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Social Sustainability Assessment of the Organic Gayo Coffee Industry in Aceh Province, Indonesia Mariyudi 1, Suryadi 2, M. Sayuti 3 and Hendra Raza 4 {mariyudi@unimal.ac.id, suryadi_zulkifli@yahoo.com, tgk_sayuti@yahoo.co.uk, hendra.raza@yahoo.com} 1Dept of Management, Faculty of Economics and Business Universitas Malikussaleh, Aceh, Indonesia 2Dept of Agribusiness, Faculty of Agriculture Universitas Malikussaleh, Aceh, Indonesia 3Dept of Industrial Engineering, Faculty of Engineering Universitas Malikussaleh, Aceh, Indonesia 4Dept of Accounting, Faculty of Economics and Business Universitas Malikussaleh, Aceh, Indonesia Abstract : In recent years, coffee is one of the popular beverages of the world and have been on the rise in many global commodity chains. The main purpose of this study was to assess social sustainability of the organic Gayo coffee industry in Aceh Province, Indonesia. To achieve this purpose descriptive survey research was used.

The case study is conducted at Aceh Tengah and Bener Meriah Districts, Aceh Province, Indonesia. Sixty-five major key actors (Aceh Province) in the supply chain considered exporter, agro-industry, non-governmental organizations (NGOs), collectors and farmers were identified for analysis. Based on RAPCOFFEE technique, 10 attributes regarding social sustainability was measured for this study. To assess social sustainability level, Morris Inequality Index was used.

The result of the research showed that the Koperasi Baitul Qirad Baburrayan and the Koperasi PPKGO relatively had the most social sustainability situation (moderate level) among other actors. Keywords : Sustainability; social; organic; gayo; coffee; rapcoffee 1. Introduction In recent years, coffee is one of the popular beverages of the world and have been on the rise in many global commodity chains. Coffee was developed in many countries as the leading commodity and important (Daglia et al. , 2000), which can raise

additional income for smallholder farmers, and export earnings.

As one of the most commodities internationally, coffee is a signi?cant part of the overall economy and a main source of foreign exchange income for many developing countries (Samper and Quiñones-Ruiz, 2017) such as Indonesia. However, the dynamic development of the environment in the coffee industry as one of the renewable agricultural resources expects an improvement and development of good management to be sustainably maintained (Samper and Quiñones-Ruiz, 2017). Since the green revolution, coffee plantations have increasingly developed using high technology into intensive plantations of monoculture, energy and chemical use (Gobbi, 2000).

Deforestation approaches through mono-crop systems contribute to biodiversity loss and increase soil erosion (Gobbi, 2000; Rubin and Hyman, 2000). Soil erosion and the use of agrochemical inputs reduce soil health (Babbar and Zak, 1995). Deforestation also contribute to eutrophication and sedimentation of the waterways. Pesticides have been linked to acute pesticide poisonings, increased rates of cancer, the evolution of secondary pests and the development of chemical resistant pests (Wesseling et al. , 1999).

It also been to the degradation of the aquatic and marine environments (Robinson and Mansingh, 1999). The ICOFEB 2018, November 12-13, Lhokseumawe, Indonesia Copyright © 2019 EAI DOI 10.4108/eai.12-11-2018.2288825 complexity of the coffee challenges and crises that have occurred over the last few decades has forced stakeholders including individual farmers, development agents, planting organizations and the government to review their focus and strategy on increasing the price of higher priced beans through sustainable organic coffee industry management techniques (Deshpande and Royere, 2001).

There is a global consensus that by-products from coffee processing face socio-economic and environmental crises that have become a focus of attention in many countries (World Bank., 2005).To answer this crisis, the issue of developing the coffee industry on an ongoing basis. Sustainability has evolved as a process and principle that links socio-economic development with management and conservation without damaging the environment (Reinecke, Manning and von Hagen, 2012; Kolk, 2013, 2014) and strengthened by institutional reform.

Indonesia is the world's fourth largest coffee-producing country (Jaya et al. , 2013; Neilson, Pritchard and Yeung, 2014), producing robusta coffee and Arabica coffee which are in great demand (estimated at around 85% of national production) (Jaya et al. , 2013). About 95% of the production is cultivated by small farmers (reaching 2 million

households) who are relatively poor, and they are very dependent on the sale of coffee beans as a source of income (Jaya et al. , 2013; Neilson, Pritchard and Yeung, 2014).

Gayo coffee is the main commodity for the people of Aceh (Wijaya Ibr and Zailani, 2010; Jaya, Machfud and Ismail, 2013) with a total area of 81,000 ha in Aceh Tengah and Bener Merah Regencies, with an average productivity of 0.79 tons / ha, relatively lower than Brazil and Vietnam (BERNARDES, 2010; Singh et al. , 2012; Widodo, 2014). The Barriers in sustainable economic development related to processing Gayo coffee, biotechnological processes, waste and ef?uents is the recovery of ?ne chemicals and production of valuable metabolites via chemical (Federici et al.

, 2009; Mussatto and Teixeira, 2010). In coffee producing countries, coffee wastes and by-products constitute a source of severe contamination and pose environmental problem. Coffee processing units that are located in almost each coffee estate pose threat to the environment because of unsafe disposal of coffee pulp, husk and ef?uents leading to serious pollution of water and land around the processing units. Secondary product and coffee wastes are the pose environmental problem and source of severe contamination (Benoit et al. , 2006).

Coffee processing units located on almost every coffee plantation pose a threat to the environment due to unsafe disposal of coffee grounds (Crognale et al. , 2006), ef?uents and husk that cause serious pollution of soil and water (Wyman, 2003) around the processing unit. It worthy to note that sustainable coffee industry is a broad concept and is one of the many activities that can contribute to attempted improving the country's economy and simultaneously conserving the environment (Murthy and Madhava Naidu, 2012; García- García et al. , 2015). Indeed, sustainability is a multi-dimensional concept (Fenoll et al. , 2014; Chianese et al. , 2016)that integrates ecological, social and economic dimensions (García- García et al. , 2015; Chianese et al. , 2016; Huang, 2018).

With this background, this review addresses to importance of social dimension of organic coffee industry that are are relevant to human welfare and the long-term benefits without jeopardizing its economic and socio- cultural well-being. The main purpose of this study was to analyse the social sustainability of the organic Gayo coffee industry in Aceh Province, Indonesia. 2. Literature Review 2.1. Sustainability in the Agriculture Industry The concept of "three-pillar" on sustainability which has become a consensus in the academic world (Commission on Environment, 1987; Elkington, 2013; Huang, 2018) and must be considered simultaneously in sustainable development (Wu, 2013b). The "three- pillar" or "triple bottom line" concept namely economic development, environmental protection, and social justice (DALY, 1995; Wu and Wu,

2012; Elkington, 2013; Huang, 2018).

The agriculture industry is increasing sustainability as an important value (Sethi, 2005). Investors often face strong pressures in CSR, governments are often compelled to set minimum sustainability standards, and the consumer buying behaviour also changes in support of sustainable products (Vermeir and Verbeke, 2006; Nelli, K and Kilari, 2013; Sayuti et al. , 2015; Sofyan, 2017). Sustainability is a multi-dimensional concept (Fenoll et al. , 2014; Chianese et al. , 2016).

This is a major problem in coordinating the relationship between economy, environment and society in sustainability (Chianese et al. , 2016; Huang, 2018), especially referring to the perspective of "weak sustainability" and "strong sustainability" (Wu and Wu, 2012; Wu, 2013a). 2.2. Sustainability Indicators for the Agriculture Industry Indicators can be defined as a measurable variable used as a representation of an associated factor or quantity (Bélanger et al.

, 2012) and are common statistical in economics to assessed of some aspects of performance that are expected from a management policy or strategy (Bockstaller et al. , 2009; Bélanger et al. , 2012). Furthermore, they are an important tool for helping move the world toward a sustainable agricultural future (Rametsteiner et al. , 2011; Singh et al. , 2012; Van Passel and Meul, 2012). In the literature, indicators for assessing the social sustainability of the coffee industry should re?ect to maintaining or be improving the welfare of the community in the agricultural system without jeopardizing their economic and socio-cultural well-being.

Therefore, the indicators in Table1 are suggested to assess the social sustainability of the Gayo coffee organic industry. Table 1. List of the social sustainability attributes N o Atributes Sustaina ble Unsustain able 1 Socialization of farming 2 0 2 New entrants into the industry/growth 4 0 3 Farming sector 2 0 4 Environmental knowledge 2 0 5 Education level 2 0 6 Conflict status 2 0 7 Farmer influence 3 0 8 Farming income 2 0 9 Kin participation 4 0 1 0 Insurance 2 0 Adapted from [50] 3. Methodology 3.1. Data Collection The case study is conducted for 5 months at Aceh Tengah and Bener Meriah Districts, Aceh Province, Indonesia.

case studies can be descriptive, exploratory, or explanatory (Perry, 1998). Research was done by survey method, discussion and in-depth interview with respondents (Jennifer, 2000). Sixty-five major key actors (Aceh Province) in the supply chain considered exporter, agro-industry, non-governmental organizations (NGOs), collectors and farmers were identified for analysis. 3.2. Data Analysis Method Technique analysis data used is leverage analysis and multi-dimensional scaling, that application namely RAPCOFFEE

(Rapid Appraisal Technique Coffee).

Based on RAPCOFFEE technique, it is adopted by rap-fish (Pitcher and Preikshot, 2001; Allahyari, 2010a)55]. 10 attributes regarding social sustainability were measured for this study. To assess social sustainability level, Morris Inequality Index (Allahyari, 2010b)was used. 4. Result And Discussion 4.1. Gayo Coffee Organic Industry Coffee is a major tropical commodity traded throughout the world with a contribution of half of the total tropical commodity exports.

The popularity and attractiveness of the world towards coffee is mainly due to its unique taste and is supported by historical, traditional, social and economic interests (Ayelign and Sabally, 2013). In addition, coffee is one of the natural sources of caffeine (Nawrot et al. , 2003)substances that can cause increased alertness and reduce fatigue (Smith, 2002). Coffee drinks, with the basic ingredients of coffee bean extract, consumed around 2.25 billion glasses every day throughout the world (Ponte, 2002). In 2013, the International Coffee Organization (ICO) estimated that the need for world coffee powder was around 8.77 million tons.

The USDA reported that coffee prices reached their highest level in two years. Indonesia is one of the countries producing and exporting coffee in the world with total exports of coffee products in 2015 reaching the US $ 1.19 billion, up the US $ 158 million compared to the previous year. During the 2011-2015 period, Indonesian coffee exports experienced a positive growth of 1.05% per year with the main export destination countries namely Germany, United States, Italy, Japan and Malaysia. Arabica coffee has better selling value abroad than in the country.

In the international coffee trade, it is known that the price of Arabica coffee has a better selling value than Robusta coffee. Figure 1 shows the comparison of prices in the domestic and foreign markets. Fig. 1.The comparison of prices in the domestic and foreign markets Gayo highland located on 850-1500 meters above sea level is around the Bukit Barisan Mountains which consists of three districts namely Gayo Lues, Bener Meriah and Aceh Tengah in the Aceh Province of Indonesia. This area is very suitable for Arabica coffee cultivation. Arabica coffee is a popular commodity and is exported to several countries such as Europe, the United States and Japan.

The total value of Gayo coffee exports reached US $ 814 million in 2010, an increase of 130% compared to 2009, the average price achieved was US $ 4.32 per kg (Zailani et al. , 2012; Jaya et al. , 2013). Although the demand for coffee is increasing, in fact, farmers have not felt significant benefits from the Gayo Coffee business, for example in terms of organic as well as geographic indication certifications (ID G 000000005), the premium

prices for the application of fair- trade and rain-forest.

This condition is caused by an unfair trade carried out by exporters and buyers in importing countries [59,65], making it very difficult to realize the sustainability of the Gayo coffee supply chain (Adams and Ghaly, 2007; Mariyudi, 2017). 4.2. Social Sustainability of the Gayo Coffee Organic Industry Social sustainability is closely related to the economic dimension, this is because social sustainability is based on the tendency of farmers to receive their coffee processing units through improving the quality of coffee which can increase the income of coffee farmers. Thus, the economic dimension can affect social sustainability. So that, the concept of unity and organized collaboration in cooperatives (or "Koperasi") is important for them.

The results show that the dimensions of the social sustainability using 10 attributes indicate that organic Gayo coffee processing activities are dominant in social groups in the form of Koperasi (89.23%). Attributes that are also measured in this study are an increase in the number of coffee farmers and stakeholders involved in the coffee business activities for the past 10 years, which are listed as new entrants into the industry/growth. Based on Table 2, the results show that in most koperasi (60%), the number of coffee farmers has almost fix over the past 10 years. There is an increase of 10 to 20% of the number of farmers and other stakeholders involved (21.54%).

The findings also show that in most agricultural sectors (80%) more than 30% of households are in coffee farming activities (20%). Coffee farmers have little (some) knowledge and information about agricultural resources and their environment and ecosystems (72.31%). Unfortunately, only in 16.92% farmers have lots of information in this regard. Also, the education level of the farmers in 60% of respondent have equal education level with the other people of cooperatives and 36,92% was lower than in comparing to the other people in the community.

There is a conflict between the farmers and between farmers with other sectors amounting to 84.62%, and a high level of conflict occurs in 3 cases (4.62%). The strength of direct farmer influence on actual agricultural regulations is 60%, this suggests coffee farmers believe that they have a large influence on the regulation of organic coffee farming. The majority of respondents (76.92%) were of the opinion that organic coffee farming activities were able to increase the family's total income by 50-80%. The actors in the coffee farming sector involved 66.15% of several relatives in the coffee selling and/or processing activities.

In addition, 73.85% of farmers are under social security insurance in just 6 months and 26.15% of farmers do not enjoy the benefits of insurance. The organic industry of Gayo

coffee is located in the Gayo highlands relatively clean and free of pollutants although not too far from the capital city of Aceh Tengah and Bener Meriah districts. The availability of free water sources used by farmers and a sense of security also supports the high rating of respondents.

The level of social sustainability according to the development coefficient for coffee cooperatives can be classified into five levels (Allahyari, 2010a): sustainable (80-100), slightly sustainable (60-79), moderate (40-59), slightly unsustainable (20-39) and unsustainable (0- 19). To compare the level of social sustainability of the Gayo coffee organic industry in Aceh Province, the average social sustainability coefficient for each cooperative is calculated and the results are shown in Figure. 2. Fig. 2. Level of Social Sustainability of the Gayo Coffee Organic Industry in Aceh Province As in Fig.

2, the results showed that the Koperasi Baitul Qiradh Baburrayan Cooperative and Koperasi PKGO had the most social sustainability situation among other actors and Koperasi Asosiasi Kopi Gayo Organik (ASKOGO) and Koperasi Asosiasi Petani Kopi Organik (APKO) has the least sustainability (unsustainable) situation. Meanwhile, four other cooperatives such as the Koperasi Serba Usaha (KSU) Arinagata, Koperasi Pedagang Kopi (KOPEPI) Ketiara, Gayo Linge Organic Coffee Cooperative (GLOC) and Koperasi Redelong Organik (REO) have been moderately sustainable.

Social sustainability improvement activities within 10 attributes must be applied together because each key factor has a link with others. Farming management in social sustainability of the Gayo coffee organic industry are the examples of key factors which can be supported by factors to improve coffee quality. Based on the social attributes of sustainability, the skills of coffee entrepreneurs will increase significantly as a result of the accumulation of increased technical skills from training and workshops programs organized by several institutions such as extension agents, universities, and research institutions, these findings support the results of the study(Jaya et al. , 2013; Jaya, Machfud and Ismail, 2013; Kolk, 2013; Samper and Quiñones-Ruiz, 2017).

In addition, environmental management and conservation through composting of pulp that is free of pollutants can minimize production costs and also provide added value to coffee farmers, these results are relevant to (Babbar and Zak, 1995; Gobbi, 2000; Rubin and Hyman, 2000). The method of managing coffee waste needs to be modified to create awareness of opportunities and constraints related to reducing environmental pollution and maximizing the use of coffee by-products. According to the results, in all coffee industries studied, coffee farming activities carried out through a cooperative format have implications for sustainability and optimal situations in terms of this index.

This finding is in line with the (Pitcher and Preikshot, 2001) RAPFISH: a Rapid Appraisal Technique to Evaluate the Sustainability Status of Fisheries and also supports the findings of (Allahyari, 2010b). Public policy especially in the organic coffee industry is needed as a public education related to the impacts of climate change. Climate change adaptation which is specifically characterized by adaptation to social, environmental and economic systems, this is important to be done as a preventive measure of broad impacts and increased ability to take advantage of new opportunities.

Support from reform and institutional strengthening of farmers in the "Koperasi", the participation and support of stakeholders through good water management or good energy management and providing incentives for good quality coffee can solve the problem of high production costs which is one factor key in coffee farming (Adams and Ghaly, 2007; Raynolds, 2009; Zailani et al. , 2012; Sayuti et al. , 2015; Sofyan, 2017). The advancement of the Cooperative organization is largely determined by institutional development in the form of linkages between group members, management and relevant stakeholders.

Farmer group cooperatives are expected to be a strong and independent organization so that coffee farmers can increase income, market and financial access as an increase in sustainability. The relationship between organic Gayo coffee farming communities has been good, especially in farmers' groups or cooperatives that involve coffee processing methods based on environmental conservation. Nevertheless, there are still some members who did not participate in this new method. 5.

Conclusion Assessment of the social sustainability of the coffee agro-industry will be needed to determine the sustainability status of the organic Gayo coffee agroindustry in the future. The use of the RAPCOFFEE technique adopted from the RAPFISH (Rapid Appraisal Technique) technique with 10 attributes regarding measured social sustainability for this study shows that the sustainability status of the Gayo Coffee Organic Industry in Aceh Province, Indonesia is fair.

Improving the quality of coffee for smallholder and coffee production in the organic Gayo coffee agro-industry must be based on increased activity in the driving factors in each attribute as a key factor to improve the social sustainability index. Hopefully, the improvement in production factors within the coffee agro-industry based on environmental conservation driving factors will have a positive impact on organic Gayo coffee farmers and increase the value of the sustainability of the coffee industry in Indonesia.

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