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COFFEE SMALL FARMERS CHALLENGE IN SUPPORTING SUSTAINABLE AGRICULTURE

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ABSTRACT
Coffee contribution is substantial to Indonesia's income but environmental matters give their own challenges for both the government and small coffee farmer (crofter). Agriculture sustainability considers three things, economic, social and environmental. Changing of farming pattern from habit of using artificial fertilizer change to organic system fully can result in production drop and increase farmer's cost production. Apart from that, another constraint is lessorganic fertilizer availability, and if still wants to force to make organic fertilizer – lack of cattle manure has to be counted. Government recommendation so the small coffee farmer to change over to organic agriculture at this time is so hard to realize. The crofter is ready to change over but the government has to guarantee many things, such as the market, cost production, selling price, and production amount.

KEY WORDS
Sustainable agriculture, organic fertilizer, coffee.

Coffee small farmer as biggest contributing of coffee production that gives huge contribution in national coffee production to the amount of 99.33% (753.3 thousand tons) from national total production 762 thousand tons, with the planting area 1,227 thousand ha or 98.14% from total national plating area (1,250.6 thousand ha) (BPS, 2021). Government attention is needed to watch income and welfare of small coffee farmer, in the form of counseling attention, cultivation, harvest, and post-harvest – and the most important thing is stable selling price.

Cultivation transformation to result in better coffee production is progressing slowly, so that productivity of coffee farmer in Indonesia is far below another country in the amount of 520.5 kg/ha (Brazil 1.515,3 kg/ha, Vietnam 2.444,5 kg/ha, Colombia 860,5 kg/ha, Ethiopia 669,7 kg/ha, Honduras 947 kg/ha and India 876,6 kg/ha). Small coffee farmers ability in cultivation, the involvement of the government and the private sector in increasing coffee production is still relatively low so that farmers' income is also low which ultimately affects their economic level and welfare. The low ability of small farmers' cultivation is serious matter for government, by providing cultivation training, and free giving farmer machine and equipment, and quality coffee seeds to farmer. Government assistance activities are intended to ensure that Indonesian coffee production gets into world standards because coffee orientation is an export commodity.

In addition to productivity issues, the type of coffee cultivated is also important. World coffee consumption is dominated by Arabica type by 70% of total world consumption, while the remaining 30% is Robusta coffee consumption (Dahiri, 2021). On the other hand, Indonesia coffee production is dominated by Robusta. Other issues happened that Indonesia quality coffee specially robusta coffee only able to qualify grade 4 (60 percent), grade 5 and grade 6 (30 percent) and just 10 percent reach grade 1 or grade 2, from the highest scale of

grade to lowest one, while arabica coffee has been qualified in grade 1 based on defective coffee system with SNI number 01-2907- 2008 by following global market, international requirement and resolution ICO No. 407 about “coffee quality improvement program” is launched in 2002 (Dahiri, 2021).

Expansion of coffee growing area is one of the increasing production factors, but bring impacts on ecology, because of that coffee expansion is oriented to environmental matter, that is reducing of artificial fertilizer using (conventional agriculture) that could damage lands used. In this correlation, Untung (2006) identified the impact of conventional agriculture development practices all this time, i.e.: (a) increased erosion surface, flood, and landslide; (b) decrease in soil fertility; (c) loss of soil organic contents; (d) groundwater salinity and irrigation also soil sedimentation; (e) increase in water pollution and soil consequences of chemical fertilizer,pesticides, domestic waste; (f) eutrophication of water bodies; (g) pesticide residues and other hazardous substances in environment – and foods that threaten public health and get market resistance; (h) degeneration of agricultural biodiversity, and the loss of local plant and farming culture; (i) give big impact on global warming; (j) increase in unemployment; (k) lessen job opportunities, increase social gap, and the number of smallholders in rural areas; (l) increase in poverty and malnutrition in rural areas; (m) farmer addiction to government and agrochemical company/industry. Agricultural development in Indonesia is directed towards sustainable agricultural development, as a part of implementing sustainable development. According to Salim, E (2011) exploitation natural recourses by plantation and mining development activities have exceed the ecological carrying capacity, resulting in excessive exploitation of natural resource.

The problem faced in relation to sustainable agricultural development, include the problem ofpoverty, unemployment, and food insecurity, creating new model pricing policies, reinforcing the power to compete in the global market also mitigating weakening economic growth due to the global crisis, recovering farmer image and farming job to get more attractive by young people, strengthening productive economic business institutions in rural areas, creating effective farming counseling system, and fulfilling food needs, as well as developing high quality of horticultural, livestock, and plantation commodity. To deal with agricultural development, it has to face with various problems as it should be in the Strategic Plan of the Ministry of Agriculture 2010-2014, namely: (a) environment catastrophe and climate change, (b) infrastructure, (c) land and water; (d)land ownership; (e) hatchery system and national nursery; (f) farmer access to capital; (g) farmer institutions and counseling; (h) food and energy security; (i) Farmer’s Exchange Rate (FER; Indonesia = “Nilai Tukar Petani (NTP)”); (j) inter-sectoral integration (Suyamto, 2010).

METHODS OF RESEARCH

Collecting data has been done in Sampean village to 24 respondents by using survey methodvia deep interview to farmers that have been using organic fertilizer fully on their own coffee land and to farmers who are still using artificial fertilizer. The data collected be tabulated before and then be counted in the percentage for each response to the question given.

$$x = \frac{\text{number of responders (for each part)}}{\text{number of respondents}}\ x\ 100\%$$

$$\text{X} = \text{mean (\%)}$$

RESULTS AND DISCUSSION

Sustainable agricultural development cannot be separated from the availability of organic fertilizer in the application location, farmers’ knowledge, level of education, experience and selling price of product produced using organic farming system. Berardi et al (2011) argue, in an effort to increase the practice of organic agricultural sustainability, and then

automatically will decrease theresistance level (both in food, economy, and survival). The development of this sustainability agricultural concern to factors of crofter's economic, social, and environmental. These factors have to be guaranteed, therefore knowledge of crofters about ecological and environmental issues become important. Quoted from argument of Hooks et al (2017) emphasize that the knowledge level of farmers is a crucial benchmark for agricultural success. Below can be seen the distribution of education, age and area of land cultivated by farmers.

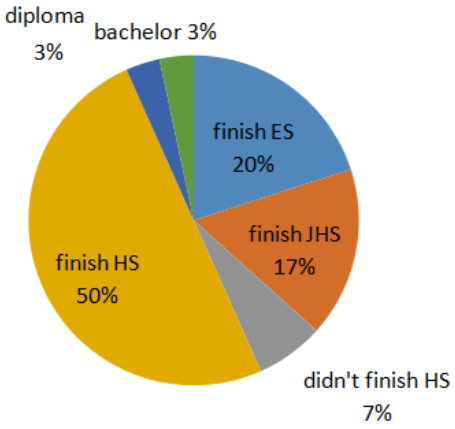

Figure 1 – Respondents of education distribution

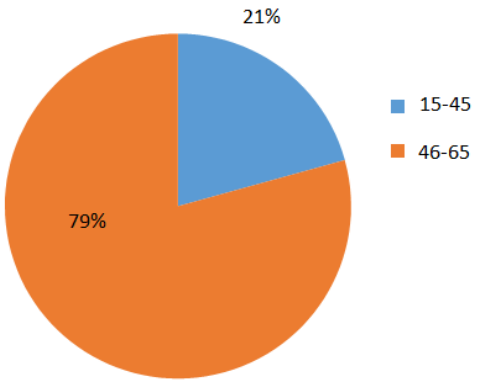

Figure 2 – Respondents of age distribution

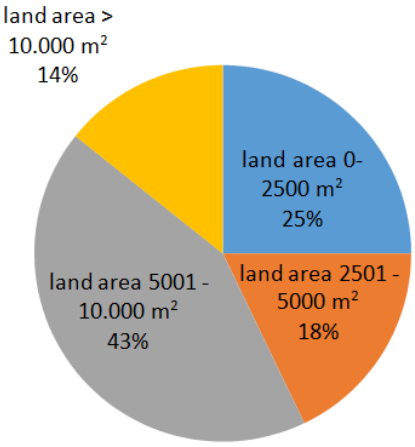

Figure 3 – Respondents of area of land distribution

The characteristic of respondent from education perspective, in generally farmers that finished their High School is 50%, got diploma and bachelor degree is 6%, while the other remains as much as 44%, they are Junior High School and Elementary School. As generic respondents haveexperienced enough in agriculture matter that can be seen from distribution of age, is known that farmers in age 46-65 (79%) have more understanding about sustainable agricultural, mainly knowledge about the use of organic fertilizers in agriculture, than farmers in age 15-45 (21%).

Aside from two other factors have mentioned before, respondents are the landowner worked on. Generally, the cultivated land is inherited from parents, as well as the house where to live in, but there are about 27% of respondents built their own house in inherited land. There are around 12% respondents bought lands for farming, and they are villagers who migrated and wantto build a village or no longer have jobs in cities or other areas.

In this study, there are several questionnaires posed to the respondents, they are knowledge about coffee cultivation, knowledge of artificial and organic fertilizer, the understanding how to make fertilizer, institutional knowledge, and knowledge of the organic agricultural production trade system.

Table 1 – Crofter respond to questions given

Number	Question	Yes (%)	No (%)
1	Knowledge about coffee cultivation		
	• Are you in farmer group?	96	4
	• Have you ever attended coffee cultivation training?	75	25
	• Are you in coffee cultivation just joining in?	15	85
2	Knowledge of artificial and organic fertilizer		
	• Is organic fertilizer good for plants?	87	13
	• Is organic fertilizer better for plants	63	37
	• Do organic fertilizers damage agricultural soil	15	85
	• Do artificial fertilizers damage agricultural land	78	22
	• Will crop production using organic fertilizers decrease?	56	44
	• Is the use of organic fertilizer difficult to use?	84	16
	• Does organic fertilizer use more labor?	78	22
	• What is the response of plants to organic fertilizers faster thanartificial fertilizers?	21	79
	• Do you want to use organic fertilizers instead of artificialfertilizers?	67	33
	• Is the nutrient content of organic fertilizer better than Boltanfertilizer?	34	66
3	The understanding how to make fertilizer		
	• Have you ever attended training on making organic fertilizers?	38	62
	• Does organic fertilizer have to use livestock manure?	89	11
	• Can organic fertilizer be made from materials other than animalmanure?	36	64
	• Is the quality of organic fertilizer better than artificial fertilizer?	45	55
	• Can organic fertilizer be made if livestock or manure is available?	90	10
4	Knowledge of the organic agricultural production trade system		
	• Have coffee sales been having problems?	6	94
	• Should the price of coffee using organic fertilizer be higher?	98	2
	• Is it mandatory for the government to facilitate the marketing oforganic coffee?	98	2
	• Would you refuse the use of organic fertilizers if the price andmarket for organic coffee were not available?	98	2

Small coffee farmers interviewed is incorporated in farmer group, by reason of rules fromgovernment that recipient of agricultural production facilities assistance (saprotan) have to join famer groups and the rules say that only member of farmer groups get the assistance from government. This policy obliges farmers to establish farmer groups of their own, and the purpose of its establishment is not from the interests of members to help each other in agriculture, but tendbecause of government coercion. However, the establishment of farmer groups in a certain area can improve the quality of agricultural products, not because of subsidies given – but the discussion held about natural sources, culture, and local environment between farmers in their each region (Sumane et al., 2017). Members of a farmer group is be given opportunity to join some training that's held by agricultural service to cultivate qualified coffee.

Training and other assistances tend to only carry out obligations of group members to joining the programs from the government, so that is not uncommon to find training participants just expecting for only transportation assistance (money) to be given later after the training is completed. Too many reasons will be mentioned by farmers why they are not taking seriously thetraining, among others are a presenter or source person was invited by the government do presentation in the too theoretic way and using complicated language (for common people), and sometimes the material provided is too general to be shared with experienced farmers.

Changes in farmers who participate in training in coffee cultivation are no different from farmers who do not participate in training or members of farmer groups. This becomes one of thereasons why farmers are not involved in the government's routine activity that is obligated to be joined by every member of farmer groups. Their opinions are by not joining the farmer groups, they can produce more coffee than the farmers that join the farmer groups and participate in all activities provided. Coffee production of farmers, whether members or not is not the basis of productivity, but more emphasis from farmers will to cultivate coffee. Farmers awareness and consistency be the main factor for the success of coffee cultivation, not by joining farmer group aswell.

Coffee cultivation is highly dependent to fertilizer, because the success of production willbe determined from maintenance and fertilizing consistently. The use of artificial fertilizers like NPK become farmer's mainstay because the response of coffee is better when fertilizer application according to coffee needs, meaning that there is a match between age and the amount of fertilizer applied (Abdel-Azis, Hasaneen & Omer, 2016). The use of organic fertilizer becomes a good alternative way because of the ability to reform ground structure among coffee planted.

Farmers confident enough that the use of organic fertilizer is good for the plant, even though will give low affect to coffee production level. Such FAO (Food and Agricultural Organization of the United Nations) (2004), explain that transition to organic agriculture could increase productivity of the low agricultural system and new market opportunity – yet, this statement is referenced by minimum data. Therefore, frequently farmers combine organic fertilizer and artificial one to keep production quantity and main soil quality. The full use of organic fertilizers is a challenge for farmers, although it is still an idea and always a consideration between production and the environment. This dilemma requires farmers to combine two types offertilizers, as to form respect for nature (Schimmelpfenning et al., 1996), and less of modal.

Farmers' awareness of natural and climate change is quite high, and they believe environmental change will slowly affect to their production level (IFOAM, 2004). Coffee farmers, apart from being given training in coffee cultivation also get materials for making organic fertilizer. The training done by the government is planned to invite experience speakers on makingorganic fertilizer. As in cultivation training, in training on making fertilizers is often to used by speaker to look for market share of the fertilizers produced. Limited time and lack of material availability for composing, as a result, it becomes an obstacle for farmers to be able to understandthe process of making fertilizer properly.

Animal wastes of cow, goat, or chicken become main materials in the making of organic fertilizer. This theory is obtained from training joined, so that is why farmers tend not to use organic fertilizer just because they don't have livestock. Government assistance in the form of livestock of cow, goat, or chicken in limited quantities is not able to meet the needs of farmers in terms of the area of land cultivated. Agricultural waste can be used as materials for making organic fertilizer but this theory is rarely mentioned by speakers in the training so farmers assume that if Ido not have livestock then organic fertilizer will not exist.

The use of organic fertilizer in all farming land when cultivating is still really hard to be done because it will be affects the production and cost. The biggest cost lies in transportation andlabors. The nutrient content of NPK and organic fertilizers is very different. Farmers have knownthe gap of different on nutrient contents and nutrient amount between artificial fertilizer and organic one, so if use organic fertilizer it will be much better than artificial NPK fertilizer. In addition, because the amount used is greater, it results in the use of a larger number of workers, increase in the operating costs of coffee farmers. Where the resilience of the agricultural economyhighly depends on the foundation of this sustainable agriculture (Storer et al., 2011), abandonmentthe cost of production in order to comply with sustainable agriculture directives will bring the opposite effect.

Impact of using organic fertilizer fully in the farming area, particularly for coffee will be caused in production and increase production cost so that if required to sell coffee beans at the same price as coffee produced using artificial fertilizer will be not fair (Rosen & Larson, 2001). Consequently, farmers demand government to design alternative way, like provide special facilityor treatment to farmers who are willing to use organic fertilizer.

Policymaker as head of this food chain has to fight and receive all these dilemmas, and create welfare but served for two conflicting purposes, to reduce poverty and improve service flow from rural areas occupied by small-scale farmers and/or family farms. Government assistance in terms of market or special trading systems for organic coffee and decent prices will motivate farmers (Oelofse et al., 2010). The market separation must be designed as soon as possible if onlywhole farmers are obliged to change over to organic agriculture. Trying to push hard farmers for utilizing organic agriculture may cause an oversupply of organic products and falling staple costs, causing financial unsustainability for some organic producers. As explained by Lien et al (2007), logic shows that the sustainable criteria (either based on one or more indicators) will generate a level distribution that is identical to that indicated using the economic efficiency criterion – instruction to farmers and policymakers must be aware at least on farmers and citizens cost for more consider about the method of which seems sustainable technically, but not classified as sustainable if seen from economic site. Expecting the involvement of the private sectorwill be very difficult, in addition to the low number of products, there is also a limited amount oforganic fertilizer that can be produced.

CONCLUSION

Sustainable agriculture considers on three matters, those are economic, social and environmental. Government has to encourage the small coffee farmer to change over to organic agriculture, which is hard to materialize because of the availability of fertilizers and the cost of which has become higher while the selling price remains the same as before. The crofter (small farmer) is ready to change from artificial fertilizer used to organic one if government guarantees market for organic coffee products, guarantee from decent amount and price.

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