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Article

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Article

Partnership Development of Smallholder Coffee Cultivation: A Model for Social Capital in the Global Value Chain

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Abstract: The productivity of smallholder coffee cultivation is declining due to ageing trees, making the rejuvenation of coffee trees with superior seeds essential. This rejuvenation process requires the support and participation of various stakeholders, including the government, banks, investors, universities, community leaders, experts, extension workers, and other parties. The nature of an incomplete contract in building partnership with farmers requires confidence building to avoid higher costs in enforcing a new behavior. However, this study shows that the accumulation of social capital also leads to higher expenses in maintaining these relationships. This study aimed to develop a social capital model to enhance partnerships between coffee farmers and relevant stakeholders. The analysis used a system dynamics model for coffee production and farmer income. The data collection involved the gathering of data and information from 17 actors in the coffee industry in Lampung, particularly in Kopista community. The study reveals that the social capital model must be constructed from four components: (1) trust, (2) ongoing cooperative activities, (3) social capital connections, and (4) memories of successful cooperative actions. Active involvement and instruction from specialists on the concept of social capital and partnership models can enhance cooperation by maintaining social connections. The policy implication of this study is that the development of a social capital model and partnership must be constructed by mentoring for economic benefits and must be continuously supported.



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Keywords: coffee; contract farming; incomplete contract; partnership; social capital

1. Introduction

Indonesian coffee production reached 729 thousand tonnes in 2018, accounting for 8% of the global coffee production ([Directorate General of Plantations 2018](#)). It includes 534 thousand tonnes of robusta and 194 thousand tonnes of arabica coffee. Indonesia exports 60% of its coffee production, while the domestic market absorbs only 40%, primarily in robusta coffee. Smallholder coffee plantations cover 1.25 million hectares, about 98% of the national coffee area, producing approximately 99.3% of the total national coffee production of 780 thousand tonnes ([Statistics Indonesia 2022](#)). Despite these figures, Indonesia's coffee production lags behind that of other coffee-producing countries. The average productivity in Indonesia is about 0.7 tonnes per hectare over 1.2 million hectares, compared to Vietnam's productivity of 2.7 tonnes per hectare on 641.7 thousand hectares. The competitiveness of Indonesian coffee production is hindered, proven by substantial imports of lower-cost green beans and instant coffee totaling 100 thousand tonnes annually, due to the low productivity of old coffee trees. Efforts to rejuvenate coffee plantations from 2012 to 2020 in countries like Brazil, Uganda, Nicaragua, Vietnam, and Colombia aimed to boost productivity per hectare. Replanting with superior robusta or certified seeds can achieve productivity levels of 2–3 tonnes per hectare ([Hulupi 2016](#)). Still, these efforts in Indonesia smallholders are hindered by a lack of commercial interest and the need for substantial initial capital.

Rosanti et al. (2020) found that wealthier coffee farmers have begun rejuvenating old coffee trees, while poorer farmers, typically with only 2 hectares of land, lack the capital needed for such investments. Farmers seldom invest in replanting when coffee prices are low because replanting reduces the number of coffee trees, which are their primary income source. High coffee prices mean that potential income is lost during the replanting period, which can take up to three years for new trees to mature and produce. Consequently, coffee farmers' annual income is often supplemented by other agricultural products and non-agricultural activities, with coffee contributing only 40% of their annual income. This income structure discourages investment in plantation development or rejuvenation, especially during periods of low coffee prices. Despite these challenges, there is potential for change in Indonesian coffee plantations. For instance, 62% of Vietnamese coffee farmers manage 1–2 hectares of land (Anh et al. 2019). Typically, coffee farmers receive about 84–94% of the price paid by exporters (Listyati et al. 2017; Aklimawati et al. 2015). Developing the coffee plantation business is crucial, as it offers several benefits, including enhanced agricultural productivity, improved market access, and overall farm development (Romadi et al. 2023).

Indonesian coffee farmers primarily focus on cultivation and limited post-harvest activities. After sun-drying the coffee beans, they sell them to village-level collectors. These collectors consolidate the goods and arrange delivery to traders, who then supply the beans to exporters. Each exporter typically has preferred suppliers or collectors, creating an almost exclusive supply chain that integrates Indonesian coffee into the global value chain (Neilson and Shonk 2014). Partnerships between agribusiness companies and small-holder plantations are expected to boost production through company resources, such as investments in planting, technical assistance, human resource management, financing, and marketing (Minten et al. 2017; Musara and Dziva 2015). Effective coffee planting requires providing inputs and facilities like land preparation, seeds, fertilizers, and pesticides (Taufik and Ratya 2018). Maintaining coffee trees also necessitates fertilizers, pesticides, and equipment for weeding and pruning. The development of the coffee industry must align with the sustainable development principles, encouraging coffee farmers to utilize land and organic waste, thereby reducing the use of environmentally harmful chemicals (Furqon et al. 2019).

In the context of the global value chain (GVC), social capital has been identified as a means to reduce transaction costs and streamline the management of various institutions involved in contractual agreements (Trienekens 2011). Transaction cost economics envisions that market efficiency will drive firms to engage farmers in production (Coase 1988), known as contract farming, rather than conducting their own corporate farming (Prowse 2012). Contract farming runs on the sharing of resources of the firm and the farmers (Cahyadi and Waibel 2016) with the goal that the exchange benefits both parties and reduces risk. The contract is an incomplete contract (Hart 2017), as there are boundaries of rationality, asymmetry of information, measurement of performance, and cost considerations that prevent putting all binding activities into clauses of contract (Besanko and Wu 2013). A change in the working method or decision to replant has consequences, notifiable as a risk of relationship and asset-specific investments to the farmers. The farmers need to have confidence of a better future prior to a decision that may harm their current stream of income. The social capital allows for transactions to be trust-based and value-based (Gulati 1998; Coleman 1987). This research paper demonstrates that building social capital is an accumulative economic effort in the global value chain of coffee in Indonesia.

Young coffee growers, members of the Kopista community, have achieved a remarkable coffee bean productivity of 2 million tons per hectare per year (Haryono et al. 2023). It represents a significant form of social capital crucial for the success of sustainable small-holder coffee cultivation. This demonstrates that the same plot with different working methods can overcome the existing problem of old trees. Resistance occurs from older farmers who are content with their knowledge, for instance, by insisting that trees grow with multiple branches as is, as opposed to the new concept of pruning. Rosanti et al. (2019)

and Haryono et al. (2024) observe that most farmers actually do not maintain their plot but only attend to it during the harvesting season. Social engineering is needed to transform the smallholders from treating coffee estate as a mere plot to an agribusiness, where farmers work 100 days and put fertilizers. However, the gap in the research on how the impact of socioeconomic variables on the forming of a social capital model for coffee farmers has not been explored. On the other hand, social capital develops through networks of connections between community members, where interactions within these networks enhance the success of collective efforts. Such communities transcend being mere collections of individuals, positively impacting the economy and other members' businesses, thereby benefiting the ecosystem as a whole. The creation of a social capital model could enhance economic collaborations between coffee growers and pertinent stakeholders. Hence, the aim of this research was to examine how collaborations between coffee farmers and various stakeholders are formed in transforming coffee production techniques, emphasizing the social dynamics within the farming community. This research is essential for elucidating the intricate connections of coffee farmers and associated entities, shaped by diverse social, economic, and cultural variables.

2. Methodology

This research was conducted in Lampung, a major coffee production center with numerous farmers, coffee processing facilities, and a robust network of collectors and exporters. The map of the location is shown in Figure 1. The primary focus of the study is the Kopista community, which employs unique planting methods that differentiate it from other coffee plantations in Lampung. Unlike traditional practices prioritizing the quantity of potential fruits, Kopista's pruning method removes low-productivity coffee branches to optimize nutrient distribution (Haryono et al. 2023). This approach, combined with disciplined production targets and distinct agribusiness patterns, sets Kopista apart from other farmer groups. Data collection for this study involved surveys of experts and critical individuals, direct observations, in-depth interviews, and focus group discussions (FGDs) with relevant parties, including 4 groups from Kopista Communities.



Figure 1. Location of the study (marked with a red frame). Source: Google Maps (2024).

Additionally, the research utilized references related to the development of social capital to foster sustainable partnerships between farmers and stakeholders. The analysis technique employed was a system dynamics model, which simulates the behavior of complex social systems. Originating from the engineering field and adapted to the social sciences, the system dynamics model, introduced by Forrester in the 1950s, provides a

rigorous method for qualitatively describing, exploring, and analyzing complex systems through processes, information flows, organizational boundaries, and strategies. This method involves feedback loops, variables, and equations, with feedback loops defined as closed chains of causes and effects.

According to Wang et al. (2008), system dynamics variables include (i) level variables, which accumulate a flow over continuous time periods; (ii) rate variables, which represent a flow during a time period; and (iii) auxiliary variables, which identify rate variables. These variables are interconnected through equations that can be integral, differential, or of other types. This model reflects changes through simulation or in real time by continuously calculating components and considering several alternative future actions (McGarvey and Hannon 2004). System dynamics simulations are used to explain phenomena in complex social systems by creating simplified systems that focus on key factors driving the phenomena and clarifying their cause-and-effect relationships. Sterman (2000) describes the system dynamics approach as iterative, improving our understanding of a problem with each iteration by providing continuous feedback. For dynamic and complex systems, a process-oriented model is necessary for effective policy analysis. The governance of coffee rejuvenation, being a complex and dynamic phenomenon, is well-suited for a study using the system dynamics methodology. Such systems are characterized by dynamically developing sectors, strong interrelationships, feedback-driven changes, non-linear behavior, dependency on historical contexts, self-organization, and adaptability. The stages involved in this study include the following: (1) analysis and identification of problems (situation considered problematic) between coffee replanting and pruning models, and the social capital partnership model; (2) composition of a causal loop diagram (CLD); (3) preparation of a stock and flow diagram (SFD); (4) the model simulation of coffee replanting; (5) model verification and validation; and (6) simulation of the mentoring impact as a main policy scenario.

3. Results

Focus group discussions (FGDs) involved key individuals and stakeholders engaged in enhancing productivity and quality in community coffee plantations. These participants included 2 exporters, 2 heads of coffee farmers' groups, 10 middlemen, and managers of 3 major banks. The initiative aimed to amplify coffee cultivation on restricted land through methods like rejuvenation, nurturing, fertilization, pruning, and other inventive approaches. Based on our findings through the FGDs, constraints related to the financing of replanting investments are as follows: banks' difficulties in selecting qualified farmers for loan, banks' requirements of offtakers, higher-productivity farming methods, farmers having no reserve fund for 3 years of the non-productive replanting stage, and farmers' reliance on old trees as collateral and revenue.

To pinpoint methods for productivity improvement and different farming practices, particularly in coffee tree rejuvenation, in-depth interviews were conducted with key figures of four farmer groups. The outcomes of these interviews can be outlined as follows:

1. Key person group 1 emphasized the importance of aligning government training programs with field conditions for effective implementation in supporting coffee cultivation. For instance, planting shade trees like bananas, although intended to provide shade, makes coffee cherries more vulnerable to pests due to reduced sunlight exposure, necessitating increased fertilizer use. A trial conducted on a 0.5 hectare land using a rejuvenation method with a fence system, akin to practices in Brazil, yielded highly promising results within two years, estimated to be 4–5 times the previous productivity. This approach facilitates easier and faster care, fertilization, and harvesting, significantly reducing labor costs. The success of this trial led to a change in attitude towards rejuvenation efforts by key person group 1's parents.
2. Key person group 2, who underwent training in organic fertilizer usage and even received a certificate from the minister, experienced a significant decline in coffee productivity after implementing it in the field. The productivity plummeted to

400 kg of green beans per hectare from the original average of 800 kg per hectare annually. This discrepancy is depicted in the model through the red loops representing government program structures in Figure 1.

3. According to key person group 3, the contract farming structure on coffee plantations involves multiple competent actors, ensuring the program's smooth operation. Regular suppliers, traders, collectors, and farmer groups are actively engaged, demonstrating interest and motivation. The company provides mentoring activities beyond educational programs, acknowledging farmers' expertise in coffee cultivation. However, challenges such as excessive rainfall during harvest, fertilizer procurement difficulties, and pest or fungus attacks persist, depicted in the model through funding structures (red loops) and service providers (blue loops). Direct observations and interviews revealed that farmers' lukewarm response to assistance and capital loan offers may stem from their negative experiences.
4. Key person group 4, with extensive experience in coffee cultivation trials, highlighted several successes: (1) the rapid increase in the number of millennial farmers joining the Kopista community through collaborative learning. (2) Members effectively disseminated their trial success, serving as a model for other coffee farmers nationwide. (3) The scarcity of subsidized fertilizer no longer hinders production, as Kopista farmers demonstrated the effectiveness of quality fertilizer, even at a higher price. (4) Regarding the farming operation cost, Kopista members devised cooperative systems to implement replanting. (5) The success of Kopista inspired emulation by other communities sponsored by multinational companies.

Before constructing the social capital model, it was essential to verify the feasibility of coffee replanting and to validate Kopista communities' profitability. There were several situations to be considered to use the system dynamics approach. Several variables were included in this study, namely coffee tree production, farmer cash flow (in: farmer income, and out: costs for input production), and coffee bean price. The feasibility analysis hinged on various conditions, including the following:

1. Tree density per hectare: Four scenarios were considered (1650 trees, 2000 trees, 3300 trees, and 4000 trees).
2. Initial production before rejuvenation: 700 kg/ha/year.
3. Coffee production target: Set at 4 tons of green beans for 3300 trees.

Additionally, several assumptions were factored into this study:

1. Fertilizer requirements amount to 25% of the production target.
2. The price of quality fertilizer is IDR 25,000 per unit (or USD 1.60 per unit), contingent upon tree density, initial and post-rejuvenation production, and the set coffee production targets.
3. The lag in coffee productivity must be accounted for to ensure the success of the coffee replanting and pruning model.

According to the system dynamics analysis depicted in Figure 2, replanting conventional coffee trees is crucial in this model. It directly impacts coffee farmer revenue: an increase in production implies an increase in maintenance and harvesting costs, as well as the need for additional intercropping land, consequently reducing coffee farmer profits.

Figure 3 illustrates the production cost per kilogram: based on 2023's lowest assumption of maintenance costs amounting to IDR 3500 per tree (or USD 0.22 per tree) and harvesting costs stand at IDR 4500 per tree (or USD 0.29 per tree). Land preparation was assumed to be low at 15 million rupiah per hectare. The price of green bean coffee was assumed to be at a low point of IDR 30,000 per kilogram or USD 1.92 per kilogram (a normal price at the beginning of 2023, whilst by Q2 2024, the price was in the range of IDR 70,000 or USD 4.47). Pruning is scheduled when the tree reaches eight years of age.

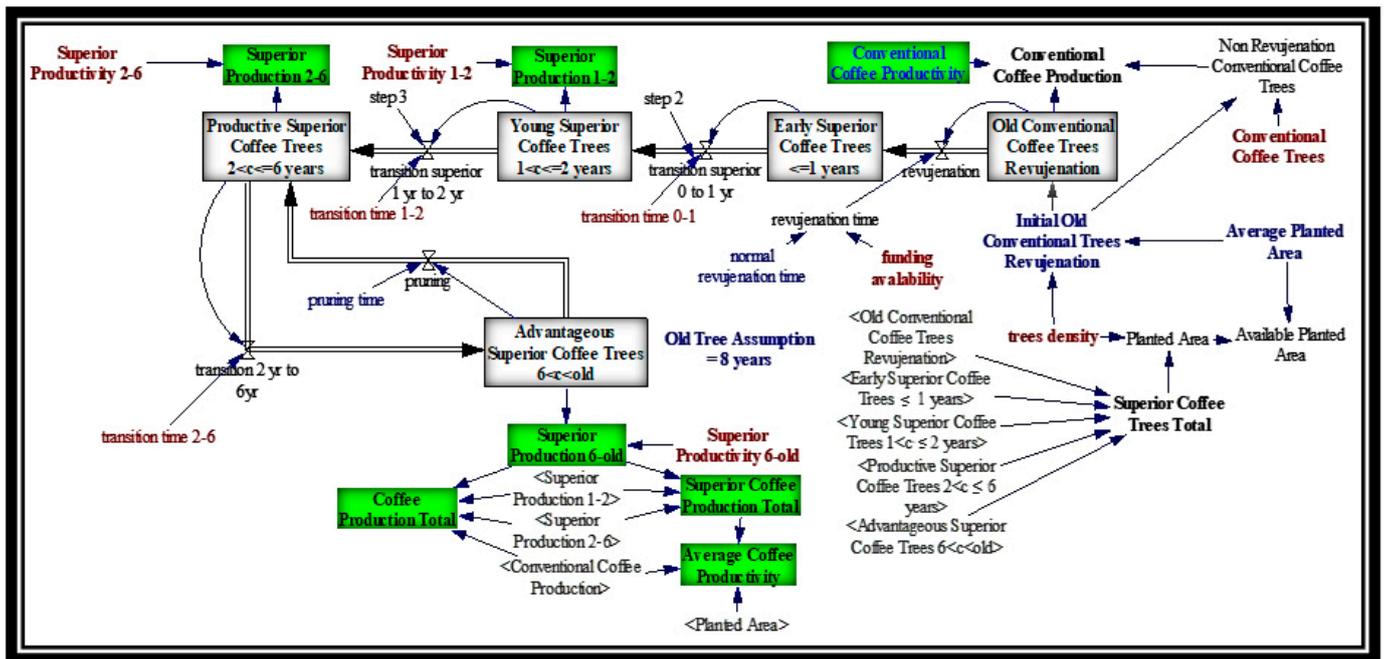


Figure 2. Factors influencing coffee replanting and pruning decisions model.

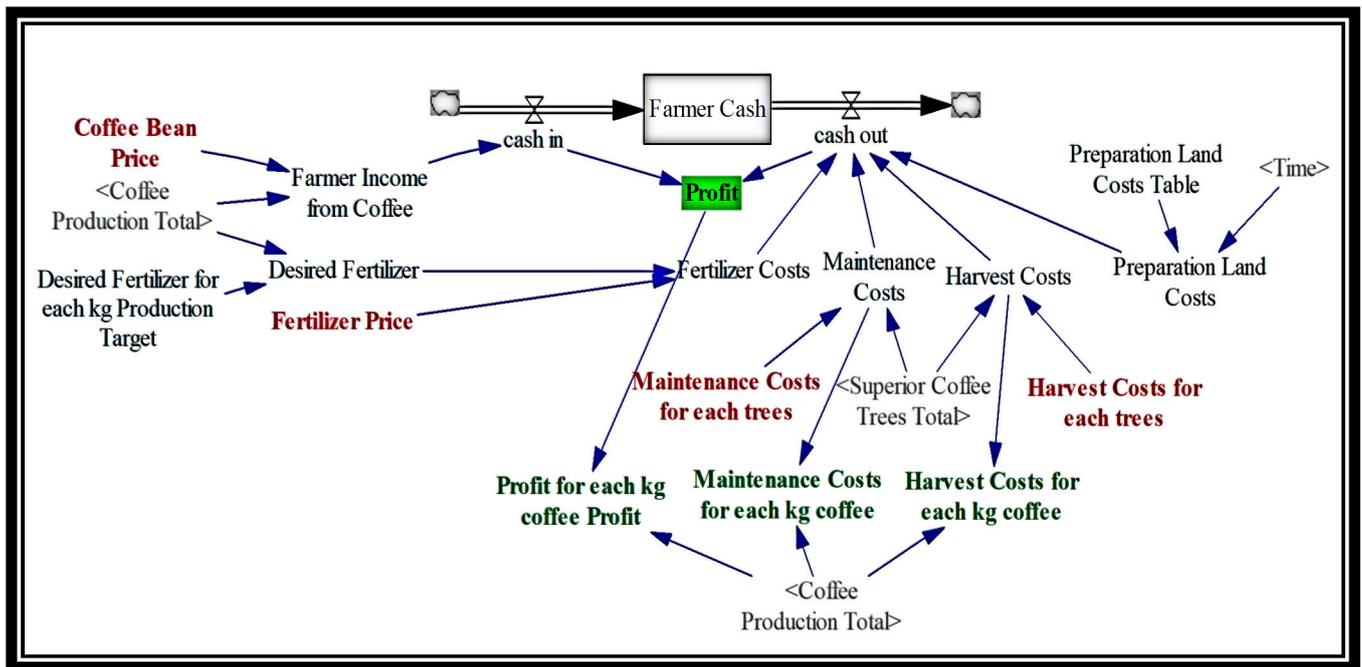


Figure 3. Income–expense model.

Figure 4 illustrates the correlation between coffee productivity and profit as production quantities vary among 1650, 2000, 3300, and 4000 trees. This trend underscores how replanting and pruning coffee plants can stabilize productivity, consequently affecting profits. A consistent pattern emerges wherein increasing the number of coffee trees corresponds to profit augmentation under stable conditions.

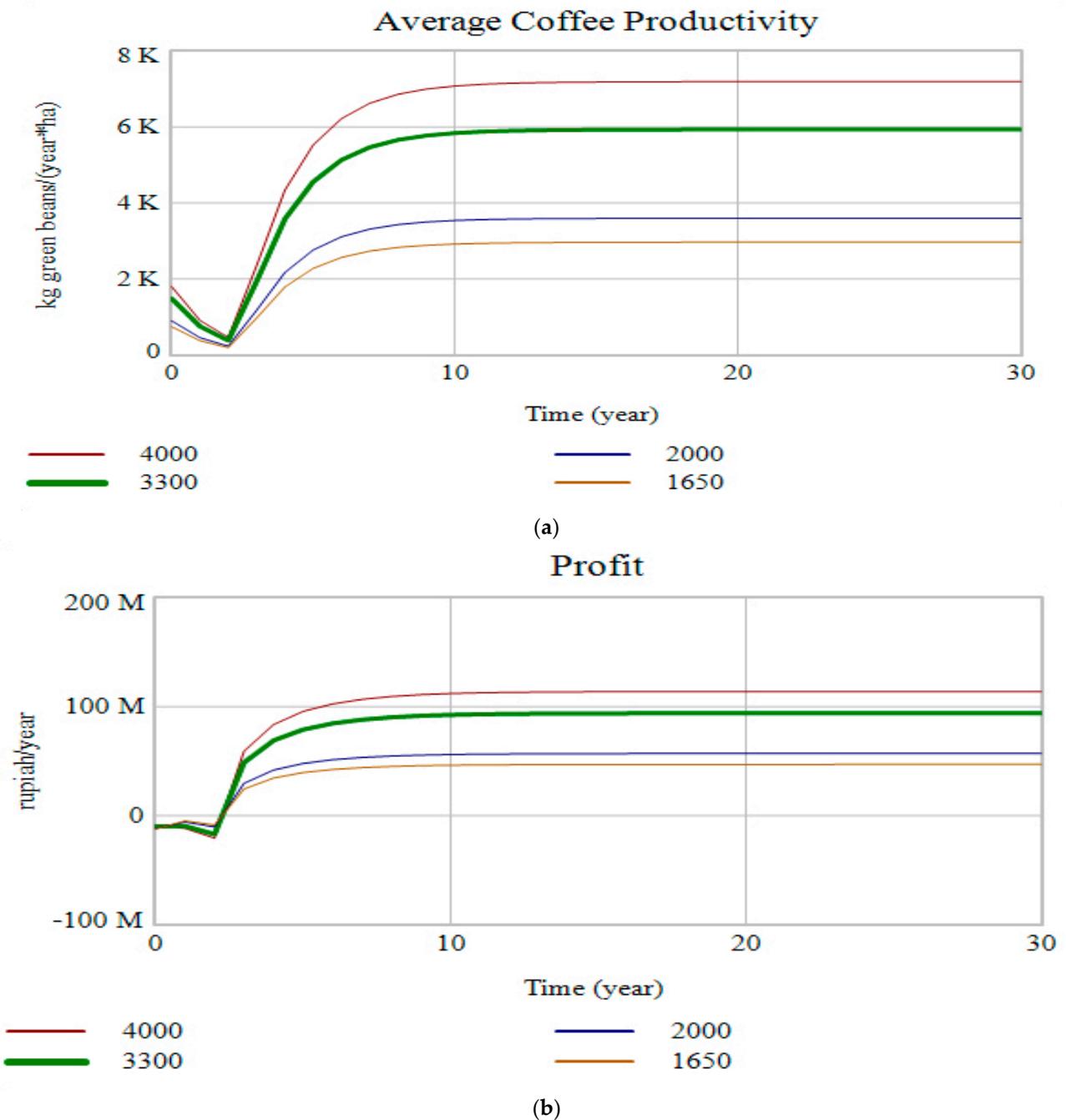


Figure 4. The correlation between coffee productivity and profit trend. (a) Coffee productivity trend; (b) coffee profit trend.

The Kopista community’s success has instilled significant confidence among millennial farmers in their ability to independently enhance coffee productivity and quality. Consequently, contract farming offers, government programs, or other partnerships need to prioritize the application of the relationship value concept. Four values inherent in interactions or social exchanges are personal value, financial value, knowledge value, dan strategic value, established as relationship values. Self-interest (Thibaut and Kelley 1959) drives social exchange with the notion that all individuals engage in a relationship with minimal sacrifice for a maximum gain. Network exchange theory poses that social exchanges are conducted not only on an individual level but also at organizational and institutional levels (Suyanto and Amal 2010). Ulaga and Eggert (2006) emphasized that relationship value is a primary precursor to relationship quality and behavioral outcomes,

thereby enhancing business-to-business relationships. Thus, the design of social capital and partnership models should revolve around developing relationship value, depicted in the model through the green loop structure. This green loop serves as the cornerstone for fostering a community’s social capital, which is instrumental in sustainably supporting smallholder coffee cultivation success in Lampung. It is essential to develop the social capital in this partnership as this application increases the financial resource for maintaining the partnership (Dhillon 2009).

The causal loop diagram (CLD) shown in Figure 5 illustrates the model for the interplay among various components within the coffee cultivation partnership system in Lampung. These components include government programs (depicted by the orange loop), millennial farmers and farming communities like Kopista (represented by the green loop), service provider activities (encompassing NGOs, collectors, suppliers, processors, research institutions, and universities) (indicated by the blue loop), and the role of organization funds (illustrated by the red loop). These loops simulate the dynamics of partnership endeavors aimed at enhancing the productivity and quality of smallholder coffee in Lampung. It means that the issue of contract farming for coffee could be beneficial for farmers due to the impact of access to inputs, services, and market on the sustainable development goals in reducing gender disparities (Machio and Meemken 2023). This same model can be applied in the cases of contract farming that improves the profit and welfare of smallholders (Narayanan 2014) and building wealth for wealthier farmers (Ton et al. 2018). An agricultural production contract is deemed as an incomplete contract, with simplifies the agreement of best efforts and does not fully specify actions that prohibit a breach of contract, prevent inefficiencies, or call for legal enforcements (Besanko and Wu 2013). The firm takes the role of the farmer community leader, research provider, and input/financing provider so as to fill the need gap of the farmers and to garner the trust of the farmers in engaging in a relationship. Relationship values ensure sustainable interactions; particularly, agricultural contracts aim to improve the welfare of smallholder coffee farmers and benefit investors, which translates to household income improvement. It could be utilized in the social capital model as the basic value added in the actual implementation.

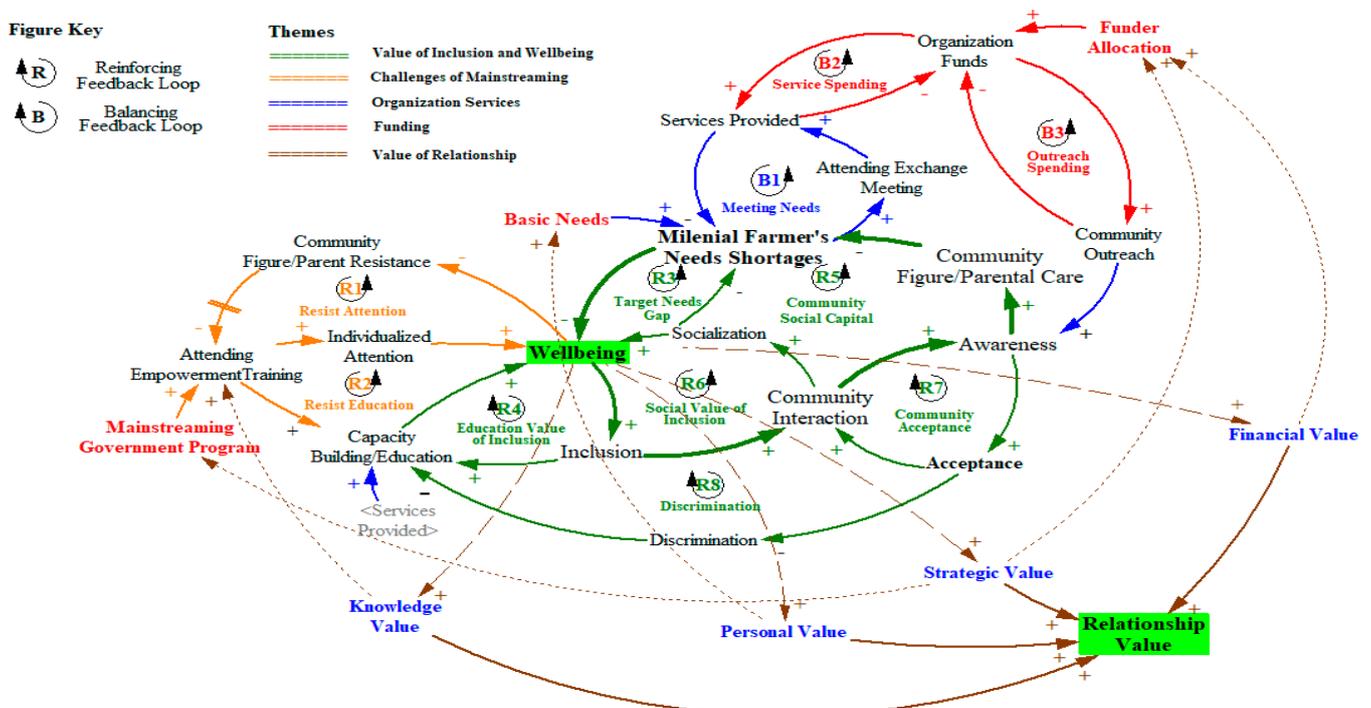


Figure 5. Model for partnering in coffee cultivation.

Figure 6 produces the simulation for partnership development of the smallholder cultivation through the impact of trust, successful experience recall, and collaborative ventures, respectively. Inclusion and well-being are fostered through interaction loops R3, R4, R5, R6, R7, and R8. In Loop R3, an increase in productivity leads to enhanced welfare, bolstering confidence in sharing experiences and engaging various stakeholders, thus enhancing the capacity and capability of young farmers and ultimately improving crop yields. The success of coffee cultivation partnerships hinges on reinforcing Loop R5 and fostering community social capital. Loop R5 serves as the primary mechanism for developing social capital within the coffee farming community. Support from community figures or elders for enhancing coffee production reduces obstacles/resistance faced by young farmers, including filling the shortages/need gap, and adopting new methods in community coffee cultivation practices, such as replanting.

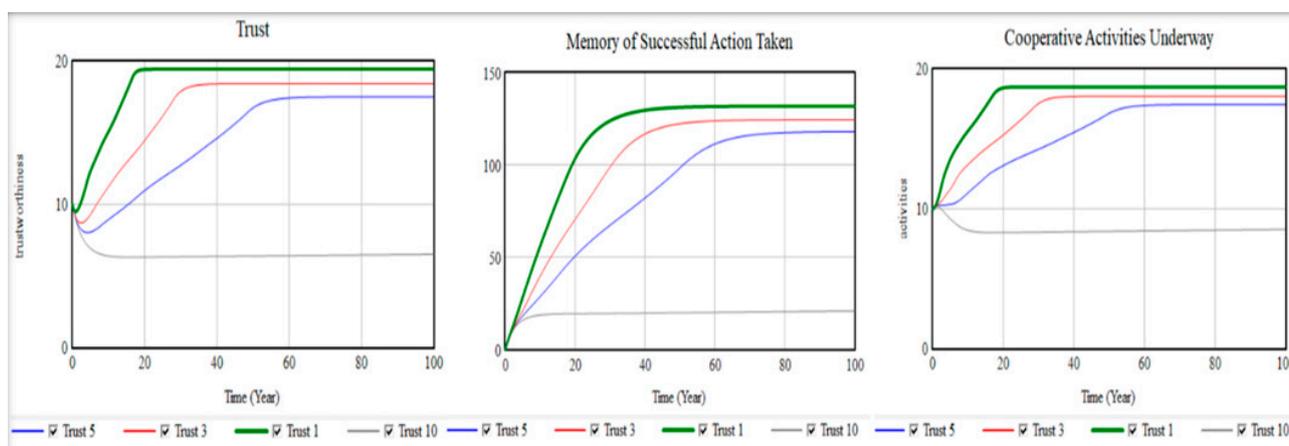


Figure 6. Simulation of the impact of trust, successful experience recall, and collaborative ventures.

The positive impact of replanting on the economy has been reported, namely, the economic improvement of smallholders' livelihood and compliance with sustainable development goals (Syarfi et al. 2019; Purba 2019). The positive impact of community figures or elderly farmers on programs has also been confirmed by several studies, leading to the improvements in smallholders' production and innovation (Conway et al. 2022; Ngeywo et al. 2015; Wellard et al. 2013). Parental/community figures have a huge impact on the success of the adoption of a new method, and they also act as endorsers or community leaders. Successful farmers, who are often regarded as community figures, can expedite the spreading of new methods, as farmers tend to imitate leaders and successful methods and aspire to be regarded/associated with successful figures. Figure 7 reveals the advantages and disadvantages of social capital, respectively. Loops R3, R4, R6, R7, and R8 contribute to the reinforcement of Loop R5, thereby enhancing well-being. The mainstream challenges refer to government programs or other competing programs; if they are accurately targeted, they will gain acceptance from community leaders (loop R1) and be effectively implemented in the field to enhance farmer capacity (loop R2), thereby fostering increased welfare. However, if a program proves detrimental to farmers, it will likely be abandoned and disregarded. Organization services, comprising support from universities, experts, NGOs, and other farming communities, can assist millennial farmers in overcoming obstacles if delivered in a manner that is acceptable, applicable, and precisely targeted (loop B1). Financial support, facilitated through banking or investment funding according to contract farming, encompasses both direct support for coffee cultivation-related expenses (such as land preparation, maintenance, fertilization, and post-harvest activities) depicted by the B2 loop, as well as funding for the development of marketing networks, transportation, and other activities beyond the scope that facilitates the successful sale of coffee at favorable prices (loop B3). The value of relationship embodies the essence of cooperation across all levels, emphasizing that relationships should not solely revolve around material gain but

should prioritize the quality of the relationship itself (relationship value), as depicted by the brown loop. The company’s process for providing and strengthening the ecosystem value will advocate advantages more than mere commercial purposes, especially for impact for the community. The “value get, value give” of relationships and engagement (Itani et al. 2019) must be considered as one of the main components of social partnership development in the case of the Kopista community.

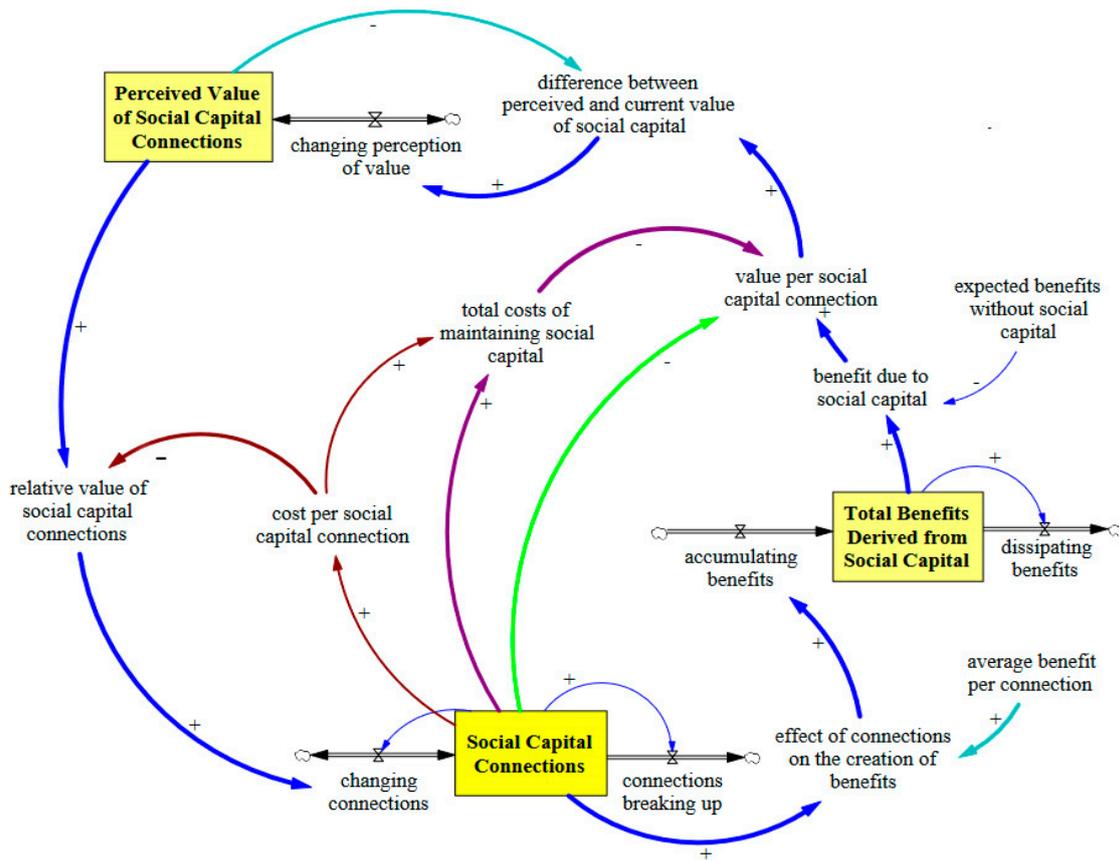


Figure 7. Framework for assessing the advantages and disadvantages of social capital. Source: Dudley (2004).

From reinforcing Loop R5, community social capital, depicted in Figure 4, a more intricate model was devised to analyze policies and strategies aimed at bolstering the social capital of farming communities. This social capital serves as a valuable asset in supporting endeavors to enhance the productivity and quality of smallholder coffee. The social capital model illustrates how trust and cooperation can be cultivated, with reciprocal reinforcement between trust, cooperation, and social capital—a formidable strength (Dudley 2004). Through simulation, it becomes evident how social capital fosters cooperative activities and how successful collaborations contribute to building trust. The simulation outcomes, showcasing scenarios where trust can be established within 1 year, 3 years, 5 years, and 10 years, are depicted in Figure 8. This aligns with real-world conditions; if trust within the coffee farming community is not swiftly attained or requires an extended period, there is a risk that proposed cultivation programs may fail to materialize. In this simulation, it was assumed that there was no impact from social capital connection on initiating cooperative activities (effect = 1).

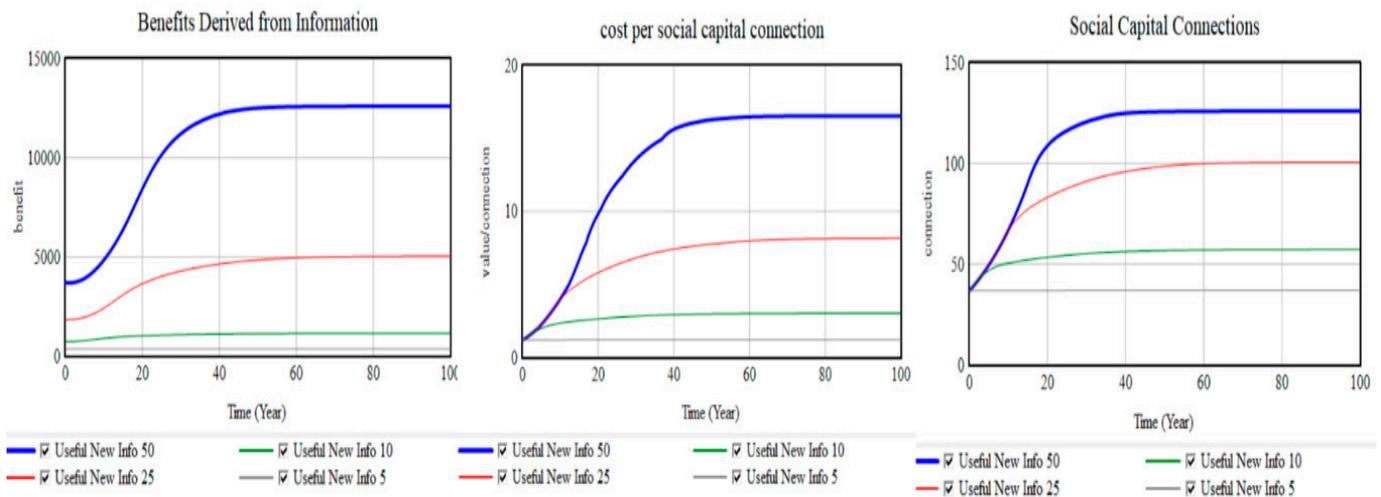


Figure 8. Simulation outcomes of social capital’s advantages and disadvantages.

4. Discussion

Incomplete investment contracts can lead to potential problems such as reduced investment, quality degradation, inefficiency due to deadweight loss, and moral hazard (Hart 2017). By strengthening social capital, the challenges posed by the initially incomplete contract approach can be reduced. Incomplete contracts often involve farmers, with or without formal agreements, similar to old plantation investors who rely on users of plantation products. Existing assets, such as coffee plantations, serve as a source of annual income, but farmers do not have the capital to re-use the assets. Therefore, the provision of extension workers to assist farmer groups in achieving production targets, dissemination of information on changes in pruning and fertilization methods, and the availability of non-subsidized fertilizers at the farmer level are key activities that the government can undertake. These efforts aim to enable selected farmers to leverage social capital in a mutually beneficial supply chain to increase efficiency in the global value chain (GVC).

Social capital facilitates a smoother collaboration among individuals, leading to mutual benefits. Ultimately, it is anticipated that these benefits will further reinforce social capital connections. Enhanced trust, in turn, increases the likelihood of successful collaborative ventures and fosters sustainable partnerships. This aligns with the previously discussed concept of relationship value. Field observations indicate that farmers often opt to sell their products to collectors who provide loans along with various conveniences and comforts, even if the price offered for coffee is slightly lower. This reinforcement likely occurs not solely due to the direct benefits provided but also because the perceived value of these benefits is intertwined with social capital. As depicted in Figure 6, the value of benefits dictates the perceived value in social capital, which changes gradually, either increasing (forming connections) or diminishing (breaking connections). The perceived value of social capital is on the rise, which can result in increased benefits (accumulating benefits), thereby enhancing the overall benefits derived from that social capital (total benefits derived from social capital). It is plausible to assume that the value of each unit of social capital is equal to the benefits derived from social capital minus the costs (value per social capital connection). The simulation outcomes, featuring scenarios of useful new info values varying in the resulting benefits and costs, are illustrated in Figure 9. Benefits derived from information refer to the current advantages gained from useful information. Social capital connections represent the relationships among individuals within a “community”, often quantified in terms of the number of connections per person.

Based on field observations and interviews with farmers, it was noted that mentoring initiatives conducted by stakeholders, including government entities, financial institutions, investors, universities, community leaders, experts, extension workers, and other relevant parties, did not lead to enhanced productivity and quality in coffee cultivation. Instead, they often proved to be counterproductive, particularly on smallholder coffee farms. In the context of the global value chain (GVC), social capital has been identified as a means to reduce transaction costs and streamline the management of various institutions involved in contractual agreements (Trienekens 2011). Consequently, the model depicted in Figure 4 was expanded to include the structural influence of mentoring projects, spanning a five-year period from year 25 to year 30. The updated model, incorporating the mentoring structure, is presented in Figure 5. Through this model, the impact on the value of social capital (social capital connection) is simulated under different scenarios: absence of mentoring (Assistance OFF), profitable mentoring (Assistance ON+), detrimental mentoring (Assistance ON-), and a combination of profitable and detrimental mentoring (Assistance ON). The mentoring project is delineated in Figure 9, simulated to span five years from the 25th to the 30th year. The influence of this mentoring project on the social capital value within the coffee farming community can be observed through the simulation outcomes depicted in Figure 11.

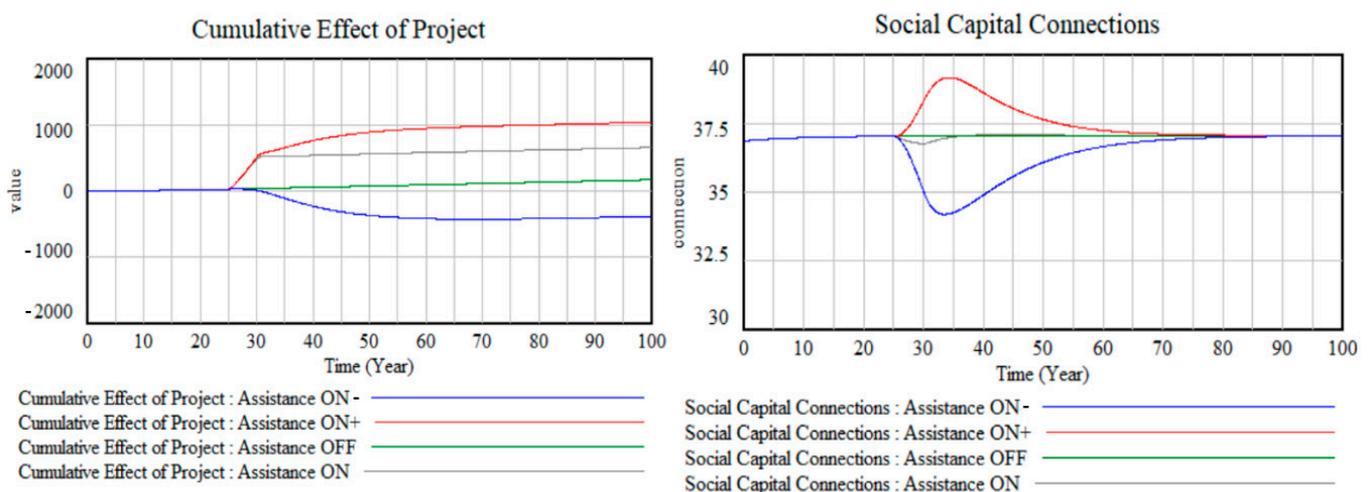


Figure 11. Simulation analyzing the impact of mentoring.

The mentoring program was simulated to span five years, from the 25th to the 30th year. It was revealed that if the program failed to meet expectations, there would be a risk of eroding the social capital that had been cultivated, as indicated by the blue curve. Recovering from this setback would take approximately 30 years (from the 30th to the 60th year) to revert to the original state—a scenario commonly observed in real-life situations; once smallholders feel deceived, rebuilding trust becomes challenging. However, if the mentoring project proves beneficial, it can enhance the value of the red curve (representing the number of connections). The gray curve demonstrates that if a detrimental mentoring project occurs, it can swiftly be rectified with a profitable mentoring initiative because it helps to mitigate the impact on the value of social capital. The option of e-mentoring could be an alternative, providing greater opportunities in knowledge transfer between actors who are involved (Rowland 2012). This observation resonates with experiences in the field, particularly regarding government-led mentoring programs, which often prove detrimental due to activities being bound by standard operating procedures (SOPs) that are not adapted to field conditions. Conversely, through active socialization efforts led by already successful leaders who share experiences grounded in reality, enthusiasm and the value of social capital among members of Kopista community can be maintained (as indicated by the ash curve). Takemura et al. (2014) discovered that social capital in local communities is closely linked to the communication skills of officers and the harmonious relationships between colleagues, underscoring the pivotal role of social capital in smallholder coffee

cultivation. From this simulation, we gain insights into the policies and strategies that need to be considered. It underscores the importance of ensuring that mentoring programs are genuinely tailored to field conditions and capable of delivering expected benefits. On the other hand, social partnership issues must also focus on the organizers to manage conflicts in partnerships (van Hille et al. 2019). Therefore, the success of implementing this partnership depends on the fulfillment of this aspect. Moreover, other aspects like dynamic capabilities and innovation can also be a concern as these are key elements that contribute to sustainability (Desiana et al. 2022).

Enhanced coffee productivity will increase well-being, leading to increased inclusion and community interaction. This reciprocal process enhances the participation of millennial farmers in identifying and overcoming obstacles in the learning process. Intensified interactions within the farming community, such as Kopista, facilitate the sharing of successful coffee cultivation experiences, thereby raising awareness among other farmers and community leaders or elders. Evidence shows that village heads have encouraged their members to adopt the coffee cultivation methods successfully implemented by Kopista members. Young farmers proactively buy suitable fertilizer and no longer rely on scarce subsidized fertilizers, which demonstrates their understanding of timely, adequate, and properly composed fertilizer applications for high productivity. Furthermore, it must be supported by technology adoption like artificial intelligence, robust machinery, wireless sensor networks, cloud computing, IoT, digital quality management, and advanced statistical process control from coffee farmers due to the positive effect on coffee productivity (Contreras-Medina et al. 2020; Kittichotsawat et al. 2021; Perdomo et al. 2023).

In particular, Kopista relies on donor funding and self-support and eagerly garners attention from fellow farmers using conventional methods. This stems from the social value attributed to Kopista, facilitated by camaraderie among farmers, a willingness to collaborate, and a steadfast commitment to learning about coffee cultivation. However, this endeavor necessitates backing from community leaders, expediting trials incorporating various innovations akin to those implemented in other nations. Conversely, it is crucial to sustain interactions between Kopista and stakeholders to yield numerous advantages. These include enhancing buyers' or exporters' perceptions of long-term benefits, alleviating negative concerns regarding credit repayment and crop offtake, fostering transparency in financial affairs, securing flexibility and cost advantages over competitors, and cultivating and preserving relationships that serve as the foundation for gaining a competitive edge. To consider this issue, the establishment of a role model could be a solution for farmers to increase productivity, as mentoring is often sourced from "strong tie" relationships (Bosma et al. 2012). The issue of an intermediary also implicates the further consideration for reducing the excessive intermediation—middleman—which means that the complexity of a supply chain could be the focus of policymakers as smallholders do not receive compensations from selling (Quayson et al. 2020). The issue must be considered by firms to increase their partnership development. Previous findings by Hakim et al. (2020) showed that the development of a supply chain could enhance the value of business actors, especially for smallholders and firms. Hence, it can be a solution for agricultural firms to establish the quality of long-term partnership development in contract farming.

5. Conclusions

This study aimed to formulate a model for social capital and partnerships to upgrade smallholder coffee cultivation, which is also applicable in contract farming models. Through the system dynamics model, we observed that increasing coffee production could lead to consistent profitability, as indicated by a trend analysis. Additionally, the design of contract farming can facilitate sales activities between farmers and collectors, fostering an ecosystem for safe financial transactions. As, generally, contract farming is an incomplete contract, it is imperative to invest in strong relationships characterized by mutual trust and respect and to uphold the relationship value concept through the persistent formation of social capital. Younger farmers from smallholder families could adopt and drive innovation to

enhance productivity and quality but only with support from relevant stakeholders or from the inherent strength of social capital within the farming community. Societies with robust social capital typically experience improved socioeconomic conditions in the long run. From a developmental standpoint, exploring methods to boost social capital for enhanced economic and social well-being is pertinent. There are several managerial implications, including the following:

1. Supporting millennial farmers in fortifying social capital to foster innovation and productivity enhancements.
2. Emphasizing the development of models for social capital and partnerships that integrate relational values like trust and mutual respect, ensuring continuity, stability, and comfort in business collaborations.
3. Examining the ideal contract farming model to bolster social capital within the millennial farming community, thereby stimulating innovation and productivity in coffee cultivation.

The presented model facilitates a focused examination of specific elements constituting the broader concept of social capital. It serves as a tool for dialogue among stakeholders and an analytical instrument in bolstering the success of coffee cultivation, thereby enhancing productivity and quality in Lampung.

Last but not least, this study has some limitations. First, the only location of the study was in Lampung; hence, a future study could observe other production centers in Indonesia. Second, the determinant of social capital is also an important factor to be explored in a future study, driven by the successful implementation of this concept. Third, a future study could also compare the Kopista method to other techniques, thus producing more general findings related to partnership development in this model.

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