/10.56189/jippm.v3i1.35478>
- Syafaruddin, S., Dambe, J., & Hamsah, H. (2024). Marketing Strategy for Cocoa Seeds in West Mapilli Village, Polewali Mandar Regency. 9, 165–171. <https://journal.lppm-unasman.ac.id/index.php/agrovital/article/view/5855>
- Tiring, D. N. (2023). The Impact of the Product Certification Program on the Productivity and Income of Cocoa Farmers in Guliling Village, Kalukku District, Mamuju Regency, West Sulawesi Province (Doctoral dissertation, Hasanuddin University).
- Wahyu Maulid Adha, Mujirin M. Yamin, & Rahmat Ghazali. (2023). The Effect of Cocoa Bean Quality Certification on Increasing the Income of Cocoa Farmers in Luyo District, Polewali Mandar Regency. MANDAR: Management Development and Applied Research Journal, 6(1), 20–28. <https://doi.org/10.31605/mandar.v6i1.3301>
- Widyastuti, L.S., Parapasan, Y., Same, M., 2021. Growth of Cocoa Seedlings (*Theobroma cacao* L.) in Various Types of Clones and Types of Mandues. Journal of Agro Plantation Industry. 9 (2), 109-118. <https://jurnal.polinela.ac.id/AIP/article/view/1574>
- Yamin Pagala, M. A., Nurdyah, N., NurAliyah, S., & Saleh, M. (2023). Farmers' Perception of the Role and Institutional Function of Cocoa Farmers in Binuang District, Polewali Mandar Regency. AGROVITAL : Journal of Agricultural Sciences, 8(2), 215. <https://doi.org/10.35329/agrovital.v8i2.3976>
- Yulianty, S., Arfah, C., Sultan, H., Nurdin, M. F., (2025). Studies, P., Faculty, A., & University, P. Involvement of Non-Government Institutions. 32(1), 61–69. <http://jurnal.faperta.untad.ac.id/index.php/agrolandnasional/article/view/2413>