Sustainability certification as a pillar to promote Indonesian coffee competitiveness

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Abstract. Coffee is an important agricultural product traded in global market. Coffee exports have contributed significantly to the economic growth of Indonesia, reducing the trade deficit and partly solved the problem of poverty reduction for people, especially in rural area. The demand of high-quality coffee is growing fast. The demand from consumers for certified coffee is also growing, and the price they are willing to pay has caught the attention of traders and producers. In global scope we have some sustainable coffee certifications including: Organic, Fair Trade Certified, Rainforest Alliance, Smithsonian Bird Friendly, UTZ Certified, and 4C Common Code. The objective of this review are: (1) perspective analysis of sustainable coffee certifications, (2) analysis of Indonesia coffee industry, and (3) strategy formulation in improving practices and accountability of Indonesia coffee development in global supply chains. There is evidence for a range of social, economic, and environmental benefits of certification. These certifications have the potential to create value for smallholders, as certain certified coffee carries a market premium. In order to meet market demand, coffee farmers have had to adapt a good farming practices to qualify for certification.

Keywords: sustainability, certification, competitiveness, coffee

1. Introduction

Coffee has an important role in the national economy. In terms of production it is known that coffee has a high economic value and acts as a source of income for farmers. In terms of coffee trade, coffee as agricultural products are widely traded and provide foreign exchange from trade in global markets. Poverty problems that occur in rural areas have the opportunity to be overcome through increased production and added value of coffee commodities.

Coffee productivity in Indonesia in the 1984-2017 period fluctuated, but subsequently tended to stagnate. In 2017 the productivity has only reached 761.55 kg of coffee beans/ha/year for Robusta coffee and 813.89 kg of coffee beans/ha/year for Arabica [1]. The productivity of this plant is classified as very low when compared to competing countries such as Vietnam whose crop productivity has reached around 2,300 kg/ha/year [2]. In Indonesia, most of the coffee plants are smallholder plantations, around 96.19%. The characteristics of smallholder coffee plantations are marked by the limited application of cultivation and postharvest technologies, so it is not in accordance with the principles of sustainable agriculture. Coffee yield is still relatively low i.e. 500-800 kg/ha/year which is around 60%
of potential production. It is affected also by using of non recommended coffee variety and many of coffee tree has already too old.

The coffee industry faces a relatively large challenge. This is indicated by the condition that will be under pressure not only from land used competition, but also the challenges of climate change. Climate change has led to an explosion of pests and diseases, which in turn has led to a decline in production. Climate change has also caused decreasing number of the area with agro-climate compliance.

On the other side, there is a shift in consumer preferences where purchases are based on compliance with standards based on health and food safety issues. Coffee certification consequently is to be an important issue due to address a number of issues related to coffee plantations such as environmental issues, health and social issues of workers, as well as health and food security. Coffee certification is an evaluation process that ensures the process of planting and processing coffee according to applicable standards. The high demand for coffee makes the national coffee plantation business begin to stretch its growth. Unfortunately, the number of small coffee plantations that are not certified, makes the selling price of coffee in farmers is very low. Coffee certification can be used to increase the value of selling coffee on the international market.

In global scope we have some sustainable coffee certifications including: Organic, Fair Trade Certified, Rainforest Alliance, Smithsonian Bird Friendly, UTZ Certified, and 4C Common Code. These certifications are quite variable and smallholders may not understand exactly why and how to get the certification. Positive impacts of certification are rarely attributable to certification alone, but operate in conjunction with other local factors, particularly education and skills levels, but also market structures, local infrastructure, and administrative capabilities [3]. However, only larger coffee producers and some smallholder farmers benefit from sustainability standards. Limitation asset and access to resources in poorer farmers caused certification is not an important matter to be achieved.

The objectives of this review are to analyze: (1) the competitiveness of the Indonesian coffee industry in the global market, (2) the role of coffee certification in driving the performance of the coffee commodity system, (3) the constraints on the implementation of coffee certification, and (4) formulate strategy in improving practices and accountability of Indonesian coffee development in global supply chains

2. Sustainable coffee certification

Quality of agriculture product is characterized by certification and verification. Certification is an instrument that can be used to gain competitive advantage over its competitors in the industry, because of its ability to increase product added value. The certification can address a growing worldwide demand for healthier and more socially, and environmentally friendly products meanwhile is based on the idea that consumers are motivated to pay a price premium for products that meet certain precisely defined and assured standards [4]. Sustainability standards provide assurances that purchases support sustainability, and better connect consumers and producers.

Based on the minimum area, certified share of cultivated land is still low. In 2016 almost 26% of the global coffee area and almost 23% of the global cocoa area were certified by at least one label (Figure 1). It is followed by tea, oil palm, cotton, forestry, bananas, sugarcane, and soybeans. There are some voluntary sustainability standards covered certify coffee production: 4C, Fairtrade International, organic, Rainforest Alliance, UTZ [5] and Smithsonian Bird Friendly [6]. For cocoa, UTZ has the highest share and it is the first label to break the 20% barrier. For coffee, 4C is the label with highest share [7].

Certified coffees are related to sustainability issue, that commonly defined as those that take into account one or more aspects of sustainability: economic, environmental, and social [8]. The term sustainability in agriculture refers to a crop that is grown in a healthy environment, that is economically viable for farmers, and that promotes social equity among farmers and workers [9]. Coffee that has been certified has been produced under specific guidelines adopted by coffee growers and verified by an
independent third-party certification organization. When a coffee is certified, approval is given by an independent organization that ensures that the coffee produced following guidelines set by the certification agency.

The 4C Certification established in 2008, the Common Code for the Coffee Community or 4C Code of Conduct includes baseline requirements for the sustainable production, processing and trading of coffee, and eliminates unacceptable practices. The 4C certification applies high standards to economic, social and environmental conditions for coffee production and processing to build a sustainable, reliable and fair coffee supply chain. 4C Compliant Coffee is coffee that has been produced in accordance with the 4C Code of Conduct, a set of practices and sustainable basic principles for the production of coffee beans. One of the main aspects of the 4C code is its vision of the coffee business as a whole. It covers many social, environmental, and economic principles for everyone in the coffee supply chain, from farmers, producer organizations, and mills, to exporters and traders. The issues of forced labor, trafficking of persons, failure to provide potable water to all workers, cutting of primary forest or destruction of other forms of natural resources, and immoral transactions in business relations are to be considered in the certification process.

Fairtrade Certification is defined as an alternative approach to conventional trade that aims to improve the livelihoods and well-being of small producers by improving their market access, strengthening their organizations, paying them a fair price with a fixed minimum, and providing continuity in trading relationships [10]. Fairtrade certification is a movement that can help the poor farmers and marginal producers to develop strategies to collaborate directly with other producer communities.

Organic certification is the impact of consumer awareness that requires healthy and environmentally friendly products. Coffee is stated as organic coffee, if the coffee has been examined and obtained an organic certificate from a third party or organic certificate issuing institution. Organic coffee certification not only serves as a guarantor of ethical and fair trade practices and protection for consumers from fraud, but especially in order to protect the rights of smallholders to their welfare and provide added value to the products produced so as to help in gaining market access. Organic Certification aims to promote and enhance natural soil activity and cycling of resources, which helps to create a rich and fertile substrate for the crop and maintain ecological balance by prohibiting use of synthetic agrochemicals.

In implementing the Rainforest Alliance Certification program, farmers and exporters must comply Sustainable Agricultural Standard through a certification body Rainforest Alliance. By applying standard sustainable farming systems, farmers can control costs, do farming efficiently, and improve coffee quality, and supporting the management of sustainable farming system.
UTZ certified is a standard for certifying coffee, cocoa and tea production and processing activities. The producer must meet the Code of Conduct control points. This standard is a set of internationally recognized economic, social and environmental criteria for responsible coffee production. Commodities produced in accordance with these standards meet the criteria for responsible production, such as the protection of workers' rights, responsible use of agrochemicals, and standards for efficient agricultural management. This program is complemented by a state-of-the-art Track-and-Trace system, allows brand owners, retailers and their end customers to always be able to trace back where the product was produced, and provide them with a guarantee that the product was obtained from the responsible manufacturer.

Agricultural commodity certification can be estimated from the certification record based on the area of the various types of certificates. In general, they certified a minimum of 2.8 million hectares and a maximum of almost 5 million hectares in 2016. The average of land certified is around 3.9 million hectares. International Trade Center recorded that in terms of the proportion of the certified area of the global coffee area, the minimum represents 25.8%, the maximum, 45.3% and the average, 35.5%. Based on the minimum area, the certified coffee area increased by almost 80% between 2011 and 2016 (Figure 2). The 4C continues to have the largest certified coffee area, and it registered the largest area growth, with over 1.8 million hectares.

![Coffee production area by standard (2008-2016)](image)
(Source: International Trade Center 2018)

Coffee certification program to promote responsible production by following one or more of the following contributions [11]: (1) social: to improve the quality of life of workers and farmers, (2) environment: increase environmentally friendly production that enhances and environment, and (3) economy: to get appropriate market access and fair prices for farmers, and (4) quality: to meet minimum quality standards for coffee beans.

In case of Indonesia, farmers prefer certifications that offer premium prices, focus on environmental conservation, offers price differentials between certified and uncertified coffee, targets farmers in a group or cooperative, values fairness, offers a price differential based on the size of the coffee beans, and offers no formal contracts or credit options, however their preferences regarding the certification schemes are primarily economically driven [11].
3. Competitiveness of the Indonesian coffee industry in global market

Coffee sector become important factor to live hoods of millions of people in many developing countries because coffee production usually produces by smallholder. Market dynamics characterized by developments in demand and supply conditions will affect the need for coffee certification. Data shows that both production and consumption have increased.

World coffee production is greatly increase in 2017/2018. The Global supply reach 163.51 million bags or increase 8.8% than previous years. Increasing production was supplied from South Amerika accounted for 47% of world production, Asia and Oceania 29%, Central America & Mexico at 13% and Africa at 11%. Brazil and Vietnam as first and second biggest producer coffee, increase it production by 5.6 % up to 57.4 million bag and by 15.5% up to 29.5 million bags, respectively. In other hand, Indonesia and Columbia as top 5 coffee producer has output declined to 4.3% to 10.36 million bags and 3.3% to 7.7 million bags [12].

Demand of coffee grew by more than 50% since the 1990s. World consumption is estimated at 165.19 million bags in 2018/19, an increase of 2.1% compared to 2017/18. Domestic consumption in exporting countries is estimated to increase by 1.4% to 50.3 million bags, while consumption in importing countries is estimated to rise by 2.5% to 114.88 million bags. Demand from non-traditional importing countries tends to grow, around 18% of global consumption in 2018/19 [13].

Coffee is high trading commodity in the world. Total shipment of all forms of coffee has set a new record, reached to 121.86 million bags in 2017/18, 2.2% higher than previous years. Presently, Arabica coffee has dominated in trading with total 70.95 million bags compare to 39.24 million bags in coffee Robusta. Arabica Coffee more expensive than coffee Robusta, with average price 137.63 US cents/lb [14].

World consumption in 2018/2019 is estimated at 164.84 million bags, 2.1% higher than previous years. The biggest growth is in Asia & Oceania that demand rose 3.6 to 35.91 million bags. Consumption in Europe, North America, South America, central America also increase by 1.5%, 2.2%, 1.1%, and 0.2% respectively [14]. While world coffee production in 2017/2018 was 163.51 million bags, increase 4.8% than previous years. Coffee production exceed word consumption by an estimated 1,59 million bags in those years contribute to the low price, 15.8% lower than the average of 132.43 US cents/lb in 2016/2017. This downward trend in coffee price greatly affect to world coffee sector. In 2018/19 is expected to be the second consecutive season of surplus. This excess in supply continues to put downward pressure on prices over the next few months [13].

Changes in coffee production is affected by climate change. Thermal and rainfall conditions are considered to be the most important factors in defining potential coffee yield. Both Arabica and Robusta are negatively affected by climate change. Global warming affects coffee production through changes in agroecosystem conformity conditions and the risk of spreading pests and diseases. Increasing pest attacks lead to the loss of quality of the coffee beans or even to the destruction of yield and plants [15,16]. Climate change that affects production and post-harvest activities, will cause a decrease in the quality of coffee, which in turn affects the income of coffee farmers in Indonesia [17].

Coffee plantations in Indonesia are dominated by smallholder plantation which reaches 95.37%. The types of coffee that are commonly grown in smallholder plantations are Arabica and Robusta coffee. The method of propagation of Robusta and Arabica coffee is different, Robusta coffee is vegetative propagated with plant material used in the form of clones, while Arabica coffee is usually propagated by seed so that the recommended planting material is in the form of varieties. Arabica coffee planted materials released by the Minister of Agriculture include AB3, USDA 762, and S 795. While Robusta coffee clones that have good quality are BP 534, BP 936, SA 237, BP 358, BP 42 and BP 409 [18].

The volume of world coffee exports in the period of 2011-2015 reached an average of 7.67 million tons, of which 6.32 million tons or 82.39% was the production of the 10 largest coffee exporter countries in the world. Brazil is the largest coffee exporter in the world with an average export volume of 2.04 million tons per year or contributing to 26.61%. Vietnam is the second largest exporter with total exports of an average of 1.58 million tons or a share of 20.59%. Indonesia, with an average coffee export of
568.33 thousand tons or 7.41% of the world coffee market, is in the fourth position under Colombia, which is the third largest exporter of coffee in the world, which market share is around 694.32 thousand tons or 9.06% [19].

The national coffee export market has changes over time. This change is related to food safety regulation in consumer countries. Another market dynamics is the growth of a special market for coffee that is produced following the sustainability standards by certification activities. Nevertheless, the market share of certified coffee beans in the world is not large, but continues to grow. At present, world-certified coffee exports consist of 4% certified sustainable coffee and 6% specialty coffee [9]. Niche market of specialty coffee and sustainable certified coffee has not managed optimally [20].

Vietnam is the major competitor of Indonesian coffee [21]. By the early 2000s, Vietnam became the second largest producer and exporter of coffee beans in the world. Vietnam is the second largest exporter of coffee and the largest exporter of Robusta coffee in the world. The contribution of coffee commodities to the national GDP in Vietnam is 30%, and contributes 10% to the export of agricultural products. During 2000-2015, Vietnam experienced a decline in competitiveness performance as indicated by the decline in the value of Revealed Comparative Advantage (RCA), Dynamic Revealed Comparative Advantage (DRCA). However, the level of competitiveness of Indonesian coffee is still half of Vietnam [21]. Percentage total certified area in Vietnam is greater than in Indonesia, for the 4C and UTZ categories (Table 1).

Table 1. Certified coffee area in Indonesia and Vietnam based on certification type

| Certification (year) | Country  | Area (ha) | Share of total coffee area (%) | Production volume (MT) | Producers (no.) |
|----------------------|----------|-----------|--------------------------------|------------------------|-----------------|
| 4C (2016)            | Indonesia| 150,013   | 12.2%                          | 86,138                 | 51,475          |
|                      | Vietnam  | 150,177   | 25.1%                          | 522,530                | 89,217          |
| Fairtrade International (2015) | Indonesia| 27,712   | 2.2%                           | 20,344                 | 26,399          |
|                      | Vietnam  | 1,137     | 0.2%                           | 4,730                  | 652             |
| Organic (2016)       | Indonesia| 81,750   | 6.7%                           | 42,550                 | n.a             |
|                      | Vietnam  | n.a       | n.a                            | n.a                    | n.a             |
| Rainforest Alliance (2016) | Indonesia| 11,752   | 11.540                         | 9,892                  | n.a             |
|                      | Vietnam  | n.a       | n.a                            | n.a                    | n.a             |
| UTZ (2016)           | Indonesia| 15,074   | 1.2%                           | 9,585                  | 5,805           |
|                      | Vietnam  | 50,598    | 8.5%                           | 172,620                | 32,275          |

(Source: International Trade Center 2018)

As the world’s major coffee producer, Vietnam faces various challenges that affect coffee production, such as climate change, competition from other crops, replanting ageing coffee trees, and increasing the production costs. The government has already formulate the policy: firstly, to maintain its position as the world’s second largest producer and exporter of coffee green beans; secondly, to double the added value in coffee production by increasing productivity, quality and value addition [2]. According to these objectives, Vietnamese certified coffee tends to increase due to achieve sustainability in coffee industry development.

4. The constraints on implementation of coffee certification

Increased demand for world coffee is also followed by increased demands on the quality of traded coffee, which is manifested in certified coffee. The requirement for sustainable coffee industry has now become a demand of the global market. Agricultural products are no longer only valued on the basis of the quality of their products but are also assessed on the basis of how to produce coffee. Coffee certification is a process by which a third party evaluates compliance with standards by conducting good
and correct coffee cultivation in accordance with standards set by the certification provider so that the quality and quality of coffee is guaranteed. Several worlds certifications bodies have conducted coffee certifications in Indonesia including Organic, Fair Trade, UTZ, Rain Forest Alliance, Bird Friendly and Common Code for the Coffee Community (4C).

Although various benefits can be obtained from sustainable coffee certificates, the implementation of the sustainable coffee certification system has only been implemented in certain regions. In Lampung, Rain Forest Alliance and 4C certification have been applied in several areas. This is inseparable from various obstacles related to the availability and access of information, farm management, capital availability and access, capital availability and access, and land ownership and status (Table 2).

Table 2. Obstacles to implement a sustainable certification system at the farmer level.

| No | Aspect     | Condition                                                                 | Caused                                                                 |
|----|------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1  | Information| Lack of certification system information                                  | Poor access to information sources                                      |
|    |            | Lack in using certification system information                            | Limitations of networking with parties in the certification system      |
| 2  | Farming    | Planning limitations in implementing sustainable farming                  | Other commodity competition and the low level of assistance related to sustainable coffee certification |
|    | System     | Limited quality achievement                                               | Limited implementation on total quality management                      |
|    |            | The high level of products containing chemical residues                   | Inappropriate use of agrochemicals                                      |
|    |            | Evolving coffee pests and diseases                                        | Inappropriate use of pesticide                                           |
| 3  | Financial  | Limitations of implementing Good Agricultural Practices (GAP)             | Limited investment from farmer’s income allocation                      |
|    |            | Limitations of following the certification program                        | Limited investment from farmer’s income allocation                      |
|    |            | Limited access to insurance and hedging instruments                      | Lack of risk management                                                 |
| 4  | Technology | Limited access to technology resources                                    | Extension agents for plantation commodities                             |
|    |            | Applying technology components                                            | Limited ability of farmers to implement technology in a whole system   |
| 5  | Land       | Limited ability of farmers to achieve economic efficiency                 | Limited land area (average under 1 ha)                                 |
|    |            | Land tenure uncertainty                                                   | Farming activities in the forest area                                  |
| 6  | Institution| Limited role of farmer organization                                       | Lack of institutions and appropriate governance                         |
|    |            | Limited function of farmer organization                                   | Poor services through local or farmer organizations                     |
Non-certified coffee farmers generally still have non-grade quality coffee or random quality due to the fact that non-certified coffee farmers still do not pay attention to the quality and quality of the coffee [23]. Non-certified coffee farmers also pay little attention to post-harvest coffee. Many coffee farmers are still drying coffee on the ground or without a mat [23]. This limits access to international markets, because products can only be accepted in local markets [22]. The high level of products containing chemical residues is due to the low level of concern of farmers towards sustainable farming systems. Non-certified coffee farmers sell coffee to middlemen, at low prices and do not get premium fees because of the poor quality and quality of coffee [24].

The low allocation of farmers' income for business capital has resulted in limitations in the application of Good Agricultural Practices (GAP) and following the certification program. The certification program engages international private producers in an effort to meet the demands of global consumers. Farmers are given facilities and assistance. In addition, small scale farmers are certified through group schemes. Farmers have limitations in accessing technology resources and implementing technology components. This is due to the extension system that is still focused on food crops and the limited ability of farmers to apply the technology as a whole. Coffee farmers still do not pay attention to the importance of picking ripe coffee fruit. There are still coffee farmers who do the picking when the fruit is not yet ripe (not red-yellow) and let the fruit fall to the ground. The handling affects the quality of beans produced so that the number of defective coffee beans is still high, the taste and water content are still not good [22]. Limited land area, which is an average of under 1 ha, has resulted in the limitations of farmers' capital to reach an economic level of efficiency. In addition, farming activities in forest areas have resulted in low business sustainability related to land status.

5. Recommendation in improving coffee sustainable development in Indonesia

The development of sustainable coffee plantations, in the future there are still many challenges that must be faced such as: 1) the existence of climate change that has an impact on natural disasters (floods, landslides, drought) and attacks of plant pests; 2) global economic conditions that have caused a fluctuation in world coffee prices; 3) product quality and post-harvest coffee; 4) limited capacity of coffee farmers and institutional farmers who are still weak; 5) increasing demand as a result of increasing population and lifestyle changes of coffee enthusiasts; 6) the unequal distribution of coffee products; and 7) limited coffee plantations. Related to this, to achieve quality and sustainable coffee products, it needs the right policies and guidance and counseling for coffee farmers who are generally in conducting conventional coffee cultivation.

Farmers stand to benefit from reduced costs, higher productivity, quality and selling prices, and higher income in the long-term. The government also has an interest in sustaining export earnings while safeguarding the country's environmental assets. The global coffee industry has an interest in ensuring long-term supply from sustainable coffee industry. These conditions, which may seem distant now, should serve as a call to action for reinforcing sustainable coffee production by formulating recommendation in some aspect: farm management, farming system, harvesting and post-harvest handling, marketing, and policy (Table 3).

Farmer database development and documentation of farming activities in farm recording book are needed as a basis to better good farm records. In farming system, the improvement can be achieved by: providing certified superior seeds and agricultural production facilities on the proper of time, quantity, price and quality; training and assistance in implementing GAP; implementing price risk management; and providing incentives for user of organic fertilizers and biopesticides in coffee cultivation. Socialization regarding brands issues and guidance for self-export is needed to develop farmer awareness about the sustainable production system. Certification programs have the potential to make significant impacts, especially on the economic and environmental factors of coffee production. The institutional recommendations are related to: providing capital stimulant and intensive assistance to
active farmer institutions; revitalizing of farmer institution, starting a partnership with a coffee exporting company, and providing incentive for the production and financial aspect of certified product.

In the program of coffee certification system, not all stakeholders play their roles and functions effectively. Most coffee certification programs in Indonesia have been funded and run by private exporters, both local and international. Exporters typically invest in organizing farmers, training them, and certifying, verifying that practices are sustainable [25].

Table 3. Recommendation in improving coffee sustainable development

| Aspect          | Recommendation                                                                 |
|-----------------|--------------------------------------------------------------------------------|
| Farm Management | Farmer database development                                                   |
| Farming System  | Documenting the farming activities in farm recording book                     |
|                 | Providing certified superior seeds and agricultural production facilities on the proper time, quantity, price and quality |
|                 | Training and assistance in implementing Good Agricultural Practices (GAP)      |
|                 | Implementing price risk management through implementation of the integrated farming system |
|                 | Providing incentives for user of organic fertilizers and biopesticides in coffee cultivation |
| Marketing       | Socialization regarding brands issues and guidance for self-export            |
|                 | Only sell to collectors/traders who have been appointed in the area.          |
|                 | Providing capital stimulant and intensive assistance to active farmer institutions |
| Institutional   | Revitalizing of farmer institutions                                           |
|                 | Starting a partnership with a coffee exporting company                         |
|                 | Providing incentive for the production and financial aspect of certified product |

6. Conclusion

Sustainable certification can be considered a market-based method to assign value to a given quality in a commodity, whether environmental, social, or economic. In order to be competitive in the global coffee market, Indonesia need to increase the certified coffee area. Vietnam as the major competitor of Indonesian coffee, have a various program to achieve sustainability in coffee industry development. Various benefits can be obtained from sustainable coffee certificates, however sustainable coffee certification system applied in a limited area, due to various obstacles related to the availability and access of information, farm management, capital availability and access, capital availability and access, and land ownership and status. Sustainable coffee production can be achieved by formulating recommendation in some aspect: farm management, farming system, harvesting and post-harvest handling, marketing, and policy. The implementation of coffee sustainability certification require collaboration between private and public sectors across the supply chain. The government of Indonesia can play an important role as a regulator and promoter. As a regulator, the government need to attract the investment and supporting growth of a sustainable coffee industry by formulating regulation and making enabling environment.

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