

Discussion Paper No. 8

PRIVATE SECTOR INITIATIVES TO BOOST PRODUCTIVITY OF COCOA, COFFEE, AND RUBBER IN INDONESIA

by Mercyta Jorsvinna Glorya and Arief Nugraha



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Cocoa, Coffee, and Rubber in Indonesia**

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EXECUTIVE SUMMARY

Indonesia is a major producer of cocoa, coffee, and rubber. These three commodities represent an important source of income for Indonesian farmers. However, productivity in cocoa and coffee are significantly lower in Indonesia than in other major producer countries, and rubber productivity has yet to reach its full potential. While there are disputes concerning the accuracy of government productivity data, all organizations involved agree that there is much room for improvement. The national government has implemented a number of policies and programs geared towards increasing farmer productivity including seedling and fertilizer subsidies, facilitated access to financial services, and land expansion programs.

These initiatives, however, are seen by many experts as ineffective as they fail to consider regional differences, provide effective training, or include sufficient on-the-ground supervision. Instead, experts interviewed for this study point to private sector actors as successful support providers. Private sector actors, including multinational companies, domestic producers, and NGOs, implement programs consisting of facilitated access to financial services and financial literacy training, quality control programs which offer farmers premium quality, and contract farming programs that guarantee price stability.

These private sector actors work closely with farmers and are able to consider their individual needs, which allows them to allocate resources more effectively. Some Indonesian government bodies have begun to work in cooperation with private sector initiatives to enhance the livelihood of farmers. This research suggests that the government should continue and increase this cooperation, involving more private stakeholders in its efforts to increase domestic productivity levels.

INDONESIA'S COCOA, COFFEE, AND RUBBER INDUSTRIES

Indonesia is among the world's leading producers of coffee, cocoa and rubber, producing the second most rubber (OECD, 2012), third most cocoa (The Ministry of Foreign Affairs, 2012), and fourth most coffee (Indonesian Agency for Creative Economy, 2017) globally.

According to the long-term government program, *The Masterplan for Acceleration and Expansion of Indonesia's Economic Development 2011-2025*, coffee, cocoa, and rubber are three of the 22 main commodities for which expansion and prosperity are prioritized by the Indonesian national government as a means to 'support the acceleration and expansion of economic development in Indonesia (National Development Planning Agency, 2011). These three commodities contribute a significant portion of Indonesia's Gross Domestic Product (GDP) under the Plantation Crop sub-sector, which accounts for 387,501.5 billion IDR and is the largest sub-sector under the Agriculture, Forestry and Fishery sector (Indonesian Central Bank, 2019).

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These promising commodities are also a considerable source of income for the agricultural export sector. Rubber leads the way, earning US \$4,958.3 million a year, followed by coffee earning US \$1,175.4 million, and cocoa earning US \$53.5 million (Statistics Indonesia, 2018). According to data from Directorate General of Plantations (2017), Indonesia's aggregate manpower relies heavily on these three industries for employment, as they employed 1,726,359 cocoa farmers in 2016, and 1,770,508 coffee farmers, and 250,886 rubber farmers in 2017.

PRODUCTION AND PRODUCTIVITY DATA

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Table 1.
Official production levels of cocoa, coffee and rubber (2012 – 2017)

Production	2012	2013	2014	2015	2016	2017
Cocoa (tonnes)	740,500	720,900	728,400	593,331	659,399	659,776
Coffee (tonnes)	691,163	675,800	643,900	639,412	639,305	668,677
Rubber (tonnes)	3,012,254	3,237,433	3,153,186	3,145,398	3,357,951	3,629,544

Source: FAOSTAT. (2019). *Indonesian cocoa, coffee, and rubber production: 2012-2017*. Retrieved from <http://www.fao.org/faostat/en/#compare>

MOA data shows a decline in production of cocoa and coffee, and an increase in rubber production. This data is questioned by some parties, who believe that MOA overestimates production numbers in some industries.

MOA data concerning rubber and coffee are generally accepted by industry actors (Nestle, personal communication, 2019; ICCRI, personal communication, 2019), but experts in the cocoa industry disagree with MOA cocoa findings. They claim MOA's production numbers are much too high, recording nearly twice the production recorded by private actors, who believe production to be only from 350,000 to 400,000 tonnes annually (Swisscontact, personal communication, 2019; Cocoa Sustainability Partnership, personal communication, 2019).

Director General of Plantations, Ir. Bambang, recognized the need to improve the accuracy of MOA data (Cocoa Sustainability Partnership, 2018). According to the Director General of Plantation website, MOA's data collection process is long as data must pass from farmers through a series of MOA officers before being submitted to the Director General of Plantations, who releases the data publicly.

The international aid agency Swisscontact, which is active in the cocoa industry, utilizes data from farmers it assists and keeps the responsibility for data collection and calculation within one office (Swisscontact, personal communication, 2019). They recommend this form of data collection, pointing out that MOA's long data collection process is vulnerable to human error. However, while critics question the integrity of MOA data, it is still relied on by international organizations like the UN Food and Agricultural Organization (FAO).

Table 2.
Official productivity rates of cocoa, coffee and rubber (2012 – 2017)

Productivity	2012	2013	2014	2015	2016	2017
Cocoa (tonne/ha)	0.57	0.41	0.42	0.35	0.39	0.38
Coffee (tonne/ha)	0.56	0.54	0.52	0.52	0.52	0.53
Rubber (tonne/ha)	0.86	0.87	0.87	0.87	0.91	0.99

Source: FAOSTAT. (2019). *Indonesian cocoa, coffee, and rubber production: 2012-2017*. Retrieved from <http://www.fao.org/faostat/en/#compare>

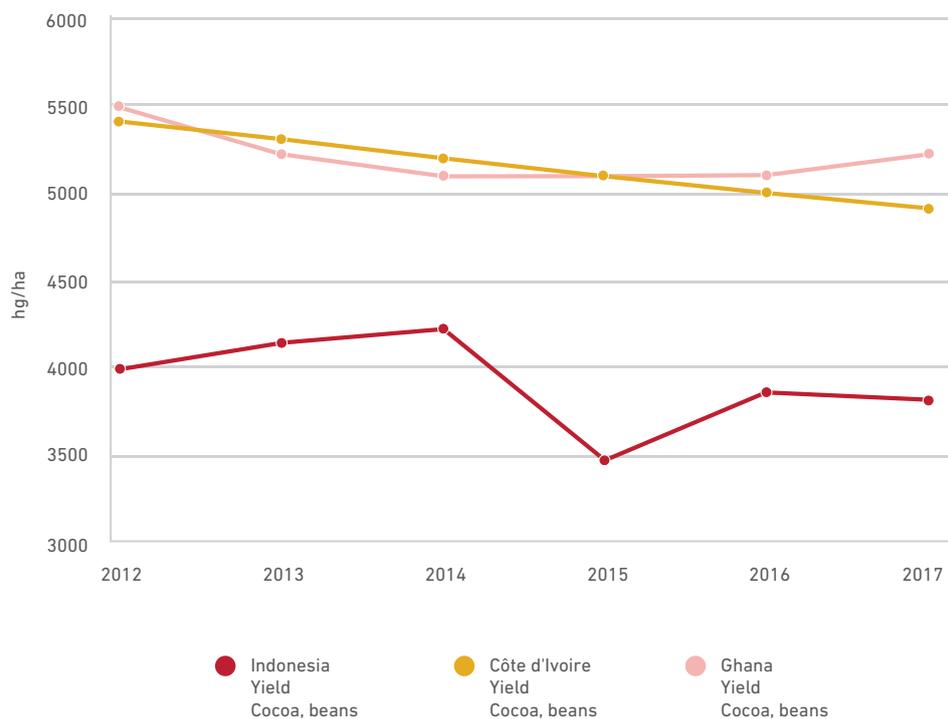
Regardless of debates concerning the accuracy of production data, Indonesia remains an important producer. However, productivity in these commodities remains low. Indonesian cocoa and coffee productivity levels are the lowest among the world's top producing countries. Ghana and the Côte d'Ivoire produced from 0.1 to 0.2 tonnes more cocoa per hectare annually from 2012 to 2017 than Indonesia. Vietnam's coffee productivity has been nearly five times that of Indonesia since 2014, producing over 2.5 tonnes per hectare in 2017. A working paper prepared for the Indonesian Ministry of Trade explains that in the high volume/low cost Robusta coffee market Vietnam is Indonesia's direct competitor, and despite higher costs of production, data suggests Vietnam has much higher levels of profitability (Neilson et al., 2015). Brazil's coffee productivity has also been close to three times higher that of Indonesia's, and Colombia's has been around twice as high since 2015.

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While Indonesia’s rubber productivity has been the world’s second highest since 2013, the productivity leader Thailand is still nearly twice as productive as Indonesia. Figures 1.1, 1.2, and 1.3 show yield data for cocoa, coffee, and rubber as compared to other leading producers between 2012 and 2017. A consensus exists among organizations involved in coffee, cocoa, and rubber that the productivity of all three commodities in Indonesia has not reached its full potential.

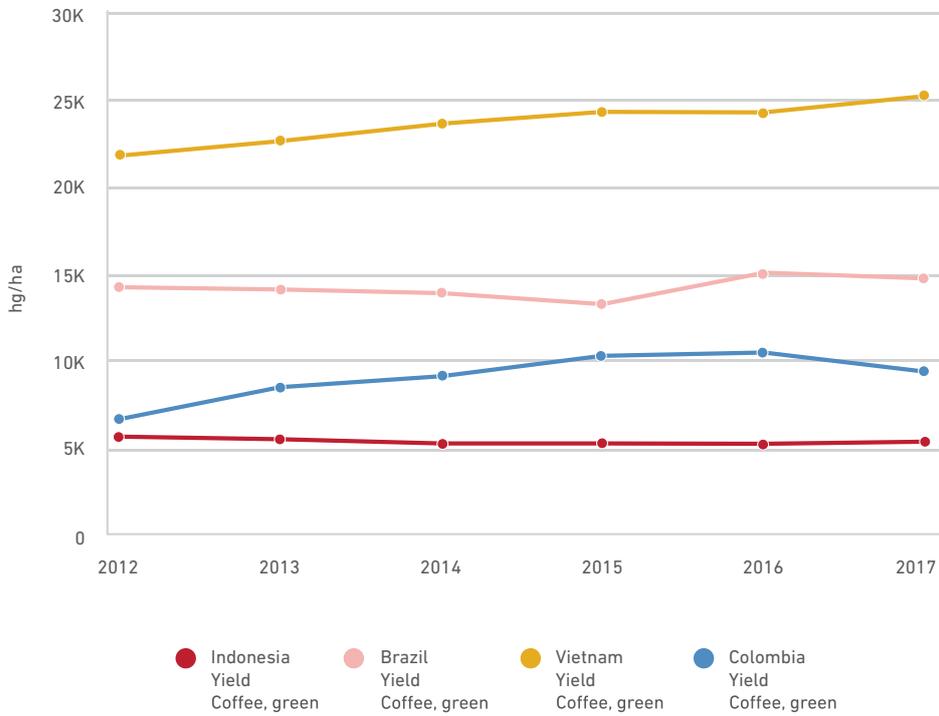
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Figure 1.1
Cocoa Yield from 2012 to 2017



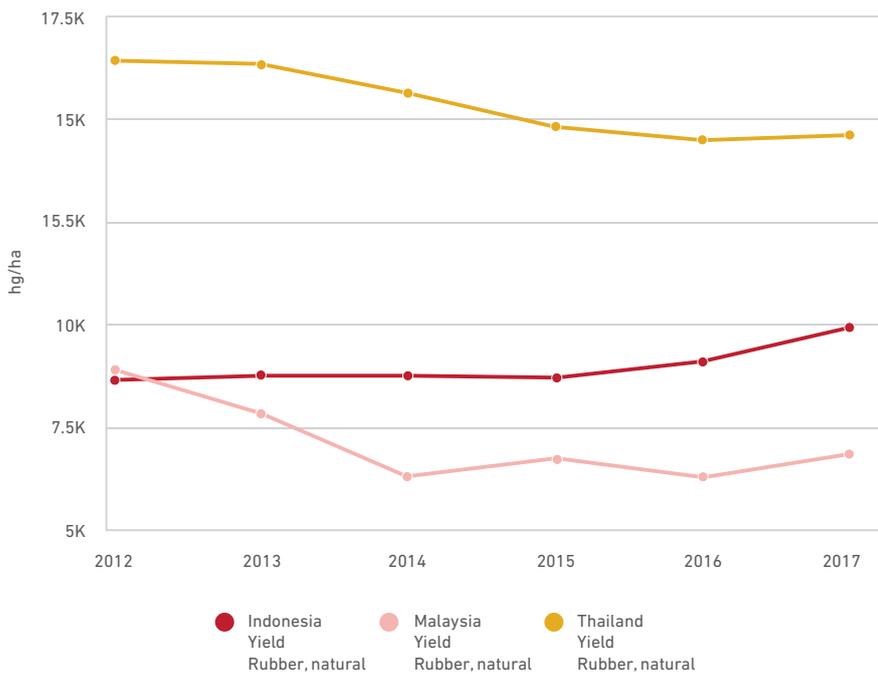
Source: FFAOSTAT. (n.d.)

Figure 1.2
Coffee Yield from 2012 to 2017



Source: FFAOSTAT. (n.d.)

Figure 1.3
Rubber Yield from 2012 to 2017



Source: FFAOSTAT. (n.d.)

PROBLEMS FACED BY INDONESIA'S COCOA, COFFEE, AND RUBBER INDUSTRIES

The factors contributing to low productivity are numerous, but as a major producer Indonesia has a lot to gain from increasing productivity and agricultural income in these industries.

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According to the UN Food and Agricultural Organization (FAOstat, n.d.), Indonesia has had the lowest cocoa productivity among the world's three leading producers since 2011. There are a number of reasons for this, including aging trees, diseases, elderly farmers, and the fact that cocoa is increasingly a low priority crop (Abdullah, 2017). According to the International Cocoa Organization (ICCO), cocoa trees are considered productive until 25 years of age, but many cocoa trees in Indonesia were planted in the 1990's, making them older than 25.

Farmers often lack the financial resources to invest in seedlings, which take up to 5 years to produce cocoa pods. Cocoa trees are also particularly susceptible to diseases like black pod disease, which can destroy up to a hectare of farm almost overnight. (Indonesia Investment, 2016). Elderly farmers, most of whom are smallholder farmers with farms from 1 to 3 hectares, are unable to bear these risks. A paper by Neilson and Mckenzie (2016) notes that the cocoa sector is ecologically and economically unsustainable and existing institutional arrangements don't successful encourage farmers to adopt sustainable practices. Instead farmers prefer to leave cocoa for other industries like rubber and palm oil (Jasman, 2016). The farmers who stay aim to make quick cash by selling unfermented beans soon after harvest, and miss the opportunity to benefit from value-adding operations that could increase the quality and return of their beans (Oktaviani et al., 2016). This vicious cycle discourages farmers from practicing innovation to increase productivity (Rubiyo & Siswanto, 2012).

The low productivity of the Indonesian cocoa industry goes hand in hand with the low quality of much of its cocoa. Cocoa quality standards are set by "ISO 2451 Cocoa Beans – Specification and Quality Requirements" which covers everything from size and color to moisture content and preparation and classification of cocoa beans. However, Indonesia's cocoa often does not reach those standards and is mainly used to produce cocoa powder and cosmetic-related products (Kalimajari, personal communication, 2019). To produce chocolate, Indonesian cocoa beans often need to be mixed with imported fermented cocoa beans from Ghana or the Côte d'Ivoire (Kalimajari, personal communication, 2019).

The coffee industry performs a little better than the cocoa industry. Neilson et.al. (2015) acknowledges that coffee yields and productivity are low by international standards, and describes the causes of low productivity as many and varied. The coffee industry suffers from many of the same problems as the cocoa industry. Like cocoa trees, coffee plants are most

productive between 5 and 25 years of age, yet many farms in Indonesia rely on plants in their late 20's. Diseases like coffee berry borer (CBB) also plague crops, and fertilizers are expensive and often under-applied (Neilson et al., 2015). As in the cocoa industry, coffee beans are exported soon after harvesting. Unprocessed coffee is referred to as green coffee, and represents the bulk of coffee exports. (Global Business Guide Indonesia, 2014)

While adequate rainfalls and the Indonesian soil allow for the production of both Robusta, a cheaper coffee bean, and Arabica, a richer, more expensive product, more than 80% of coffee produced in Indonesia is Robusta (Nangoy & Nicholson, 2018). This is because farmers can make easier cash with Robusta coffee, as the Robusta market is more regular and buyers are easier to find. It has also been noted, however, by researchers like Neilson (2007) that the farmgate price for Arabica tends to be lower than that of Robusta as Arabica beans often require extensive processing after leaving the farm. Still, specialty coffee varieties with distinct flavors from different regions have recently made names in Indonesia and abroad. Some popular brands include Gayo, Mandailing, and Toraja. The market for Indonesian coffee is growing, and opportunities to take advantage of domestic processing of higher quality coffee are increasing (Neilson et al., 2015).

Just like cocoa and coffee, rubber trees in Indonesia, which are productive between 7 and 25 years of age, are past their prime and costly to replace (IBP, 2016). According to experts from the Indonesian Rubber Research Institute (IRRI), replacing old trees with superior rubber tree clones, which may give them higher latex yields, can boost the productivity of rubber (IRRC, personal communication, 2019). The largest problem faced by Indonesian rubber manufacturers is quality. In Indonesia, the quality of rubber is measured by Standard Indonesian Rubber (SIR), which sets standards similar to the international standards set by ISO 2000:2014 (Badan Standardasi Nasional, 2017). According to the international standard, good natural rubber such as TSR-20¹ cannot exceed certain measurements of dirt, ash, nitrogen, volatile matter and other components.

Unfortunately, the vast majority of Indonesia's rubber cannot meet these standards or compete with higher quality rubber from Thailand and Malaysia. Sitepu (2016) confirms that Indonesian rubber farmers, most of which are small holders, produce low quality rubber and struggle to adapt to changing industry conditions. The lack of a developed downstream industry adds to this problem (Global Business Guide Indonesia, 2016) and makes the absorption of rubber in the country relatively low, as rubber cannot be further processed into usable final products in the country. These factors contribute to a dependence on buyers in international markets, where rubber prices are being driven down by large numbers of exports from producer countries and the development of synthetic rubber.

¹ This kind of rubber is also known as 'karet spesifikasi teknis' (Technically Specified Rubber/TSR), and makes up most of Indonesia's rubber exports.

NATIONAL POLICIES SUPPORTING INDONESIA'S COCOA, COFFEE, AND RUBBER INDUSTRIES AND THEIR SHORTCOMINGS

“Despite some cases of success, government programs alone have generally been ineffective in significantly increasing productivity in the three industries studied here due to lack of consideration for regional differences and emphasis on quality, insufficient supervision, and weak efforts to educate farmers in quality and sustainability.”

The Indonesian government has responded with initiatives that address problems faced by all three commodities. The initiatives are comprised of financial support, supplies of seeds and equipment, land expansion, crop cultivation subsidies, and government extension services. These initiatives, however, are accused of being applied without sufficient understanding of whether or not they benefit farmers. Research like Neilson and Mckenzie (2016) has criticized government initiatives for not adopting participatory research approaches and involving farmers in program planning. Despite some cases of success, government programs alone have generally been ineffective in significantly increasing productivity in the three industries studied here due to lack of consideration for regional differences and emphasis on quality, insufficient supervision, and weak efforts to educate farmers in quality and sustainability.

To boost the quality and productivity of cocoa, the Coordinating Ministry for Economic Affairs has established programs (Coordinating Ministry of Economic Affairs, 2011) with the following aims:

- Increasing production, and sustainable productivity, and improving the quality of cocoa;
- Improving the quality of cocoa beans through fermentation and certification (through the National Movement for Cocoa Bean Fermentation or GERNAS) (MOA, 2014); and
- Accelerating the provision of infrastructure that supports the development of the national cocoa industry.

MOA has set out supportive programs which include investment in the cocoa industry of almost 250 million USD (2.4 trillion IDR) from 2010-2014, and continuing investment as outlined in the Strategic Plan for the Indonesian Ministry of Agriculture: 2015-2019 (Rafani, 2016). MOA also plans to provide seedlings to cocoa-growing regions in Indonesia (Abdoellah, 2017).

In the following five years, MOA hopes to plant around 160 million superior quality cocoa beans on over 140 thousand hectares, increasing productivity three fold (Zainuddin, 2019). By providing seedlings to farmers MOA hopes to reduce the costs of planting new crops and encourage farmers to replace aging trees with more productive seedlings. The program also offers subsidized fertilizers and pesticides to help fight off disease and decrease the risk borne by smallholder farmers.

In addition, since 2012 the Ministry of Industry (MOI) has distributed cocoa machines to top cocoa producing provinces in Indonesia such as West Sumatera, Central Sulawesi, South Sulawesi, and Southeast Sulawesi. These machines are meant to further modernize the downstream cocoa industry and facilitate in-country processing of cocoa beans. They aim to reduce the need for farmers to sell unfermented beans to an international market where cheaper unfermented

cocoa is in demand. This was supposed to allow the Indonesian cocoa industry to increase value-adding operations and earn a higher return.

However, these programs have sparked concerns from actors involved in the cocoa industry. Experts note that over the period from 2009 to 2015 cocoa production decreased, despite extensive government programs meant to increase production (Neilson & Mackenzie, 2016). Policies often don't address regional differences, and problems result from this one-size-fits-all policy. For instance, while seedlings initially appear of adequate quality, and are tested by cocoa research centers in Java, upon arrival in Sulawesi because of different soil types these seedlings no longer bear fruit. Subsidized fertilizers and pesticides are also difficult to come by in many remote regions, and are sold by middlemen who are known to market irresponsibly (Leimona et al., 2015). Neilson (2007) shows that pesticides are not sufficiently regulated and fraudulent and adulterated products which can damage crops are heavily marketed by distributors in cocoa producing regions. Additionally, cocoa machines are often not given to top cocoa producing areas as intended, but instead to areas where cocoa farmers are no longer productive (Swisscontact, personal communication, 2019).

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Fold and Neilson (2007) note that government programs often don't question the appropriateness of technology distributed to small-holder farmers, and many are unable or refuse to adopt unnecessary and costly technology. A similar study also claims that results of government programs have been disappointing due to a lack of supervision, and experts and businesses involved with the sector agree that government on-field supervision of farmers 'hardly exists' (Swisscontact, personal communication, 2019; Kalimajari, personal communication, 2019). A lack of comprehensive trainings for farmers has further been cited as an issue not addressed sufficiently by government policy. To increase productivity farmers would benefit from international certification from the UTZ and USDA. Fold and Neilson (2018) show that the market for certified coffee is growing, as major buyers like Mars have made commitments to purchase 100% certified cocoa beans as early as 2020. Certificates will give cocoa farmers a higher bargaining power when selling their products, but this isn't sufficiently addressed by government programs (Kalimajari, personal communication, 2019).

In the coffee business, MOI developed a plan for 2015-2020 that includes research and development (R&D), applying national standardization (SNI) to innovate and diversify Indonesian coffee processing, encouraging increased production of Arabica coffee beans, diversifying processed coffee products, and modernizing the downstream structure of the coffee industry (Department of Industry, 2009). By applying SNI the government hopes to increase coffee quality, making Indonesian coffee more competitive on the international market. MOA also seeks to boost coffee productivity through financial allocations, land expansion, training of Good Agricultural Practices (GAP), as well as on-field supervision.

By applying SNI the government hopes to increase coffee quality, making Indonesian coffee more competitive on the international market.

Coffee businesses and coffee experts see gaps in the policies. For instance, while application of SNI will help improve coffee quality, the number of on-field supervisors able to directly train farmers on planting and post-planting techniques is limited, and not all coffee farmers can benefit from government support (ICCRI, personal communication, 2019). A 2015 World Bank report confirms that state provision of goods such as extension services to coffee farmers is largely dysfunctional (Neilson et al., 2015). Despite enforced standards, there is inadequate supervision to ensure that farmers can meet these new standards. As the government has been unable to enforce quality standards, private actors in the coffee industry have replaced government standards with voluntary private regulation.

A study by Vicol et al. (2018) explain that private regulation has been a major mode of agri-food value chain governance in the past two decades. Furthermore, demand in the international market is still for cheaper Robusta beans, and it can be difficult to find buyers who pay quality premiums. This makes growing Arabica beans unattractive, despite government programs to encourage Arabica. As a result, the developing downstream industry operates below capacity as it struggles to establish a consistent supply of high quality coffee. Since prices cannot be guaranteed and coffee farmers sell their beans at low prices, they often switch to more profitable commodities that require less attention.

“ The increase of rubber productivity is being addressed by the Indonesian government’s Masterplan for the Acceleration and Expansion of Indonesia’s Economic Development (MP3EI) 2011-2025.

The increase of rubber productivity is being addressed by the Indonesian government’s *Masterplan for the Acceleration and Expansion of Indonesia’s Economic Development (MP3EI) 2011-2025*. The Coordinating Ministry for Economic Affairs has also signed an agreement with Thailand and Malaysia in a Special Ministerial Committee Meeting of the International Tripartite Rubber Council (ITRC) in February 2019 to replant natural rubber on up to 50,000 hectares per year (ASEAN Rubber Business Council, 2019). It pledged to implement a long-term rubber replantation program using a Supply Management Scheme (SMS) (Setyowati, n.d).

” A program implemented by MOA to elevate the rubber sector in Indonesia further involved financial allocations that were to increase from IDR 53 billion in 2015 to almost IDR 60 billion (4 million USD) in 2019 (Direktorat Jenderal Perkebunan Kementerian Pertanian, 2015). Land for rubber cultivation was to increase by 5,820 hectares per year. Additionally, the ministry also planned programs for plant rejuvenation, seed distribution, and loans as well as price guarantees for farmers.

These policies, however, focus mainly on increasing the size of plantations, while ignoring the major problems facing the industry, namely quality. Rubber experts question the land expansion policy because Indonesia already holds the world’s largest total area of rubber plantations, and the forested area needed to expand plantations is becoming increasingly valuable. Experts also point out that replanting programs don’t consider wider sustainability, which can impact not only the environment, but also current and future supply levels (Sitepu, 2016).

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Boosting the productivity of rubber requires a more far-reaching replantation program that focuses not on expanding agricultural land, but on increasing superior rubber tree clones which produce higher quality latex. Currently only 60% of Indonesian rubber farms use superior quality rubber clone trees. To reach high productivity akin to that of Thailand, for instance, superior rubber tree clones must be given to all rubber plantations in the country (IRRC, personal communication, 2019). Quality issues are not sufficiently addressed by government programs, which aim to blindly increase productivity. Programs also don't emphasize educating farmers on the importance of quality, which results in uncompetitive rubber product exports.

“Currently only 60% of Indonesian rubber farms use superior quality rubber clone trees.”

Some argue that rubber farmers should instead receive more and steadier rubber price guarantees and loans for all of their farming necessities, which will encourage them to invest in increased productivity. While this is addressed by some government policies, it is not done sufficiently. Most experts interviewed for this study believe the existing solutions proposed by MOA and the Coordinating Ministry for Economic Affairs should be expanded upon and increased.

In the face of a decrease in global rubber market prices the Coordinating Minister for Economic Affairs agreed along with Thailand and Malaysia on three ITRC policies to stabilize rubber prices. Indonesia will cut the natural rubber export volume, expand the domestic use of rubber in construction, and replant rubber plantations (Susilo & Nasution, 2019). The Rubber Association of Indonesia (GAPKINDO) will oversee the export cuts (Aisyah, 2019). Meanwhile, President Joko Widodo ordered the Minister of Public Works and Housing to use natural rubber for asphalt nationwide in order to absorb natural rubber domestically. Since 2018, several provinces like South Sumatra, Riau and Jambi have paved roads using rubberized asphalt (GAPKINDO, 2019).

Government programs address the many problems faced by these major industries, but often do so inefficiently. Without sufficient understanding of the needs of farmers, programs incorrectly target certain areas of these industries, while leaving others unsupported. In the cocoa industry programs focus on providing subsidized inputs, but allocate them ineffectively and don't provide education or supervision to ensure these inputs are being used correctly. In the coffee industry programs focus on increasing quality, yet are unable to supervise quality creation, and cannot guarantee a consistent market for better quality coffee. Programs in the rubber industry encourage land expansion, when the main problem faced by farmers is low quality.

SOLUTIONS PROVIDED BY PRIVATE SECTOR INITIATIVES

“Over the past two decades private sector actors have become increasingly involved in the agri-food value chain.”

The private sector provides additional solutions to increase cocoa, coffee, and rubber productivity. Over the past two decades private sector actors have become increasingly involved in the agri-food value chain. According to Vicol et al. (2018), agri-food buyers are more and more concerned with the sustainability of their supply, especially in industries like cocoa where there is growing global supply uncertainty. Private sector actors are also often financially invested in the industries with which they work, and are therefore motivated to ensure their success. Problems like lack of consideration for regional differences and quality, lack of supervision, and insufficient farmer education are more easily addressed by these actors, who tend to work with smaller numbers of farmers with whom they are more closely connected. As early as 2007 experts in the cocoa industry suggested that the most effective way for government to increase farm productivity was to provide a supportive framework in which international interventions could succeed (Neilson, 2007). It is by entering into partnerships with the private sector that government programs can make a difference.

“Each actor specializes in specific commodities: Nestlé focuses on coffee, Swisscontact and Kalimajari specialize in cocoa, and Kirana Megatara in rubber.”

The initiatives of four local and international actors were identified for the purpose of this study. These international actors include an international aid agency (Swisscontact), a multinational company (Nestlé), a local company (Kirana Megatara), and a local NGO (Kalimajari). Each actor specializes in specific commodities: Nestlé focuses on coffee, Swisscontact and Kalimajari specialize in cocoa, and Kirana Megatara in rubber. The four actors have assisted a significant number of cocoa, coffee, and rubber farmers in the country, and have managed to improve productivity rates almost across the board. Some local and provincial government bodies have begun to cooperate with private sector actors and have succeeded in effectively disbursing national resources to farmers in need. Their successes can be seen as models for government policy makers to follow and encourage other private sector and government actors to engage in.

Started as a family business in 1866, Nestlé is a food and beverage company with its central office located in Vevey, Switzerland. It employs approximately 230,000 people in more than 84 countries, with 466 factories and offices in at least 70 countries (Nestlé, 2019). Swisscontact is a business-oriented independent foundation in international development cooperation. It works in 30 countries and the main aim of its 100 development projects is to create opportunities for entrepreneurship. Swisscontact working groups, established in each location of their development projects, identify and train local actors so that they can independently develop their businesses (Swisscontact, 2019). The Indonesian NGO Kalimajari is located in Bali. It works to enhance the lives of cocoa farmers by offering training in economics, finance, and farming-related techniques. In partnership with local stakeholders it aims to develop fermented cocoa beans products and markets in Indonesia (Kalimajari, 2019). Kalimajari is funded by the Indonesian government as well as international aid agencies. The fourth actor is Kirana Megatara, the largest producer of crumb rubber in Indonesia, holding more than 18% of the rubber market share in the country. The company produces Technically Specified Rubber (SIR 10, SIR 20, and SIR 20 CV), which is mainly used for car tires. Rubber produced by Kirana Megatara is mostly exported to international tire makers, such as Apollo, Bridgestone and Michelin (Kirana Megatara, n.d.).

The initiatives of these four actors differ greatly from those taken by the Indonesian government. A paper by Neilson (2007) pointed out that demand-side dynamics in global agri-food industries are complex and necessitate the close involvement of large private organizations at the local and regional level. This involvement leads to programs which can be tailored more easily to meet the needs of local farmers. Private sector initiatives focus mainly on educating farmers and providing them with the means to increase their income independently. Some of these initiatives include education on how to access financial services, incentives to increase quality via quality control programs, and contract farming, which guarantees price stability and good relationships between farmers and other actors in the supply chain. Furthermore, these private sector actors all value on-field supervision, and have developed partnerships with NGOs and private companies to support supervision activities. These industries have also seen increasing government involvement in cooperative supervision activities.

“Private sector initiatives focus mainly on educating farmers and providing them with the means to increase their income independently.”

FINANCIAL INTERVENTIONS

Both Swisscontact and Nestlé have established financial intervention programs providing farmers with access to financial support. These programs emphasize the importance of financial literacy and aim to develop a relationship between banks and farmers. A GERNAS (2008) report called for reform of the banking sector, land administration and administrative banking practices, but farmers still continue to face problems in obtaining formal credit.

“While government programs also include facilitated access to financial services, the programs implemented by Swisscontact and Nestlé further incorporate continued monitoring and supervision.”

While government programs also include facilitated access to financial services, the programs implemented by Swisscontact and Nestlé further incorporate continued monitoring and supervision. They work directly with farmers and banks, ensuring that loans go towards increasing cocoa productivity instead of towards other ventures or personal use. According to Vicol et al., (2019) farmers benefiting from government subsidies borrow with limited supervision and often invest outside of the cocoa industry, as many farmers main source of income is not cocoa. By avoiding this, Swisscontact and Nestle are able to increase investment in cocoa productivity more effectively than government programs.

“According to Vicol et al., (2019) farmers benefiting from government subsidies borrow with limited supervision and often invest outside of the cocoa industry, as many farmers main source of income is not cocoa.”

A. Convincing Banks of Cocoa Farmers' Potential by Swisscontact

Banks usually see farmers as incompatible with the financial sector. They expect farmers to have an insufficient educational background and a low probability of repaying loans. Farmers are also uncomfortable applying for loans to finance their farming needs, as they perceive banks to serve solely urban clients (Ashari & Friyatno, 2006). The Collateral in Cocoa Financing Program established by Swisscontact tries to resolve this issue. In this program, Swisscontact's main task is to convince banks to disburse loans to cocoa farmers. They provide comprehensively researched alternatives to conventional collateral, which basically revolve around the cocoa bean itself as it is easy to collect, divisible, fast to liquidate, and highly demanded within cocoa regions (Swisscontact, 2017). Also, they train banks on how to select farmers who can repay loans. Swisscontact then holds annual meetings between the two sides, so that farmers can ask questions directly to banks, and banks can interact directly with farmers. The program fosters friendly relations between the parties and encourages trust.

B. Nestlé's Local Credit Scheme in Lampung

Nestlé provides coffee farmers in Lampung with financial and banking literacy training. Partnering with the local bank BTPN, they teach farmers how to create bank accounts at stalls near their villages. They simplify the process by enabling farmers to register using mobile phones. Farmers first learn how to save money and carry out other banking transactions, they then become eligible

for a micro loan through a government-subsidized credit scheme (*Kredit Usaha Rakyat*). These loans are not disbursed in cash but as allowances to buy fertilizer as farmers sometimes spend cash on things unrelated to their farming activities. Nestlé's efforts have taught 16,000 to 20,000 farmers financial literacy and have given them access to microloans. It has also encouraged farmers to spend more on fertilizers, which is essential for producing high quality cocoa.

These programs represent hands-on efforts by private sector actors to educate farmers and increase independence. While these particular initiatives are geared towards facilitating access to financial services, the same values are duplicated in other programs such as Swisscontact's Sustainable Cocoa Production Program (SCPP) (Swisscontact, n.d.), and Nestlé's Nestle Cocoa Plan (Nestlé, n.d.), which combined have significantly increased cocoa productivity. Government programs like the subsidized credit scheme can benefit farmers, but farmers rarely access them without education, consideration for regional differences and supervision. Herein lies the comparable success of private sector initiatives.

QUALITY CONTROL PROGRAM BY KIRANA MEGATARA

The Indonesian rubber industry is known for producing low quality rubber unable to meet international standards. This is not effectively addressed by government programs, which instead encourage farmers to increase the size of their plantations. The private sector, however, is more keenly tuned in to these issues. The domestic company Kirana Megatara addresses them directly. This company offers higher prices for high quality rubber, and connects with local farmers to educate them on quality.

Middlemen often buy rubber from farmers at low prices: IDR 7,000/kg – IDR 8,000/kg for dried rubber and IDR 3,000/kg – IDR 4,000/kg for wet rubber (Kirana Megatara, personal communication, 2019). Kirana Megatara, on the other hand, offers higher prices that correspond to those at the Singapore Commodity Exchange (SICOM), which determines and publicizes world market prices for natural rubber (Tokyo Commodity Exchange, 2010).

Figure 2.
Singapore Commodity Exchange (SICOM) rubber prices 2014 - 2019



Source: Singapore Commodity Exchange (n.d)

From 2014 until 2019, rubber prices paid by Kirana Megatara ranged from IDR 17,000 (USD 1.24) per kilo in November 2015 and January 2016 to IDR 36,000 (USD 2.7) per kilo in February 2017. These prices, however, only apply if farmers sell rubber to Megatara that is considered clean and does not contain gypsum, soil, and rocks. It also needs to be dried for two weeks and not dipped in water from either pond or dam (Kirana Megatara, personal communication, 2019). To check whether the product adheres to clean rubber standards, Kirana Megatara maintains a laboratory in each of its factories. They are accessible to farmers, who can observe how officers check the rubber quality, which prevents cheating practices on either side.

By ensuring quality, Kirana Megatara makes Indonesian rubber more competitive on the international market, and encourages farmers to invest in practices that increase quality, like using superior quality rubber tree clones. The quality control program motivates farmers to innovate and allows them to sell their product at a higher price, something government programs fail to do.

CONTRACT FARMING PROGRAM BY KALIMAJARI

“
While government policies encourage production of quality cocoa, the lack of supervision and an inability to provide price guarantees makes quality cocoa unattractive.”

Farmers in Indonesia have the capacity to produce high quality cocoa, but without consistent buyers able to pay quality premiums, many don't. While government policies encourage production of quality cocoa, the lack of supervision and an inability to provide price guarantees makes quality cocoa unattractive. A contract-farming program implemented by Kalimajari makes an effort to solve this problem by connecting farmers with buyers of quality cocoa beans.

Contract farming sets certain obligations and rights agreed between buyers and farmers (Fachexpertise, n.d.). Contracts specify quality standards and include a predetermined price at which cocoa sellers can sell their product. Entering into a contract means that buyers are obligated to purchase cocoa from farmers at these specified prices given that the cocoa beans meet a certain quality standard. Kalimajari uses contract farming to increase the welfare of cocoa farmers. Kalimajari initially entered into written agreements with 19 cocoa buyers, including Valrhona in France, and Pipiltin as well as Cau Chocolate Bali in Indonesia. The 19 buyers place orders with the farmers to produce fermented and internationally certified cocoa beans. Kalimajari then trains the cocoa farmers in GAP. This training ensured that 619 farmers were certified by USDA Organic, an organic certification agency from the United States of America, and UTZ, a sustainable certification agency from the Netherlands over the course of the program. In a study by Neilson and Mckenzie (2016), it is suggested that the demand for sustainable, certified cocoa is likely to increase as major industry players begin to emphasize the importance of sustainability. This will make farmer certificates increasingly valuable.

The 19 buyers paid between IDR 40,000 and 50,000 per kilogram of cocoa beans, which is double the price of unfermented cocoa beans that are usually sold by Indonesian farmers for IDR 20,000 – 25,000 per kilo. UTZ and USDA Organic also visited farmers in Jembrana, Bali, to train them in cocoa planting and better cutting techniques.

This program encouraged farmers to produce higher quality cocoa, as it guarantees that farmers could earn quality premiums from their product. Many farmers in Indonesia are cautious to put extra resources into improving quality, as the market is not yet developed to reward them for their efforts. Contract farming, however, provides them with the extra confidence they need to produce a more competitive product. This has also been recorded in other works by Neilson and Shonk (2014). The education provided by Kalimajari over the course of this project provided additional benefits to farmers, enabling them to continue to improve productivity independently.

ON-FIELD SUPERVISION

A large component lacking in government programs is on-field supervision and understanding of local conditions. This makes it difficult to effectively allocate resources. Vicol., et al (2018) shows that while the Indonesian government invests in supportive programs, they don't have enough staff in the field to assure these programs are being applied correctly. Many private sector actors, however, prioritize on-field supervision.

All four of the non-government actors in this study firmly agree that farmers need supervision, not just workshops. Farmers should apply the knowledge they receive directly in-field. Nestlé, Swisscontact, Kirana Megatara, and Kalimajari give extension officers (EO) the main task of helping farmers with daily challenges. These EO supervise GAP, cutting, planting, choosing the right clones, and proper use of fertilizers, seeds, and soil. According to personal communication with Swisscontact (2019), government-employed agricultural field instructors (*penyuluh pertanian lapangan*) usually take care of more than five commodities per person while privately-employed EO handle only one commodity. This enables them to master the finer details of the pre- and post-planting techniques used for cocoa, coffee, and rubber.

The four non-government actors have a very limited number of EO, less than 100 each. Indonesia's biggest rubber exporter Kirana Megatara, for instance, has only 30 EO spread across their 15 factories in Kalimantan and Sumatra (Kirana Megatara, personal communication, 2019). This would be insufficient as each actor assists more than 100 farmers each, so these actors developed partnerships to resolve the matter. Partners include buyers of products, research institutes and NGOs. All of them cooperate with the non-government actors studied here to support the work of the EO in order to increase the total number of supervised farmers.

Recently there has also been a shift in government policy which encourages government-employed field instructors to work more closely with private EO (Gesha, 2019). MOA has collaborated with NGOs and corporations such as Mars to insure more supervision is available to farmers. (Zainuddin, 2019). The government field-instructor model could further benefit from increased cooperation with these private sector actors.

“Recently there has also been a shift in government policy which encourages government-employed field instructors to work more closely with private EO (Gesha, 2019).”

Table 3.
Partnerships for extension services

Swisscontact	SECO Switzerland, Barry Callebaut, Big Tree Farm, Cargill, Ecom, Guittard, JB Cocoa, Krakakoa, Mars, Mondelēz International, Nestlé, Cocoa Sustainability Partnership Indonesia & PISAgro
Kalimajari	Jembrana District Government, Kerta Semaya Samaniya Union, Barry Callebaut, Pipiltin, Valrhona, Cau Chocolate Bali, Rainforest Alliance, UTZ, Indonesia Coffee and Cocoa Research Institute. & Cocoa Sustainability Partnership Indonesia
Nestlé	Indonesia Coffee and Cocoa Research Institute, Nestle Research & Development Centre in Tours – France, Swisscontact, & PISAgro
Kirana Megatara	PISAgro, Apollo, Bridgestone, Continental, Cooper Tires, Fate, Good Year, Gajah Tunggal, Hankook, Kumho Tyres, Michelin. Nexen, Pirelli, Sumitomo, Toyo Tires, Yokohama Rubber & Mercedes Benz

Source: Partners were identified through interview and company websites

PRODUCTIVITY AND INCOME INCREASE RESULTING FROM PRIVATE SECTOR INITIATIVES

The private initiatives described above contributed to improved productivity rates. All four private sector actors have significantly increased productivity in their respective sectors by educating farmers on quality and sustainability, considering regional difference, and providing adequate supervision.

Swisscontact, with 7 years of experience supervising 154,000 cocoa farmers under their Sustainable Cocoa Production Program (SCPP), explains that their results vary with time. Beginner farmers, with 2-years of Swisscontact supervision, can achieve average productivity of 0.62 tonnes/ha annually. Farmers with 6-years supervision, can achieve average productivity of 0.93 tonnes/ha, and last but not least, professional farmers can achieve average productivity as high as 2.5 tonnes/ha annually. By contrast, the Ministry of Agriculture (MOA) records national cocoa productivity to be approximately 0.4 tonnes/ha annually, so Swisscontact farmers' average productivity is significantly higher than the average productivity rates in Indonesia. Swisscontact-supervised farmers' productivity is recorded at 55% higher for beginner farmers, 133% higher for farmers with 6-years supervision, and 625% higher for professional farmers.

Swisscontact has successfully improved the productivity rates of approximately 154,000 cocoa farmers, and they believe that with the right assistance, and consistent use of GAP, Indonesia's cocoa productivity should reach 2 tonnes/ha annually, which is more than four times as high as the current productivity rate reported by MOA. The projected productivity of 2 tonnes/ha annually is confirmed by MOA (Zainuddin, 2019).

Kalimajari, which only manages approximately 619 cocoa farmers with each farmer possessing less than 1 hectare of land, records productivity not much higher than MOA and FAO's average productivity rates. However, their cocoa beans are bought at much higher prices due to their fermented quality. Average productivity is 0.3 tonnes/ha for one harvesting period – 0.6 tonnes/ha annually. Farmers receive 40,000 IDR for each kilo, meaning that farmers selling to Kalimajari earn a minimum of 12 million IDR per harvest, and 24 million IDR annually. These incomes are far higher than those of cocoa farmers who sell their product for only around 20,000 IDR per kilo, and are unable to make up for the low prices per kilo with greater productivity.

Nestlé has supervised 20,000 coffee farmers in Lampung for over 30 years and has achieved an average productivity of 1.2 tonnes/ha annually. This number is more than twice as high as MOA's reported average productivity for Indonesian coffee farmers, which is approximately 0.5 tonnes/ha. It is 20% higher than Colombia's average coffee productivity, which is approximately 1 tonne/ha. Nestlé and the Indonesian Coffee and Cocoa Research Institute (ICCRI) agreed that Indonesia's coffee productivity is still low, and independent coffee experts with decades of experience in managing small-scale coffee businesses, claim that Indonesia's coffee productivity can still be improved (Coffee Business Expert, personal communication, 2019). The general conclusion is that Indonesian coffee producers should be able achieve productivity rates of more than 1 tonnes/ha per year in optimal conditions.

Finally, Kirana Megatara has seen 8,000 of the rubber farmers they've assisted reach productivity levels of 1.2 tonnes/ha annually. Kirana Megatara's rubber farmers' productivity is 36% higher than the national rubber productivity, which is reported at approximately 0.88 tonnes/ha. Farmers achieved this by reinvesting in their rubber farms as they earn high returns from quality sales to Kirana Megatara.

Both Kirana Megatara and the Indonesian Rubber Research Institute IRRI agree that rubber's productivity in Indonesia should be able to reach 1.7 tonnes per hectare, which is significantly higher than the current productivity rate claimed by FAO of below 1.0 tonnes per hectare (Kirana Megatara, personal communication, 2019; IRRC, personal communication 2019).

CONCLUSIONS

The Indonesian government addresses the issue of low productivity in the cocoa, coffee, and rubber industries by offering subsidized seeds and distributing machinery, as well as carrying out farmland expansion policies. Non-government players and private industry experts have criticized this, as the distribution of seeds, machines, and the expansion of land tends to be done without ensuring that these initiatives will benefit farmers. There is a lack of consideration for regional differences, supervision, and farmer education, which reduces the effectiveness of government programs. Furthermore, if there is no market for better quality products no amount of government encouragement will convince farmers to invest in quality. Official data proves that these attempts are ineffective, as it shows that Indonesia's productivity in cocoa, coffee, and rubber still lag behind that of the leading global producers.

On the other hand, attempts made by Swisscontact, Nestlé, Kirana Megatara, and Kalimajari achieved improved productivity in cocoa, coffee and rubber as these non-government players emphasized educating farmers and increasing their independence. These private sector actors work more closely with farmers and are more informed about the many needs of farmers in different regions. This enables them to tailor programs and allocate resources more efficiently. They also strongly value supervision, and have connected with organizations to increase the number of on-field supervisors available to the farmers they work with. Private sector actors provide farmers access to bank loans so that they can sustain their farming activities, and educate them on financial literacy so they are able to continue accessing these services independently. Companies like Kirana Megatara create a space where quality is valued and ensure that farmers are able to earn a higher return by producing higher quality products, which are more competitive on the international market. The initiatives by Kalimajari also promote quality products, ensure price security, and educate farmers, providing them with certificates which increase their bargaining power. These initiatives are targeted at increasing independence.

Seeing how private initiatives implemented by non-government players have improved productivity, it is advisable for the national government to cooperate with private sector actors. The government could incorporate these successful initiatives into government programs or cooperate with private initiative to broaden their outreach and impact throughout Indonesia. Some government programs have begun to include private sector actors at the local and provincial level, and continue to advocate for cooperation.

Government bodies and associated organizations like the Indonesian Cocoa Commission (ICC), and the Cocoa Sustainability Partnership (CSP) which coordinates between government, NGO, and domestic private sector actors in the cocoa industry have existed since the early 2000s. The Indonesian government also cooperates with international bodies like the International Cocoa Organization.

In May of 2019 the Director General of Plantations, Kasdi Subagyono, visited Mars Cocoa Research Center in Pangkep to see how the sustainability leader produces their superior quality cocoa beans (Zainuddin, 2019). The Director General acknowledges Mars as a role model, and plans to

model their upcoming BUN 500 planting program after Mars programs. During this meeting both Mars and government officials emphasized the importance of working together.

This emphasis on partnership was echoed by officials at the opening of a meeting for agricultural extension service providers in Yogyakarta in July of the same year. A leading official from MOA, Momon Rusmono, spoke to address the importance of collaboration between state, non-governmental, and private extension service providers. He acknowledged that while all three extension service providers had the same goal, namely prosperity for farmers and sustainability, they all approached it differently. By combining these different methods, he said, extension service providers could help farmers achieve increased productivity and sustainability (Gesha, 2019).

Other government officials like the Coordinating Director of Food and Agriculture Coordination, Musdhalifah Machmud have also stressed the importance of cooperation and called for assistance from the private sector. In 2018, the Director General of Estate Crops, Ir Bambang, emphasized the need to engage various stakeholders in program design, and asked private sector actors to help in providing accurate production data, after having acknowledged that MOA production data in the cocoa industry seemed to contradict what researchers were experiencing in the field (Cocoa Sustainability Partnership, 2018).

This shows that the government is willing to coordinate with the private sector and adopt new methods from private sector programs. The government's involvement with the Cocos Sustainability Partnership (CSP) and other public-private co-shared institutions such as those noted above is viewed favorably by industry actors. However, a paper by Diaz Rios (2013) notes that these types of initiatives and institutions tend to gain more traction with international trading companies and manufacturers than government. They represent an opportunity that could be more effectively harnessed by government to support long-term sectoral development. The government should continue to engage with various industry stakeholders and refer to them for guidance and assistance. By combining efforts, private sector initiatives, which are more tailored to local needs but generally carried out on a smaller scale, can reach more farmers through government networks. In turn government programs, which often lack information and are applied ineffectively, will gain more local, industry specific knowledge.

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