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The mediated partnership model for sustainable coffee production: experiences from Indonesia

RESEARCH ARTICLE

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Abstract

This study demonstrates how a bottom-up agricultural development project, rooted in the practices of the smallholders and their (local) networks, might relate to global sustainability standards and certification schemes. Such an initiative starts with the economic interests of the farmers and may result in sustainability certification afterwards. An approach was investigated to implement more sustainable coffee production at the local level in Indonesia – the Mediated Partnership Model (Motramed). We conceptualize this model, initiated by an Indonesian research institute, as a form of collaborative governance to create a new, more sustainable management practice. We particularly focus on four critical mechanisms in the partnering process: defining a common problem, building trust, exploring collaborative advantages, and establishing a leadership role. Empirical research was conducted in three regions: Bali, Flores, and Java. In conclusion, we define several critical factors that need to be addressed to further develop similar bottom-up partnerships for more varied agricultural commodities.

Keywords: mediated partnership, sustainable coffee, collaborative governance, production network, Indonesia
JEL code: O130, Q110, Q130, Q180

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1. Introduction

A more sustainable production of agricultural commodities is generally seen as being in the interest of the livelihood of farmers in the South (Bitzer *et al.*, 2008; Giovannucci and Koekoek, 2003). This interest is particularly reflected in the steady growth of sustainability standards and certification schemes initiated by Northern-based business and Non-Governmental Organizations (NGOs) or partnerships between them (Bartley, 2010; Bitzer and Glasbergen, 2015; Fuchs *et al.*, 2011). As external initiatives from the top of the value chain, these schemes are channeled downwards to the bottom of the chain as new conditions for production (Giovannucci and Ponte, 2005). At the bottom of the chain, the producers need to make sense of the standards, decide on how to respond, and handle them given local socioeconomic circumstances and preferences (see also Bitzer *et al.*, 2013; Hatanaka, 2010; Marin-Burgos *et al.*, 2015; Schouten *et al.*, 2016; Vellema *et al.*, 2013). Participation in these market-based initiatives is voluntary, but it has gradually become a prerequisite for access to parts of the global market. However, it is still doubtful whether Northern-based certification is the most effective way to improve farmers' livelihood (Abdulsamad *et al.*, 2015; Van Rijsbergen *et al.*, 2016).

This study shows how bottom-up agricultural development projects, rooted in the practices of the smallholders and their (local) networks, might relate to these external certification inputs from the North. In this study, we analyze such a project: Motramed (in English: mediated partnership model), which is different from the former initiatives on coffee production, as the certification standards are not a starting point for a change in the practices of coffee producers, but they may result from practices that are changed with the intention to improve the living conditions of the farmers first. Motramed was initiated in 2001 by Indonesian Coffee and Cocoa Research Institute (ICCRI). ICCRI is a research center that specializes in the cultivation and processing techniques of coffee and cocoa¹.

Motramed is based on the following considerations (Hartatri and De Rosari, 2011; Mawardi *et al.*, 2006; Soemarno *et al.*, 2009; Virgiano, 2012). The first consideration is the idea that the farmers' income should be increased by improving coffee quality and shortening the marketing channel. The problems of low quality and a long supply chain are seen as interconnected, and therefore, improving both is regarded as an inseparable formula for improving the livelihood of farmers.

Second, coffee quality should be improved through technology transfer. ICCRI has the responsibility of disseminating technology to the farmers. In Motramed, ICCRI introduces the procedure of wet processing (WP) of coffee cherries, which meets international standards. By following WP, farmers will gain added value from processed coffee that they do not gain by directly selling coffee without advanced processing (Mawardi *et al.*, 2006).

Third, the marketing channel should be simplified by building partnerships between farmers and exporters. The long supply chain between farmers and exporters has resulted in an inefficient marketing channel. Because of this long chain, there is only small value for each player, of which farmers get the least value due to their weak bargaining position (Astuti *et al.*, 2015; Hartatri, 2016; Neilson, 2008). Therefore, in Motramed, directly connecting farmers and exporters results in a shorter coffee supply chain. Thus, farmers will receive a higher price than they would when they sell to local traders or middlemen.

Although these considerations focus on economic improvement, Motramed also addresses social and environmental aspects in order to comply with sustainability principles. Motramed encourages farmers to work in collectivity by establishing farmer organizations. Through these organizations, it is easier to coordinate the activities of coffee processing, and collective marketing will create a stronger bargaining

¹ ICCRI was established in 1911 and is located in Jember, East Java. Structurally, ICCRI is still part of the Indonesian government, under coordination by the Ministry of Agriculture, the Ministry of Research, Technology and Higher Education, and the Ministry of State-Owned Enterprises. However, in terms of its operational budget, ICCRI is a self-funding institution. ICCRI has a wide network, which was established from numerous collaborations and research projects with stakeholders, ranging from international to local organizations, research centers, companies and governments.

position for farmers (Mawardi *et al.*, 2006). Motramed promotes shade tree applications and applies organic farming (Mawardi, 2009a). However, in the partnering process, economic aspects receive priority, as they are considered an incentive to encourage farmers and other actors to participate.

This study aims to contribute to our knowledge of the intricacies of implementing such a bottom-up partnership model to induce more sustainable production at the local level. We are particularly interested in the factors that are conducive and limit change. From our analysis, we aim to draw on lessons from similar initiatives to improve the economic position of farmers in the sustainable production of agricultural commodities at the local level. We first introduce an analytical framework. Next, we explain our research methods. In the subsequent section, we analyze a pilot project in Bali that developed into a model of change, followed by an analysis of two other Motramed cases. In the conclusion, we reflect on these findings.

2. Analytical framework

Herein, we conceptualize Motramed as a form of collaborative governance to create a new, more sustainable management practice. The term ‘collaborative governance’ refers to the interactive process through which the changes in the production network will be realized. In the Motramed case, the actors involved in coffee production and trade need to create a new mutually beneficial relationship. In this process, they need to develop a common definition of the problems, a shared vision of the future, and commitments to activities that need to be employed. Van Tulder and Pfisterer (2013) refer to this kind of process as the creation of a ‘partnering space.’ A partnering space is a framework within which the positions and roles of actors from different societal sectors are considered in a collaborative arrangement. Through their interactions, the actors are assumed to be able to identify opportunities for aligned actions and build a synergistic relationship. In such a relationship, the actors realize more through cooperation than they are able to realize on their own. The concept of partnering space resonates with the view of Austin and Seitanidi (2012), who declared that creating value is the central justification for multi-actor partnering. They define collaborative value as transitory, and the enduring benefits are relative to the costs that are generated due to the interactions of the collaborators and those accrued by organizations, individuals, and society.

Based on these studies, we can analytically clarify the process and mechanisms that are instrumental and critical to Motramed as a partnering process. Most generally, we assume that this process includes generating the ability, desirability, and willingness to develop a new production network.

First, the actors involved in the production network must recognize a common problem. As Schruijer (1999: 2) observed, collaboration can only be created when a shared problem definition is developed. Regarding Motramed, there must be recognition of inefficient coffee production that is caused by existing production methods and connections to the market. A critical mechanism to create an accepted problem definition would be the transfer of knowledge and expertise regarding more promising production networks. According to Loconto (2016), mobilizing knowledge is fundamental to better linking small farmers with markets in developing countries and creating transitions to a more sustainable production network. Such knowledge transfer includes information on what to do, how to do it, when to do it, and why.

Second, the actors need to recognize their interdependent relations and the need for collaboration. Regarding Motramed, a critical mechanism is fostering trust among actors and commitment to cooperate in the change process. Trust particularly encapsulates an emotional argument, which is the reduction of feelings of risk and vulnerability in the partnering process. Trust is regarded as a significant component of collaboration in networks (Glasbergen, 2011). Trust diminishes the risk of opportunistic behavior in a relationship, increases the probability that actors will invest their resources and is supposed to stimulate learning and the exchange of information and knowledge (Klijn *et al.*, 2010). In a trader-supplier relationship, trust includes recognition of the competence of the supplier to deliver the required quality and quantity of the product (Saad *et al.*, 1999: 43). Everlasting trust for all is not instantaneously created. Building trust is a social process that needs

to be managed, maintained and supported by positive experiences (Barroso-Méndez *et al.*, 2016; Brewer and Haylarr, 2005; Glasbergen, 2011).

Third, the actors in the partnership need to recognize the advantages of cooperation, and these advantages should be regarded as long-lasting. The central mechanism should be the creation of collaborative advantage. Regarding Motramed, potential actors need to find advantages that they cannot achieve without the partnership (Brinkerhoff, 2002; Emerson *et al.*, 2011). According to Glasbergen (2011), collaborative advantages must relate to resources, skills, and a balance between benefits and costs among partners. In this study, collaborative advantages will be analyzed by looking at the actors' interests in coffee production and how they distribute responsibilities among themselves in accordance to their capacity and resources.

Fourth, the functioning of an intermediary entity that fulfills a leadership role in the network is important. The leadership role denotes the capacity to bring the different actors together around the issue and to facilitate communication to take the partnership forward. Leadership is not something that comes naturally. As Huxham and Vangen (2000) observed, leadership is often thwarted by dilemmas and difficulties. Therefore, it requires abundant energy, skill, and personal attention to chaperone the cause and drive a partnering process forward. Leadership intervention tasks include appreciation or envisioning, convening, problem structuring, designing the process, reflective intervention, conflict handling, brokering and institutional entrepreneurship (Gray, 2007). Because participation in Motramed is voluntary, the leadership role occurs in a non-hierarchical context, which implies that it is mainly based on specific competences that are valued by the other actors.

The process of employing these mechanisms should be seen as an iterative and cyclical process rather than as a linear process. It is an empirical question as to how these mechanisms unfold in practice. Here, we take them as a 'lens' to study Motramed and the lessons that can be learned.

3. Research methods

The current study applies a qualitative research approach to understand the evolvement of Motramed as a local partnership to induce more sustainable production of Arabica coffee at the producer level. We employed three main research methods.

First, semi-structured interviews were used to gain a comprehensive view of the actors in the process of collaboration to develop a new management practice through Motramed. The informants were chosen through purposive sampling. We first interviewed the initiator of Motramed, i.e. ICCRI's researchers. They led us to the key informants in each region, who were interviewed by snowball sampling in accordance with the need for data in the field (Table 1).

The semi-structured interviews were helpful to detect the informants' framing of coffee production problems. We also crosschecked the information that we had previously obtained from the informants. We sometimes

Table 1. Composition of informants from the three locations.

| No. | Institutions | Number of informants |
|-----|--|----------------------|
| 1. | Indonesian Coffee and Cocoa Research Institute (ICCRI) | 2 |
| 2. | Farmer groups and cooperatives | 12 |
| 3. | The Estate Crops Agency (Dinas Perkebunan) | 5 |
| 4. | Exporter | 3 |
| 5. | Bank | 2 |
| 6. | NGO and community organizations related to coffee | 4 |
| 7. | Perhutani (State-owned enterprise on state forestry) | 1 |
| | Total | 29 |

conducted interviews more than once so that the informants could talk freely without interruption from other informants.

Second, we attended three meetings related to Motramed: two annual member meetings of cooperatives in Bajawa and Bondowoso and a coffee stakeholders meeting in Bondowoso. We collected information on the interaction patterns among the actors in the partnering process, particularly focusing on trust and commitment building and the role of leadership.

Third, we analyzed documents related to Motramed both from governmental bodies and ICCRI, such as the Memorandum of Understanding (MoU) in some regions, published reports of the implementation of Motramed in some regions, and the requirements books of Geographical Indications. We also analyzed statistical data for coffee production, productivity, land area and coffee prices to gather data regarding the changes that resulted from Motramed.

From 7 to 10 November 2015, we went to the Bajawa and Manggarai regions in Flores to conduct preliminary research with the aim of gaining a clearer picture of Motramed before finalizing the research framework. Then, from the end of December 2015 to March 2016, we completed our research in three different regions in Indonesia. We selected these regions based on specific features and the progress of Motramed. The first region is Kintamani, Bali, which was chosen as a pilot project that began in 2001. The second region is Bajawa, Flores, which applied Motramed in 2004. The third region is Bondowoso, East Java, which applied Motramed in 2011 with more stakeholders involved since the initiation of Motramed.

4. Case 1: the pilot project of the partnering process in Kintamani, Bali

In this section, we will analyze the partnering process based on the four mechanisms introduced in the previous section. The period of analysis covers the beginning of the partnership in 2001 until 2015. Originally, Motramed was not a model with a fixed design, but it developed over time. The origin was closely related to the application of a Geographical Indication (GI) protection system². A pilot project was initiated by ICCRI in cooperation with CIRAD (a French agricultural research organization) and was supported by the Provincial Estate Crops Agency of Bali (*Disbun Bali*). Kintamani, Bali, was chosen as the pilot project location because of its popularity as an Arabica coffee producer.

4.1 Common problem definition

Before the pilot project started, ICCRI had conducted a baseline study regarding the potential of Arabica coffee in Kintamani. This study showed that the price of Arabica coffee in Kintamani was lower than that of Robusta coffee, i.e. 5,200 IDR/kg for Arabica and 5,400 IDR/kg (USD 0.48) for Robusta (interview with the senior researcher of ICCRI), although Arabica coffee is generally regarded as being of higher quality. Consequently, farmers had lost their motivation to maintain their coffee plantations and preferred to change to tangerine trees, which offered more profit. This massive conversion became an environmental threat for Bali because Kintamani is a highland area and coffee plants have a function in preserving groundwater. The study concluded that the low prices were caused by the low quality and long supply chain at the production level. These basic problems were not only problems for farmers but also a concern of the local government. Therefore, it was necessary to attract more farmers and improve their coffee plantations through the creation of a price incentive. ICCRI concluded that this goal could be realized by building a partnership among the actors involved in coffee production. ICCRI played a role as a provider of knowledge regarding the improvement of coffee quality and disseminated this knowledge to the staff of *Disbun Bali* and farmers.

² This system is part of Law No. 15, year 2001, regarding trademarks. GI is a sign that indicates the origin of products. GI is important because geographical factors, including human and natural factors, result in specific characteristics and qualities. GI was created as a response against the misuse of geographical names by Japanese and Dutch companies (Mawardi, 2009a).

4.2 Building trust

It was not easy to convince farmers to participate in this partnership. At first, ICCRI and the staff of *Disbun Bali* purposively selected four potential *Subak Abian* (SA)³ – Kertawaringin, Triguna Karya, Bhaktiyasa and Ulian Murn – that showed a strong willingness to try the new technique of WP introduced by ICCRI. The staff of *Disbun Bali* explained how they tried to convince farmers to participate in the partnership:

Together with ICCRI, we worked on improving the understanding of farmers to change their habits from strip picking, which dominates green and yellow cherries, to fully red picking. We presented economic calculations to them showing that processing coffee will result in higher prices than directly selling coffee to local traders.

ICCRI also showed farmers how to better manage their coffee plantations. Farmers were not only persuaded by the economic advantages; the health aspects of the production process, e.g. a more hygienic process, also played a role. With more advanced knowledge, the farmers valued coffee more highly than they did before, and they even started to consume this high quality coffee themselves. Meanwhile, the government also supported farmers by establishing a processing unit for each SA and providing machines to these units. During the harvest period, ICCRI researchers and the staff of *Disbun Bali* intensively assisted farmers to ensure that they would comply with the standard operating procedures (SOP).

The next step was connecting farmers to exporters. Previously, farmers and exporters did not interact because exporters preferred to buy coffee beans from their suppliers. Many exporters were reluctant to directly interact with farmers. In their view, it was risky for their business because of the low quality of coffee and because farmers were reportedly unable to keep their commitment to an agreement (according to interviews with the exporter). Farmers were also anxious about trading with exporters because exporters might be deceitful in their pricing. Thus, their relationship was undermined by doubt and misunderstanding. However, the presence of ICCRI and the staff of *Disbun Bali* sufficiently assured both farmers and exporters of the value of initiating interaction between farmers and exporters.

ICCRI succeeded in inviting an exporter from France in 2002. However, this exporter did not buy coffee from the farmers because the quality did not yet meet the standards, as the farmers were still in the early process of learning WP. Later, in 2003, with CIRAD's network, PT Indo CafCo under the ECOM Group was willing to participate. Despite concerns about dealing with farmers, the Director of PT Indo CafCo was very interested in the Kintamani Coffee brand. ICCRI's intensive monitoring of farmers convinced him to take part in this partnership. Thus, PT Indo CafCo's trust was strongly influenced by the credibility of ICCRI as the mediator and the active role of *Disbun Bali* in supporting the farmers.

4.3 Exploring collaborative advantage

In partnering processes, all actors need to find long-lasting advantages that they cannot achieve without the partnership. These collaborative advantages can be analyzed by examining their interests and the distribution of responsibilities.

ICCRI, as the mediator in this partnership, had an interest in disseminating its research results to the community as part of their obligations as a research center. Their research results consisted of not only knowledge and skills regarding coffee but also agricultural products, ranging from seedlings to machineries. ICCRI observed an opportunity to expand its network in the coffee sector.

³ *Subak Abian* (SA) is a traditional farmer organization that adheres to the Hindu philosophy of 'Tri Hita Karana', which translates as three causes of happiness that can be obtained when one has a good relationship with God, other people and the environment. SA is involved in not only agricultural activities but also religion and social activities.

The local government's interest was to improve the regional economy through coffee farming, which was regarded as a potential area that could be developed. With this interest, the local government also expected that the increase in farmers' welfare would lead to the growth of other sectors, such as education and health. However, the agency did not have the ability to achieve this alone. By cooperating with ICCRI, the local government could achieve its goals. The local government also helped ICCRI disseminate its knowledge and agricultural products. The support of the government consisted of providing machines (some of which were bought from ICCRI), tools, technical assistance, and loans for farmer groups.

Farmers had an interest in earning a higher income. They were highly motivated to participate in the partnership if there was a price incentive for their work. Previously, farmers did not have much price-setting power because of the low quality of their coffee. After applying the WP technique, farmers could produce green bean coffee grade 1 with a good taste profile, as tested in the CIRAD and ICCRI laboratories⁴. Better quality led to a better price at the farmer level (Figure 1).

Figure 1 shows that in 2001, before the quality improvement program of Motramed had begun, the coffee price in Bali at the farmer gate was three times lower than the world coffee price. However, in the next few years, the Bali coffee price gradually increased and had a small margin compared to the world coffee price because of its improved quality. In 2006, the Bali coffee price was higher than the world coffee price by approximately 7%, and farmers received a price premium. Although the discounted Bali coffee price fluctuated between -0.8% at the lowest and -30% at the highest from the world coffee price in 2002-2015⁵, it still showed a large improvement since the initiation of Motramed. The price fluctuation was strongly influenced by the world coffee price and the currency exchange rate. During the partnership with PT Indo CafCo as an exporter, farmers received almost the same price as the international price⁶.

The increase in coffee price attracted more SA to participate in the program. They believed that by complying with the SOP of WP, farmers could earn a higher income. In the first two years, ICCRI and *Disbun Bali* only focused on four SA until farmers could produce better quality coffee. Afterwards, four SA were added each year for training and support in coffee quality improvement (CGIP, 2007). Although many more SA showed interest in the partnership, they could not all receive this aid due to the limited budget of the government.

⁴ Additional results from the laboratory test of Kintamani Arabica coffee can be found in Mawardi (2009b).

⁵ A more elaborate explanation of this chart is presented in Supplementary Table S1.

⁶ The world coffee price in the chart uses the grade 1 price of the 'Other Milds' coffee category from International Coffee Organization (in which Indonesian Arabica coffee is part of Other Milds category), whereas the Bali coffee price is for unsorted beans at the farmer gate. If the farmer gate price is converted to grade 1, 10% needs to be added. Thus, the farmers were receiving a good price from PT Indo CafCo because they produced grade 1 Arabica coffee.

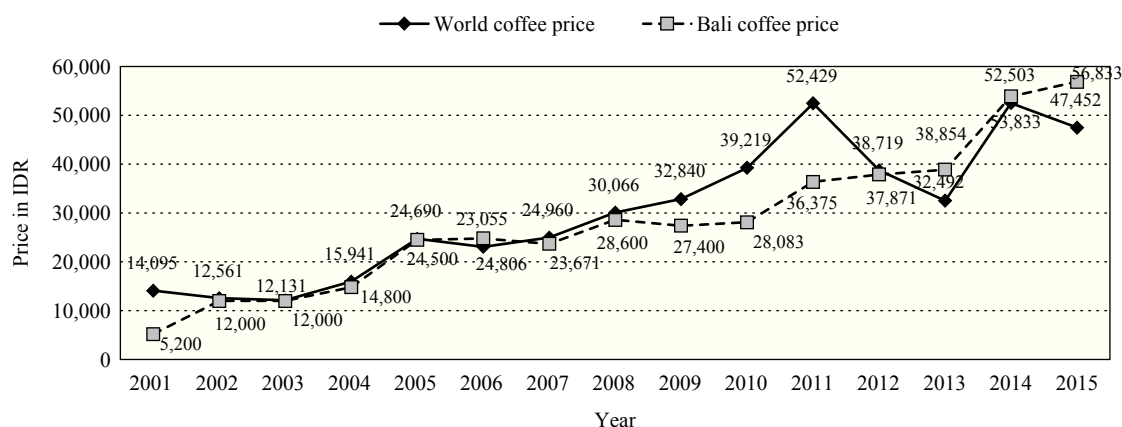


Figure 1. The price of Bali coffee compared with the world coffee price (adapted from Mawardi *et al.*, 2006; The Estate Crops Agency of Bali Province, 2015).

The exporter's interest was to obtain a sustainable coffee supply with good quality and quantity. With this partnership, PT Indo CafCo obtained an agreed quantity that met its quality standards and the expectations from their overseas buyers. During the partnership, PT Indo CafCo contributed by allocating an assistance fee to ICCRI, offering their staff to monitor the processing in the field, and providing processing machines. In addition, PT Indo CafCo made an advanced payment if farmers had difficulties obtaining capital to start coffee processing. These contributions showed that the exporter understood the farmers' interest in obtaining a price incentive for their work. Without easy access to capital and machines, it would be difficult for farmers to improve their coffee quality.

In 2008, Kintamani Bali Arabica Coffee was awarded a Geographical Indication certificate, which was the first GI certificate in Indonesia, based on the Community of Geographical Indication Protection (CGIP)⁷. Although the GI certificate is not a commercial certificate for trading, it ensured that Kintamani Arabica coffee is a regional asset protected by law. The GI certificate regulates the procedure of coffee production, processing, quality control, and marketing. This certificate added value to the Bali Kintamani Arabica coffee brand, as it became better known on national and international markets for its quality and unique taste. This certificate is an additional advantage of the partnership for all involved actors.

4.4 On the leadership role

Although there was no assigned leadership in this partnership, this role was taken by ICCRI. With its renowned reputation as an expert in coffee production and its understanding of the social, political and economic context within which production occurs, ICCRI could link the farmers, government and exporters and could facilitate communication among them. Leadership thus implied facilitating a partnering process based on the creation of consensus on a preferable future for all stakeholders in the coffee production process.

During the partnering process in Kintamani, several obstacles influenced the progress of the partnership. First, PT Indo CafCo decided to end its coffee trading in Bali after six years (2003-2009). Although their main reason was a change in internal policy caused by a change in director, it was also clear that the exporter no longer observed collaborative advantages that made it worthy to continue the partnership, as explained by a former staff member:

We closed our coffee trade in Bali in 2009 because the director resigned. The new director did not want to continue the partnership because it was complicated, and it did not give much profit or quantity. Another reason was that the company wanted to focus on its main area in Medan, Sumatera, which could produce a larger quantity. We may get a lot of profit through such a partnership, but it takes a long time to reach that level.

Second, after PT Indo CafCo left Bali, the local market became overly dynamic and competitive among buyers. Farmers preferred to sell their coffee to buyers with the highest offer. Consequently, farmers started to sell smaller quantities individually and this put the spirit of collectivity at risk. Meanwhile, ICCRI could not continue its work because there was no financial support from PT Indo CafCo or the local government⁸. As commented by a farmer representative:

⁷ CGIP, established in 2005, assisted in the process of obtaining a GI certificate, and it later played a role as supervisor of the quality of Bali Kintamani Arabica coffee. The members of CGIP include 61 SA (representing 3,201 households) and 6 local coffee processors (with WP technique), and the local governments, ICCRI, CIRAD and PT Indo CafCo, which are members of the advisory board (CGIP, 2007: 4).

⁸ Although ICCRI formally ended its leadership role in the partnership, it still maintains an informal relationship with farmers and local governments. For example, ICCRI still consults regarding coffee quality and the coffee market through mobile phone contacts with the farmers and *Disbun Bali*.

When PT Indo CafCo was still here, Kintamani coffee was a leading commodity. We won a national contest in coffee taste. Unfortunately, a few farmers now no longer follow the SOP because there is no guarantee from the buyers. We think that there is no company like PT Indo CafCo, which gave us advantages as long as we produced good quality coffee.

Third, farmers hesitated to continue the spirit of Motramed through the strategy of 'one-door marketing' developed by the provincial government of Bali. This strategy aimed to stabilize coffee prices, regulate supply and demand, maintain commitment to quality and control its distribution so that unfair competition could be avoided (according to an interview with the director of CGIP Cooperative). The government initiated the cooperative of CGIP, which was expected to bring back the spirit of collectivity among SA and become a representative of coffee farmers to sell Bali Kintamani Arabica Coffee. However, not all SA were willing to participate in collective marketing through the CGIP Cooperative, with one reason being that farmers were reluctant to pay fees to the cooperative, even though the members would ultimately benefit from the fees.

4.5 Evaluation

Previously, the farmers in this region were not well organized and were dependent on local collectors, and they sold unsorted, low-quality beans. The local government, i.e. *Disbun Bali*, did not have the knowledge to intervene. Motramed changed the old production network to a new one and created a fixed relationship between farmers and the exporter. The local government received advanced knowledge regarding coffee processing from ICCRI, and the governmental staff was able to train farmers. This partnering process was possible due to the leadership role of ICCRI and its close cooperation with the local government. After a decade of Motramed, the market in Bali is now more developed, produces better-quality coffee and is more dynamic. The positive side is that many buyers come to Bali to purchase good-quality coffee in smaller quantities than the exporter did. This creates competition among buyers, and farmers have more options to sell their coffee to the preferred buyer. However, this also has a negative side, as farmers tend to go back to an individualized system of trading. Farmers have gradually become more reluctant to participate in collective marketing through the CGIP Cooperative. A positive side effect is that the local government of Bali adopted this model and applied it to other commodities, such as cashew nuts and Robusta coffee, in other districts.

5. Intermezzo: the philosophy of Motramed

Based on the successful implementation of the pilot project in Kintamani, ICCRI conceptualized the Motramed partnering process into four stages, as shown in Figure 2. ICCRI also presented the model at the national level at the Ministry of Agriculture and at the national coffee symposium in August 2006.

Figure 2 shows three main actors in Motramed: farmer groups, coffee exporters and the mediator. In the first stage or pre-partnership, there are only relationships between the mediator and farmer groups and the mediator and exporters. Farmers and exporters do not have any relationship yet. The mediator explores the possibilities of developing a partnership. In the second stage, the mediator begins to connect farmer groups to exporters. The mediator transfers knowledge to farmers about quality improvement, while exporters can explore their advantages. In the third stage, the relation between farmer groups and the exporter is stronger. Here, the mediator plays a role as a consultant in the process. In the fourth stage, the independence stage, the mediator reduces its involvement and plays a role as a consultative actor.

The mediator plays a crucial role as a mobilizer of the other actors. The mediator should be a neutral actor who has credibility and is trusted by all actors involved in coffee production. The mediator should have expert knowledge on coffee and needs to be competent to create liaisons among the main actors in coffee production. In this model, the mediator is ICCRI, because the ICCRI has advanced agricultural technology related to coffee production and is a respected actor in the sector. Moreover, the mediator needs to fulfill several roles: conducting a baseline study to explore the possibilities of a partnership, finding exporters as a partner, building trust between farmers and exporters, providing training for farmers, monitoring the process

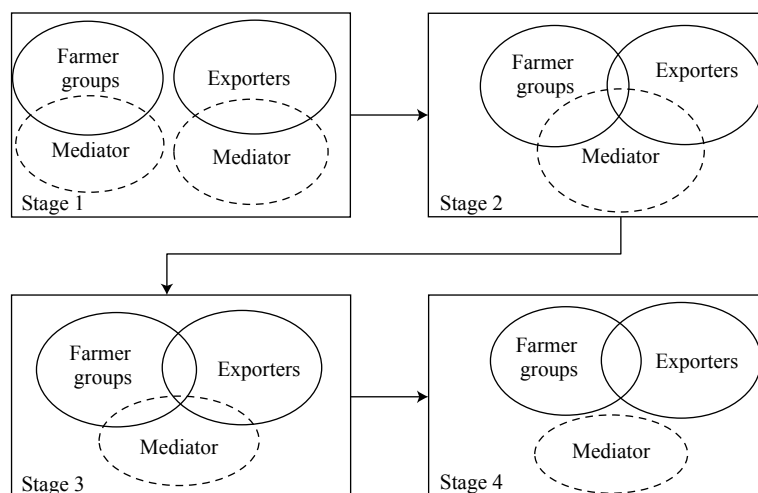


Figure 2. The implementation stages of Motramed (adapted from Mawardi *et al.*, 2006: 84).

of knowledge transfer, controlling coffee quality, and sustaining negotiations to achieve mutual agreement between farmers and exporters. In carrying out these roles, the mediator always coordinates with relevant governmental agencies.

Although it is not stated clearly in the model, ICCRI cannot perform this work without an active supporting role of local governments through their budget allocations, human resources, and facilities. Local governments, at either the provincial or district level, can be considered a client who, due to their limited capability, asks ICCRI to be their consultant in coffee development. Their involvement in Motramed is supposed to help them develop their regional economy. However, the level and form of involvement of local governments in Motramed may vary from one region to another.

6. Case 2: the operationalization of Motramed in Bajawa, Flores

Valuable lessons obtained from the Kintamani case improved the implementation of Motramed in Bajawa, Flores. Initially, the Provincial Estate Crops Agency of East Nusa Tenggara (ENT) in 2004 asked ICCRI to explore the possibility of implementing the model in some Arabica coffee regions on Flores Island, including Bajawa and Manggarai. In its feasibility study, ICCRI found similar problems to those in Kintamani. The old management practice in Bajawa was worse than that in Kintamani, as farmers did not have any knowledge of post-harvest and coffee processing, and this lack of knowledge resulted in a much lower coffee price than that in Bali. In Bajawa, District of Ngada, farmers only received approximately 1,100-1,500 IDR, or 0.15 USD/kg for Arabica coffee cherries⁹, which is four times less than the coffee price in Bali before the partnership was implemented. Farmers did not have any bargaining power because the quality was very low and the prices were set by local traders or collectors on the local market.

Only the District Estate Crops Agency of Ngada (*Disbun Ngada*) actively supported Motramed and officially started the partnership with ICCRI in 2005. The objective of *Disbun Ngada* was to improve coffee farmers' welfare and to protect Bajawa coffee as their regional asset¹⁰. *Disbun Ngada*, which was supported by the provincial government of ENT, provided two budget allocations: assistance for the operational costs of ICCRI and facilities for farmers, including assisting farmers in the process.

⁹ Based on interviews with the senior researcher of ICCRI and the staff of the District Estate Crops Agency of Ngada.

¹⁰ Previously, coffee from Bajawa was widely known as Ruteng coffee (a sub-district in Manggarai) because all the post-harvest processing was performed in Ruteng, and Bajawa was only a supplier of coffee cherries. Consequently, there was no economic advantage to process coffee in Bajawa (interview with the staff of *Disbun Ngada*).

We observed that the new management practice in Bajawa was much better organized than the one in Kintamani. Although the same technique of coffee processing used in Kintamani was applied in Bajawa, the network of farmer groups was stronger. Farmers received training regarding coffee quality, group dynamics and the economic system of togetherness to improve the organizational capacity of the farmer groups. In Kintamani, although ICCRI did not recognize the need for this training, improving farmers' organizational capacity resulted in the acquisition of a crucial asset. Bajawa farmers were culturally different because they were very active, open to change and eager to develop Arabica coffee.

As a start, two farmer groups that were willing to receive assistance and try something new were selected: Fa Masa and Suka Maju. Earlier, many farmers refused to participate because they did not want to become the subject of an experiment, as expressed by the staff of *Disbun Ngada*:

At the beginning of our work, we often heard from farmers that they did not need us, and they asked us to leave. However, we are grateful that we have indomitable leaders (i.e. ICCRI researchers and the head of *Disbun Ngada*) who encouraged us to continue to help farmers because of the farmers' ignorance on how to produce better coffee.

With the support and promise of ICCRI and the government, farmers were encouraged to continue the process. In fact, the farmer groups quickly improved the quality of their production. *Disbun Ngada* and ICCRI developed a processing unit¹¹ in each farmer group. The training courses and the processing unit were new for Motramed, and they were developed based on the evaluation of Kintamani's experience.

As a next step, ICCRI tried to invite exporters to join Motramed. Previously, there were no exporters in this region because yields were low and transporting and shipping costs were high. The first large exporter to enter Flores Island was PT Indokom Citra Persada, which ICCRI successfully invited. Involvement with Motramed was a big decision for this company, as they used to buy coffee from a supplier, and building a partnership with farmers was something new. However, the reputation of ICCRI in the coffee sector was seen as a guarantee of success, and PT Indokom felt confident with the support of the local government in Motramed.

In addition to creating trust, all respective actors needed to explore the advantages of participating in Motramed. Applying Motramed in the Bajawa region was a challenge because of the lack of resources, such as bad infrastructure and inadequate human resources, which were common in the Eastern part of Indonesia. ICCRI's interest was to make Motramed as successful as it was in Bali despite the unfavorable conditions. This interest matched well with the interest of the local government to promote their region, improve regional income by increasing farmers' income and develop Arabica coffee. The farmers also obtained many advantages from participating in Motramed, such as new knowledge and skills in coffee processing, economic calculations, and negotiations with buyers, and they became more aware of coffee quality. One of the farmer groups expressed this awareness of quality as follows:

When farmers process coffee based on the SOP, the prices never decline. Farmers do not want to go back to the traditional methods. 'Quality is a must!' We really feel the advantages of producing good quality coffee.

PT Indokom understood the effort made by farmers to improve coffee quality. Therefore, after the farmers succeeded at producing green beans with good quality, PT Indokom gave them a better price than the local market. Table 2 below shows some remarkable coffee prices in Bajawa since Motramed was implemented.

¹¹ In Bahasa, this is called *Unit Pengolahan Hasil* (UPH). This UPH functions as a business unit to support collective processing and trade with the exporter.

Table 2. The price history of Flores Bajawa Arabica Coffee (based on interviews with Bajawa actors 2015 and adapted from Soemarno *et al.*, 2009; The Estate Crops Agency of Ngada District, 2015).

| Year | Price | Notes |
|------|---|--|
| 2004 | 1,100 IDR per 1 kg of red cherries (equal to 6,600 IDR per kg green bean) | Farmers directly sold red cherries at the local market, as they did not yet know how to process coffee. |
| 2005 | 17,500 IDR per 1 kg of green beans | Processed coffee with a better quality. While the price of green beans at the local market was 12,000 IDR, Bajawa farmers received a 30% higher price from PT Indokom. |
| 2007 | 20,500 IDR per 1 kg | Green beans (unsorted). |
| 2013 | 27,500 IDR per 1 kg | This was a good price, as the world coffee price fell this year. |
| 2014 | 11,750 IDR per 1 liter of wet parchment bean (equivalent to approximately 45,000 IDR per 1 kg of green beans) | Starting this year, farmers sold wet coffee parchment to PT Indokom. Wet parchment is processed coffee that has 30% moisture content. This solution (i.e. wet HS) was decided upon because of (1) high rainfall that did not support the drying process; and (2) farmers' limited capital, whereas aid from the government was insufficient for all farmer groups. Farmers still benefited from this price because they did not have to do all the processing. |

PT Indokom obtained advantages from Motramed as well. First, the supply chain was shorter because the company purchased directly from farmers. Second, PT Indokom acquired coffee with assured quality, which suited their consumers' standards. PT Indokom encouraged farmers by giving aid, such as machines and tools to support coffee processing. At this stage, the relationship between farmers and the exporter became closer over time. Frequent meetings to discuss problems and solutions were possible. For example, because of the excellent quality, PT Indokom asked for a larger quantity; however, the farmers encountered difficulties related to labor, capital and natural factors. The win-win solution consisted of selling dried parchment coffee (dried HS)¹². By selling dried HS, farmers saved time in processing but still received a good price.

The district government showed a strong commitment and was very supportive in controlling the processes in each farmer group. In the meantime, the local government started to transfer the Motramed model to other commodities.

Moreover, other coffee actors in Bajawa made greater efforts to develop the Arabica coffee commodity by obtaining sustainability certifications and the GI certificate, thus institutionalizing a more sustainable production process. PT Indokom helped Bajawa farmers become organic certified and sent its Internal Control System team to assist farmers in preparing their farms. In 2007, Bajawa coffee farms obtained organic certification from the USDA and next obtained Rainforest Alliance certification in 2008. According to the farmer groups, the sustainability certification not only positively impacted health and the environment but also farmers' income¹³. For example, when the world coffee prices fell in 2013, Bajawa coffee farmers still received a good price from PT Indokom because of its quality and the growing demand by international consumers for a sustainability guarantee.

Additionally, the Bajawa coffee stakeholders established the CGIP for Bajawa Flores Arabica Coffee and prepared the requirements book to apply for the GI certificate.¹⁴ In 2013, Bajawa Arabica coffee was awarded

¹² Dried HS is processed coffee beans that still contain parchment (shell horn). If the shell horn is removed with huller machines, the product is called green beans (CGIP, 2011: 89).

¹³ Based on interviews with the director of PT Indokom and the Internal Control System staff.

¹⁴ The requirements book contains the history of Bajawa coffee, coffee processing, community, etc. By 2011, CGIP members consisted of 25 farmer groups that produced red cherries (representing 600 household farmers), 14 UPH, and 1 roaster (CGIP Flores Bajawa, 2011: 14).

the GI certificate by the Indonesian government. With this certificate, the Flores Bajawa Arabica coffee brand is now better prepared to preserve the coffee tradition in Bajawa.

6.1 The follow-up of Motramed

After the ICCRI reduced its role as a mediator, the district government, together with other stakeholders, such as PT Indokom, the CGIP Bajawa, and an NGO that became involved, further developed the coffee sector.

First, the CGIP Cooperative, which was more structured than the one in Kintamani, began to function as a one-door-marketing system of Flores Bajawa Arabica Coffee. In price negotiations, PT Indokom and the CGIP Cooperative sat together to discuss the prices and tonnages. Collective marketing through the CGIP Cooperative strengthened the farmers' position in negotiating the price with the company. The cooperative became a symbol of a shared commitment of the coffee stakeholders to develop Bajawa. For every kg of coffee sold through this cooperative, farmers or *Unit Pengolahan Hasil* (UPH) must contribute a marketing fee of approximately 500 IDR (or 0.5 cents in USD). With this marketing fee, the CGIP Cooperative has collected 66 million IDR that will be used to prepare the Fair Trade accreditation.

Second, a new MoU was concluded in 2015 between the district government of Ngada with the CGIP cooperative, PT Indokom, Bank of East Nusa Tenggara, VECO Indonesia and ICCRI. More actors became interested in joining this MoU due to the achievements of Motramed in Bajawa. VECO Indonesia, as an NGO, will for example play a facilitation role for farmers in preparing for the Fair Trade certificate through capacity improvement. The Bank of East Nusa Tenggara will help farmers by providing access to loans for coffee processing. With this MoU, the program was more focused on on-farm management training to increase the production and expansion of coffee land area than the previous MoU. Motramed's main focus was on post-harvest quality improvement; there was not much attention to on-farm improvements. Consequently, land area and production tended to stagnate over the past few years (Table 3).

Third, the District government of Ngada issued local regulation number 6, year 2016, regarding the protection of Bajawa coffee as a regional asset. This regulation aimed to further protect Bajawa coffee and to confer more benefits to the community. It covers issues such as land protection to avoid chemical farming inputs and diversion of land use, collective marketing and labor during the harvest period.

Table 3. Growing area, production and productivity of Bajawa Arabica coffee, 2010-2014 (adapted from The Estate Crops Agency of Ngada District (*Disbun Ngada*), 2015).

| No. | Year | Growing area (ha) | Production (ton) | Productivity |
|-----|------|-------------------|------------------|--------------|
| 1 | 2010 | 5,677 | 1,996 | 739 |
| 2 | 2011 | 5,651 | 2,584 | 766 |
| 3 | 2012 | 5,627 | 3,047 | 811 |
| 4 | 2013 | 5,510 | 3,298 | 867 |
| 5 | 2014 | 5,720 | 3,448 | 825 |

7. Case 3: the further development of Motramed in Bondowoso, East Java

Bondowoso, East Java, applied to Motramed in 2011. The partnering process in this case differs from that of the previous regions. The partnership model was introduced to the Provincial Estate Crops Agency in East Java in approximately 2006, immediately after the development in Flores. ICCRI attempted to contact officials at the provincial level, assuming that it might be easier to cover many districts at once. However, this approach was never continued. Similar to what occurred in Bali and Manggarai, the district governments were not willing to support a program from the provincial government. Although this was not a major constraint in the implementation of Motramed, it influenced the progress and continuation of the partnership. In this section, we particularly address what is different from the previous regions in the partnering process.

The first difference concerns the 2011 MoU of the partnership, which was signed by seven actors and is valid for five years and operationalized in annual work plans. The new actors had different interests. The Bank of Indonesia was interested in maintaining the stability of the Indonesian currency. One method to accomplish this was to increase the export of agricultural commodities, such as Arabica coffee. The Bank of East Java would profit from providing loans to farmer groups. Perhutani is a public company engaged in the protection of forests. Although Perhutani was not directly involved with coffee processing, it became involved because 99% of the coffee plantations in Bondowoso are farmed in forest areas protected under the management of Perhutani. Perhutani's interest is to ensure that the coffee plantations are managed in accordance with the principles of protected forest management. Following each actor's interests, the roles of the respective actors were clearly stated in the MoU (Table 4).

Based on the MoU and in contrast to the previous regions, the leadership role in Bondowoso was not solely handled by ICCRI; it was shared with the district government and Bank of Indonesia Jember.

The second difference compared to the other regions is that the quality improvement in Bondowoso showed rapid progress. This progress was made possible by the improved conditions of the old management practice in Bondowoso compared with those in Bajawa. The farmers already had some knowledge regarding post-harvest quality and the market. Unlike previous regions, where it took 1-2 years for the coffee to be exported, it only took approximately 8 months for the five selected farmer groups in Bondowoso to produce coffee with improved quality and export it through PT Indokom. These five farmer groups also had the opportunity

Table 4. The roles of actors in Motramed Bondowoso (adapted from Memorandum of Understanding, 2011).

| No. | Actors | Roles |
|-----|---|--|
| 1. | District Government of Bondowoso | • Provides facilities and infrastructure and facilitates training and mentoring. |
| 2. | Bank of Indonesia, Jember | • Facilitates technical aid, such as research, training and the provision of information, in order to improve farmer competency. • Facilitates access to financing. |
| 3. | Indonesian Coffee and Cocoa Research Institute (ICCRI) | • Provides coaching in all stages of coffee production, including cultivation, processing and marketing. |
| 4. | PT. Regional Development Bank of East Java (Bank Jatim) | • Provides financing to assist with the development of Arabica coffee farmers as long as doing so is in accordance with the bank's regulations. |
| 5. | 'Perhutani' public company | • Provides forest area that could be used to develop Arabica coffee as long as this is in accordance with principles of sustainable forest management. |
| 6. | PT. Indokom | • Is a marketing partner, i.e. buyer. |
| 7. | Association of Bondowoso coffee farmers | • Organizes farmers and farmer groups in the area of Bondowoso. • Participates in a program to empower coffee farmers. |

to visit ICCRI's coffee plantation in Jember so that they could learn faster. The following was expressed by a member of a farmer cooperative:

After the first harvest period, when our coffee was exported to the Swiss and was recognized by the Mayor, PT Indokom, the Provincial government's representative and other actors, I was full of emotion. Now, I understand the benefits of good processing for the farmer and that the responsibility is in the hands of farmers; the government and other actors can only help farmers improve their production.

For farmers, the collaboration was a great advantage, as they had previously only applied traditional processing (drying in the street without a proper technique) and had only received 7,000 IDR per kg. After they succeeded in improved coffee processing and exporting, the coffee price increased to 22,000 IDR per kg of green beans in 2011. For PT Indokom, this partnership was advantageous, as this region is located near its office headquarters in East Java, which made distribution easier and more efficient.

Despite its rapid progress, we found a few threats at the farmer level that were also discussed at the annual cooperative and coffee stakeholder meetings. First, there was an indication of dishonest behavior by a few farmers regarding profit sharing to Perhutani. According to the cooperation agreement between Perhutani and the forest village community, farmers are required to share 30% of the coffee production (i.e. red cherries) with Perhutani. However, there were a few unscrupulous individuals who misused the agreement for their personal profit. Second, there were a few farmer groups that did not return the loan to Bank Jatim at the agreed time. The Head of *Disbun Bondowoso* often reminded farmers of the importance of Bank Jatim's trust in the partnership for the continuation of their coffee business. Third, keeping farmers in the collective commitment was problematic. Coffee farmers in Bondowoso could achieve positive results because they applied the SOP for coffee quality introduced by ICCRI. However, we observed that a few farmers were tempted to obtain more short-term profit by inconsistently following the SOP. Some of the farmers who had participated since the beginning of Motramed became concerned about this condition (as stated in interviews with farmer groups).

These problems might not have occurred if the farmer organizations had sufficiently intervened. In Bondowoso, there are three important farmer organizations; however, their roles overlap, and these organizations failed to maintain the farmers' commitment to develop Arabica coffee. This is similar to the situation in Kintamani, Bali. Keeping farmers in a collective is a social problem that is difficult to solve, and it can become one of the constraining factors in the partnership. The following was stated by the senior researcher at ICCRI:

I affirm to farmers that in developing agriculture, the capital problem only plays a small part. If the problems of developing agriculture are 100%, then 60% of it is a social problem, such as selfishness, internal conflicts, dishonest behavior and more. The technological problem covers approximately 30% of the problem, and the rest is a capital problem. Farmers always complain about the lack of capital as their main problem, but this is not always the case. If the farmers have good organization and are solid and united, then banks, local governments or other actors will not hesitate to give them aid and financial facilitation.

Although the new production practices are better organized, as shown by the MoU, the issue of farmer commitment needs to be noted. Nevertheless, all actors plan to continue the MoU for the second term and further address the capacity improvement of farmer organizations.

8. Conclusions

This study examined a bottom-up development initiative to create a new partnership for more sustainable coffee production at the local level in Indonesia. We conceptualized the partnering process of the Motramed as a form of collaborative governance to create a new management practice.

Motramed aims to change the practices common in coffee production throughout Indonesia to improve farmers' welfare. Traditional production is characterized by farmers that possess inadequate knowledge regarding quality and price setting. They directly sell their unsorted coffee beans to local traders without further processing. These farmers do not have much capital and face difficulty obtaining funding to develop their coffee farms. Moreover, coffee farmers usually work individually. Although they are sometimes members of farmer groups, these farmer groups are often incapable of assisting farmers. Furthermore, there is no close relationship between farmers, exporters and governments in the old management practice.

The new production methods that Motramed aims to bring about are quite different. The most important changes are that farmers (1) have obtained new knowledge and skills regarding coffee processing, which improves the quality and quantity of their production; (2) have applied collective marketing of coffee in better-organized farmer groups that are part of higher-level regional trading organizations; (3) have direct access to the international market through a permanent relationship with an exporter; (4) are sufficiently educated regarding price-setting, have acquired an improved bargaining position and can more easily obtain funding from banks; (5) have become a member in organizations that trade in sustainability certified coffee; and (6) are sustained by local governments that now recognize that coffee production can expand regional economic development and have acquired knowledge to further sustain the farmers.

In this study, we defined four mechanisms: defining a common problem, building trust, creating collaborative advantages and establishing leadership, which we used as a lens to study the changes brought about by Motramed. We analyzed the implementation of the partnerships in three different regions and particularly focused on the constraining and conducive factors that are critical to the success of Motramed. Our main conclusion is that it is particularly difficult for the process of sustainable change to continue after the initial improvement in coffee production. As we have seen, there is a great risk that tensions between individual interests and collective interests will manifest themselves. This indicates that Motramed still creates rather fragile new production practices.

A first critical factor is the scope of the problem. Motramed started with a small and localized problem definition in coffee production, i.e. low quality and inefficient marketing. This restricted definition ensured a practical approach involving only specialized actors to address the problems. Motramed thus primarily focused on the economic aspects of coffee production while the ecological and social aspects were mainly seen as a possible side effect. Only during the partnering process did the relevance of sustainability certification become clear as an important factor in new production practices. It is suggested that a more elaborate model might better balance its focus among the economic, social and environmental aspects of the production process, including the prospect of acquiring certification at the beginning.

A second critical factor is the significant role of district governments. ICCRI would not be able to implement the partnership without the support of local governments in organizing farmers, allocating operational budgets and providing staff. For the local governments, Motramed is a way to promote their regions and improve the regional economy. In the most successful cases, the district government, together with ICCRI's researchers, is continuously and intensively involved in daily practices at the farmer level. The Kintamani and Bondowoso cases in the early years show that a lack of responsiveness from the district governments towards Motramed led to the stagnation of its implementation. Therefore, the implementation of Motramed also depends on the willingness of the district governments to consider coffee production a priority.

A third critical factor is the development of a shared responsibility between the provincial and district governments for the partnership approach. As we have seen, the intention to expand more regions might not be in accordance with the political situation. Since the implementation of regional autonomy in Indonesia, each of the districts has its own priorities, which may differ from higher level government policies. The cases in our study show that the Motramed model works well with the support of the district governments. Nevertheless, regarding budgeting and coordination, it is suggested that the support of provincial governments

is essential. Initiators of a partnership model such as Motramed should be aware of the political tensions that they might create in a multilevel governance situation.

A fourth critical factor relates to the organization of the farmers. Among the three regions, Bajawa farmers developed the strongest farmer groups and showed the strongest commitment to keep farmers in collective action. In other regions, the organizations faced the difficulty of convincing farmers that they should abide by the rules of the CGIP organization. After farmers increased their knowledge regarding quality and marketing, the market grew and more buyers became interested, and therefore, farmers had increasing options for selling their coffee. However, this also had a negative side, as some farmers tended to show opportunistic behavior and focused on their own short-term economic profits. These farmers preferred to sell in smaller quantities to many buyers rather than to only to one exporter under the CGIP organization. This may result in a decline of trust between farmers and exporters. Therefore, strengthening the capacity of farmer organizations and raising awareness regarding the virtues of collective action is an essential asset of the partnership model.

A fifth critical factor is regarding the question of how many and what type of actors to involve in the partnership. Inducting more actors may result in additional risks because of different interests and perceived problems. In the third region, we observed that Motramed involved more actors from various backgrounds as partners. The positive side of this is that with additional actors and different resources, more aspects of the coffee sector can be addressed, which might hasten progress. If there are additional participating actors, then there are additional interests that require consideration and these interests may be competing or conflicting. However, our research shows that the participation of actors who are able to secure funding, such as banks, positively influences the results of Motramed.

Recently, ICCRI has started to expand the Motramed model to many regions in Indonesia. Together with local governments, Motramed has been initiated not only for Arabica coffee but also for Robusta coffee and cocoa. Discussion is also continuing regarding the adoption of the Motramed model in a national program of the Ministry of Agriculture. This will create additional opportunities to develop a nationwide bottom-up development process to improve smallholder production of agricultural commodities, but it may also lead to bureaucratization of the approach with much red tape. Further research on the conditions of an effective national program should be the next step in advancing this type of bottom-up sustainable development of the smallholder coffee sector with a connection to global certification schemes.

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Supplementary material

Supplementary material can be found online at <https://doi.org/10.22434/IFAMR2017.0021>.

Table S1. The price history of Bali coffee compared with the world coffee price.

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The mediated partnership model for sustainable coffee production: experiences from Indonesia

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Table S1. The price history of Bali coffee compared with the world coffee price (adapted from Mawardi *et al.*, 2006; The Provincial Estate Crops Agency of Bali (*Disbun Bali*), 2015).

| Year | World coffee price (USD/kg) ¹ | World coffee price (IDR) ² | Bali coffee price at farmer gate (IDR) ³ | Discounted/premium to world price |
|------|--|---------------------------------------|---|-----------------------------------|
| 2001 | 1.37 | 14,095.02 | 5,200 | -63.1% |
| 2002 | 1.36 | 12,560.65 | 12,000 | -4.5% |
| 2003 | 1.42 | 12,131.23 | 12,000 | -1.1% |
| 2004 | 1.77 | 15,940.51 | 14,800 | -7.2% |
| 2005 | 2.53 | 24,690.45 | 24,500 | -0.8% |
| 2006 | 2.52 | 23,054.80 | 24,806 | 7.6% |
| 2007 | 2.72 | 24,959.85 | 23,671 | -5.2% |
| 2008 | 3.08 | 30,066.30 | 28,600 | -4.9% |
| 2009 | 3.17 | 32,840.42 | 27,400 | -16.6% |
| 2010 | 4.32 | 39,219.26 | 28,083 | -28.4% |
| 2011 | 5.98 | 52,429.02 | 36,375 | -30.6% |
| 2012 | 4.11 | 38,719.01 | 37,871 | -2.2% |
| 2013 | 3.08 | 32,491.60 | 38,854 | 19.6% |
| 2014 | 4.42 | 52,503.32 | 53,833 | 2.5% |
| 2015 | 3.53 | 47,451.93 | 56,833 | 19.8% |

¹ Annual average price for Other Milds Arabica (data adapted from ICO, 2016). Other Milds is a group of indicator prices made by International Coffee Organization (ICO) along with other groups: Columbian Milds, Brazilian Naturals and Robustas. Arabica coffee from Indonesia is part of the Other Milds group.

² Conversion to IDR based on annual average rate issued by Bank Indonesia (Central Bank of Indonesia, 2016).

³ Unsorted coffee contains approximately 13% moisture.