

Strategy to Improving Smallholder Coffee Farmers Productivity

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Abstract: *Coffee is a leading export commodity that provides great foreign exchange for Indonesia. The increase in domestic coffee consumption and the high export demand apparently cannot be fulfilled by Indonesian coffee producers. Many factors are cause underdevelopment of Indonesia's coffee industry. This paper aims to explore strategies to improve smallholder coffee farmer's productivity. To understand the phenomenon, author identify the problems encountered in coffee farming. Furthermore, a more in-depth literature review of these issues was conducted to present the most appropriate strategies. Based on the findings, author propose several notions that have positive impact to improving smallholder coffee farmers productivity in Indonesia, there are fair trade certification, technology adoption and intensive farmer training, closely involve women, and focus on active farmers.*

Keywords: *Coffee, technology adoption, empowerment, farmers, Indonesia*

1. Introduction

Coffee plays an important role in the livelihood of smallholder farmers. International Coffee Organization noted that coffee supports the millions of smallholder farmers and provide substantial employment opportunities. Coffee cultivation requires a lot of labor, especially in the production process and the harvest, make coffee became one of the drivers of development in rural areas (Pratiwi, 2015). Arabica and Robusta are the two most widely grown coffee species in Indonesia. Robusta coffee composition approximately 83% of the total Indonesian coffee production and Arabica coffee as the remaining 17%. Comparison of Robusta coffee production with Arabica is expected to increase the percentage, for Arabica coffee to 30% and Robusta 70% (Gabungan Eksportir Kopi Indonesia, 2017). The difference between the two varieties lies mainly in the taste and level of caffeine. Arabica has a richer and better taste than Robusta, and is known to have higher price (PTPN XII, 2013).

The increase in domestic coffee consumption and the high export demand, in point of fact cannot be fulfilled by coffee producers. The good Indonesian coffee production apparently not accompanied by the processing industry (Pratiwi, 2015). Whereas, the increase in the quantity and quality of coffee produced by farmers is also expected to increase their profits and prosperity. While many authors focuses on the coffee value chain (Mitchel, 2009; Kordigehalli, 2011; Pratiwi, 2015) and establish communication through mobile phone technology (Mittal & Tripathi, 2009; Masuki. *et al.*, 2010; Tettey, 2013) to improving small coffee farmers, this paper aims to explore strategies to improve smallholder coffee farmer's productivity. Many factors are suspected to cause a decline in national production and coffee exports. Lack of quality control and decreased production of coffee beans produced by small farmers is thought to be one of the main factors, as they are the largest contributor to national coffee production. The other factors such as technical factors, inadequate infrastructure, regulatory, socio-economic conditions, as well as the limitations of the technology is also

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thought to be an obstacle in the development of the coffee processing industry (Directorate General of Agriculture, 2014).

Based on the literature review on various agricultural research, a strategy often used to solve productivity problems is fair trade certification and adoption of new technologies. Fair Trade is a trading system which claims that coffee are produced and marketed with ethical standard. The goal of a fair trade certification is to empower farmers, enable farmers to get better conditions and fair prices, and concern for environmental issues. Empowerment can be seen as a means for community development, poverty reduction, and the creation of a better social environment (Ansoms, 2008). Given the large number of women working in the coffee industry, especially in plantations involving women more closely can potentially increase the independence of women in terms of finance and help improve the quality of life of their families. In addition, involving women in various trainings enables them to apply good farming practices. The concept of women's empowerment can be defined as a process of expanding women's freedom that allows individuals to think, make choices, take action, and exercise authority in an autonomous way (Baltiwala, 1994; World Bank, 2001).

Many coffee-producing countries experiencing similar problems, but they managed to survive and apply better technology adoption. Adoption can be interpreted as the application of some new ideas, tools or technology that is delivered in the form of communication messages. Technology adoption is simply defined as the act where one begins to use new practices to replace the old. The adoption of new technologies is part of adaptation to risk and climate change (Brien *et al.*, 1965; Chambers and Quiggin, 2000). Adoption technology in coffee farming should be applied such as soil fertility management, crop production, post-harvest, and environmental improvement projects. The more advanced technology makes many new technologies that can be

applied to coffee plantations. The opportunity to increase the productivity of Indonesian coffee crops is wide open. Indonesia has a tropical climate that is very suitable for both types of coffee plants. Coffee plant productivity is very likely to increase because the productivity of coffee plants in Indonesia only reaches about 50% of the potential that can be achieved (Wahyudi & Jati, 2012).

2. Literature Study

This section will explore the history of coffee in Indonesia and the root of the problems that arise in coffee farming. Coffee is one of the agriculture sub-sector commodities that have an important role in economic activity in Indonesia and one of the country's foreign exchange producers besides palm oil, rubber, and cocoa. Indonesia's coffee production in 2016 is estimated to reach 610.42 thousand tons with Sumatra as the largest coffee producer since the highest coffee producing provinces are in Sumatra. Coffee plantation in Indonesia is divided into Large Estate and Smallholders Estate. Estate Company (large estate) is a company in the form of a business entity / legal entity engaged in cultivation of plantation crops on a controlled land, with commercial purpose and obtained a business license from the authorized agency in the granting of plantation business permit. Smallholders estates are a plantations cultivated by the household and is not in the form of a business entity / legal entity. Approximately 95% of the area and coffee production in Indonesia is smallholder's coffee, while the rest is estates coffee (BPS, 2017). Here are the problems that are often encountered by smallholder farmers.

An unstable market

The International Coffee Organization (ICO) recently proclaimed miserable news about the decline in coffee farm revenues and some farmers suffered losses. Some farmers get a pretty lucrative harvest, but do not have enough funds to do crop maintenance. Coffee commodities are recognized to often

experience price fluctuations as a result of an imbalance between supply and demand of coffee commodities on world markets. The data show that since March 2015, composite prices are below the 10-year average (Perfect Daily Grind, 2016). In fact, the trend of yields and quality is unpredictable, not even the price of coffee. Nothing is certain until the price has been paid (Ospina, 2017). In line with ICO, Wahyudi and Jati (2012) believe if the price of coffee is the main obstacle facing coffee producers. Coffee farmers only earn about 19-22% of the total price of a cup of coffee, contrast to the price of coffee in the consumer countries. Unstable coffee prices at national and international levels play a major role in coffee producers. In the season when coffee prices fall, farmers may not be able to allocate funds and resources for coffee production technology. If this continues to happen, the quality and the yield of their crops will gradually decline (Asfaw, Bezabh, Anteneh, & Kumela, 2016).

Limited government interest

Indonesia is an important coffee supplier to the world market, notwithstanding, coffee is not a strategic priority for the Indonesian government. Government support targets commodities with larger portions of exports or regional tax bases such as palm oil and cocoa (The Sustainable Trade Initiative, 2014). There is no real support from the government for the national coffee industry, whether it is the provision of seeds, knowledge transfer to farmers, or ease of exporting to exporters (SWA, 2013). Irfan Anwar, Chairman of Association of Indonesian Coffee Exporters (AEKI), said that Indonesia's coffee production in recent years has continued to decline. He believes that the decrease of production must be solved together with the government, for example by giving licensing permits to entrepreneurs to open new coffee plantations, provision of seeds and fertilizer to farmers (Suryanto, 2016).

Low productivity

Ministry of Agriculture mentioned that there are a number of problems in the development

of coffee commodities in Indonesia, one of which is low productivity. Low productivity of is caused by the number of old and damaged plants, lack of maintenance from pests, and low technology dissemination (Alamsyah, 2015). The same information is also conveyed by Chairman of AICE, he believed the major obstacle in the coffee industry today is the low productivity of farmers, the farmers are not optimal in the intensification of coffee plantation (SWA, 2013). Minister of Industry, Saleh Husin, state if coffee plantation area in Indonesia is quite wide, reaching 1.24 million ha. Unfortunately, this coffee plantations area are not supported by high productivity (Rachman, 2015). The coffee yield is still relatively low i.e. 500 – 800 kg/hectare/year which is around 60% of potential production. Produce low quality coffees because the application of standard processing has not been fully adopted (ICO seminar, 2012).

Climate Change

Last year's climate change has caused drought across Indonesia, it was reported most of the estates are affected by dry weather throughout South Sulawesi, Java and Eastern Indonesia. Some coffee farmers in the Central Highlands of Central Sumatra, claim their crops dropped by 50% due to unpredictable rain and drought (Beament, 2017). Another case, coffee farmers in Manggarai, Flores, NTT experienced crop failure due to the monsoon rains that cannot be predicted in advance. Consequently the coffee flowers fall and coffee fruit also become unhealthy. There are at least 1,500 hectares of land that suffered crop failure (Serikat Petani Indonesia, 2017). Anteneh, Bezabih, and Asfaw (2015) indicates that climate change has become a serious problem and has a negative impact on coffee productivity. Coffee berry borer, coffee berry disease and leaf rust disease (la roya) is one of the most well-known diseases, and has affected coffee plants for more than a century. In 2012, within two years, the disease has caused more than \$ 1 billion in Central America (USAID, 2017). However, farmers' awareness of disease control is very limited and few coffee farmers are able to adapt to

extreme climate change. Plus there are no short-term adaptation strategies that can help rural coffee communities strengthen their capacity to cope with disasters, improve their farming skills (eg pruning, shade, nutritional management and waste water management) and diversify their livelihoods (Haggar, 2012).

3. Methodology

This conceptual paper is intended to identify problems of coffee farming in Indonesia through an analysis of the history of coffee in Indonesia and find the solution to improving smallholder farmer's productivity. The question of this paper is: how to improve smallholder coffee farmer's productivity in Indonesia? The answer to this questions will be based on further literature review. Factors described in the paper are analyzed using a theoretical framework based on the review and analysis of data from the literature. Thus the author need to explore, review the interrelated literature, combine, and discuss them in order to obtain a new concept in accordance with conditions in Indonesia. Some information in several areas such as agriculture, economics, and climate change are used to obtain literature on the topic. For future research, qualitative and quantitative research should be done to obtain data indicating if the given solution is appropriate.

4. Finding and Discussion

The number of problems concerning the low productivity of small farmers made this problem requires to be solved immediately. Here are several literature studies that suggested strategies to increase coffee production:

Fair Trade Certification

Fair trade creates opportunities for small producers, providing a guaranteed price above the fixed base price when the market price is low. This benefits farmers when the global market of coffee beans fluctuates wildly

(Valkila & Nygren, 2010; Ruben, 2011). Contracts with fair trade certification ensure that the products are produced in decent working conditions and environment conscious. In exchange, the farmers must follow standard procedures to obtain the fair trade certification. First they must ensure eco-friendly practices such as the use of fertilizers, pesticides, water and energy. Second, they have to commitment to human rights such as not exploit child labor, education for the children of coffee farmers, prioritizing gender equality, health care, increasing labor rights, and facilitating long-term trade relations (Mussato, 2011).

Several studies concluded that Fair Trade has achieved their goal to increase productions and profits for smallholder producers, which positively affect their quality of life. Fair Trade substantially improves the welfare of coffee farmers and their families, primarily because it provides better access to credit facilities, as well as through training and capacity building for product management. Fair trade certification becomes an effective solution of an unstable markets and a perfect solution when the governments have limited support for smallholders. When they get a decent life from coffee, then they will automatically be more active to increase the amount of production and quality of their coffee. Fair trade certification is the answer to the problems faced by farmers, they can prosper farmers by providing guidance in advancing the coffee production and provide better prices when the prices fluctuate. Fair trade is a solution to help smallholders with limited access to resources invest in long-term quality and productivity and build resilience in the face of global threats such as climate change (Oikocredit, 2017).

Then this research propose Fair Trade Certification have the positive influence on increasing coffee production and the welfare of coffee farmers in Indonesia.

Technology adoption and intensive training

Coffee farmers in Indonesia are mostly small farmers with low incomes, low education and

low skills. They pay less attention to efficient and effective farming techniques. These farmers are surrounded by other low-income farmers, who manage their plantations passively. Implementation of good agriculture practices is very important to get high quality, farmer coaching efforts needed to change the behavior of plant maintenance. A concrete example of the lack of knowledge of farmers on good agriculture practice is coffee plantations in North Sumatra, where pruning and sanitation has not been implemented properly (Perkebunannews.com, 2017). If no one does innovation, these farmers cannot learn from each other to increase revenues and yields. There has been a lot of research done to resolve climate change with various technologies and the prevention to avoid major losses. Most studies recommend agronomic practices such as the right spacing, weeding, use of manure, pruning, stumping, and disease controls should adopted by farmers (Kalyebara, 1999). Manifestations of this adoption can be observed in the form of behavior, methods and equipment and technology used in its communication activities (Mardikanto & Sutarni, 1983).

Technology adoption and intensive coffee farmers are the best solution to counter the problem of climate change. Access to agricultural technologies is a major role in increasing adoption rates. The more farmers' access to agricultural technology, the more they can adopt. Improvements can be initiated with governance assistance from planting to post-harvest processing, new land clearing and rejuvenation of old and inadequate coffee trees (disbun.jabarprov.go.id). There have been a farmer training program in Indonesia using a class-based teaching model. Such programs have the advantage of being relatively affordable to run. However, to effectively change farmer farming practices, a more intensive approach is encouraged. The "farmers field" method, for example, features local coaches and participatory teaching methods sent to small training groups on a regular basis (The Sustainable Trade Initiative, 2014). By adopting modern technology, coffee

farmers can increase their productivity. The government also should be set up special team to deal with several serious cases such as rust leaf. Leaf rust disease problem was attracted international attention, in some countries they form a special team to handle leaf rust problem. One of them in Spain, has been formed investigation team Roya Recovery Project whose main task to examine the diseases of coffee leaf rust plants (Guhl, 2008; Musika, 2017).

Then this research propose technology adoption and intensive farmer training have the positive influence on increasing coffee production in Indonesia.

Closely involve women

Anteneh et al. (2015), found that the participation of women in coffee farming is still far from the expected level. Targeting women farmers is important to ensure the adoption of wider agricultural practices, and to combat gender inequalities in rural areas. Women play an important role in the agricultural sector in Indonesia, about 40% of agricultural activities. In addition, women constitute 80 percent of coffee workers in North Sumatra, Indonesia. Although they play a key role in the cultivation of coffee, processing and marketing, it is often excluded from training and other development opportunities.

The United States Agency for International Development (USAID) believes that for economic development is necessary to increase women's empowerment (Christie, 2010). Targeting women farmers will be important to ensure a widespread adoption of better farming practices, and to promote progress in fighting gender inequalities in rural areas. These women should be taught about new adoption technology and given intensive farming training, because they are directly related to production process activities. They must have good knowledge and ability to run the entire production process because it will affect the quality and quantity of coffee produced. When women farmers have better access to technical training and productive inputs, they are more likely to apply good

farming practices. When women farmers are included in agricultural development opportunities, they receive critical knowledge, skills and assets that help them improve their household productivity (The Sustainable Trade Initiative, 2014).

In Karaba's research has been proven if after women participated in income-generating activities, now they become independent and are no longer financially dependent on their husbands. It leads to socio-economic empowerment and paves the way for development in the family, society, and national level (Birshall, 2002, Gisaro, 2013). In Indonesia, Java Mountain Coffee became the first social company for indigenous women to join Conservation International's Sustainable Coffee Challenge and invest in women farmers in Java. According to them, women do most of the work at the base of the global coffee supply chain in developing countries. Therefore, it is necessary to empower women by allowing them to reach their full potential. They pay women coffee workers in Bali and Java to join various certification programs and fund a new climate-proof coffee tree nursery program. From this program, it is expected that revenues will increase as agricultural output increases as new trees are more resistant to climate change. (Petriza, 2016).

Then this research propose closely involve women have the positive influence on increasing coffee production in Indonesia.

Focus on active farmers

Coffee grows well from the tip of Aceh to Lampung, generated from plantations stretching along the Gayo Highlands, in Central Aceh and Bener Meriah Provinces. Four of the highest coffee producers in Indonesia are located in Sumatra, with details: Aceh 47.38 thousand tons, North Sumatra 60.18 thousand tons, South Sumatra 110.39 thousand tons and Lampung 110.35 thousand tons (BPS, 2017). Training can be prioritized to half of a half million farmers in South Sumatra. Indonesian coffee is produced by an estimated 1.5 million smallholder farmers, with an average farmer size of less than one

hectare of coffee. Over 60% of Robusta coffee production is concentrated in Southern Sumatra. These farmers tend to have a commitment to growing coffee and therefore keen to adopt changes in agricultural practices. Focus on southern farmers can be the solution of low productivity, because they are very committed and eager to learn to produce good quality coffee. They are also actively adopting technology adoption to increase productivity. Less-active farmers are usually found outside of South Sumatra and include farmers who are not dependent on coffee as a major source of income, as well as farmers who do not have many coffee trees (The Sustainable Trade Initiative, 2014).

Then this research propose focus on Southern Sumatra's active farmers have the positive influence on increasing coffee production in Indonesia.

4. Conclusion

Based on the literature review, fair trade certification, technology adoption and intensive farmer training, closely involve women, and focus on active farmers. Fair trade certification has a goal to empower farmers, enabling farmers to increase the amount of production that will lead to better living conditions. Contracts with fair trade certification ensure that the products will get a fair price, but farmers must follow standard procedures to obtain fair trade certification. Fair trade encourage to involve women in various trainings to enable them to apply good farming practices. Adoption of technologies such as soil fertility management, crop production, post-harvest should be applied to farming practices in their daily life. Training can be prioritized for half of a half million farmers in South Sumatra, since they are actively adopting technology adoption to increase productivity. They are very committed and eager to learn to produce good quality coffee. This adoption manifestation can be observed in the form of behaviors, methods and equipment and technologies used in its communication activities.

This study can be used by actors in the coffee industry as an evaluation to generate better strategies to improving smallholder coffee farmer's productivity. Moreover, it is also expected to contribute to the agricultural knowledge. For future research, qualitative and quantitative research should be done to obtain data indicating if the given solution is appropriate.

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