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Letter of Acceptance for Abstract

Dear Authors: Rusdi Evizal (a*) and Fembriarti Erry Prasmatiwi (b)

We are pleased to inform you that your abstract (ABS-35, Oral Presentation), entitled:



"Coffee farming management as impact of the distance of farmers[^] home in Tanggamus District, Lampung Province, Indonesia"

has been reviewed and accepted to be presented at ICAFE 2021 conference to be held on 21 October 2021 in Yogyakarta, Indonesia.

Please submit your full paper and make the payment for registration fee before the deadlines, visit our website for more information.

Thank You.

Best regards,

Prof. Ir. Ali Munawar, M.Sc., Ph.D.
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The organizing committee of ICAFE 2021 acknowledges the following payment for registration fee,

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Authors	Rusdi Evizal (a*) and Fembriarti Erry Prasmatiwi (b)
Paid Amount	IDR 2,500,000
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Thank You.

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October 21st, 2021
Yogyakarta, Indonesia

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Coffee farming management as impact of the distance of farmers' home in Tanggamus District, Lampung Province, Indonesia

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Abstract. Tanggamus District is the second largest coffee producer in Lampung Province after West Lampung District. The main production region located at the highland of northern side of Tanggamus namely Sub-district of Air Nanningan, Pulau Panggung, and Ulu Belu which bordering with protected forest area. This research was conducted in Sumberejo Sub-district of Tanggamus Regency using survey method and Focused Group Discussion, considering that Sumberejo was the population center and the main coffee producer among Talang Padang ex-subdistrict region. The study involved 3 villages that chosen purposively with 71 respondent of coffee farmers that determined using simple random sampling method, and 3 series of FGD in April 2019 until September 2020. Data was analyzed using both descriptive and quantitative method. The results show that there are 49% sample farmers that grow coffee located at medium (5-19 km) or long distance (≥ 20 km) from home. There are 25-76% sample farmers work as seasonal migrant who usually (76.5% farmers) come to the garden once a month or once in two months. About 38% of sample farmers have coffee plantations outside Sumberejo Sub-district mainly at Sub-district of Air Nanningan and Ulu Belu. Long-distance coffee plantations are characterized by larger landholdings (1.5 ha on average), higher coffee stands per hectare (2,456 trees on average), and are dominated by mature coffee trees (41% farmers) and younger coffee trees (29% farmers). The more distance from home the lower shade trees population is. However more divers of MPTS are found in coffee plantation that located close to home residency. The yield of coffee plantations that are close or medium distance from home ranges 0.75-0.77 ton per hectare per year. Meanwhile, coffee plantations that are located far distance from home get a yield of 0.94 ton per hectare.

1. Introduction

The provinces of Lampung, South Sumatra, and Bengkulu are known as the triangle of Indonesian coffee producers. According to the Center for Agricultural Data and Information [1] this region contributes 63.21% of Indonesia's Robusta coffee production. Producer districts are located in the Bukit Barisan Selatan Mountain Range, namely Tanggamus, West Lampung, North Lampung, Way Kanan (at Lampung Province), South OKU, OKU, Lahat, Muara Enim, Empat Lawang (at South Sumatra Province), Seluma, Kepahiang, Rejang Lebong, and Lebong (at Bengkulu Province).

The expansion of the coffee plantation area encourages the migration of farmers and seasonal workers to earn a living [2]. Seasonal labor migration occurs especially in the coffee picking season [3] where workers are brought in from outside the region [4]. Migration to coffee production centers in Lampung occurs spontaneously or following the transmigration program. According to the Directorate General of PKPPT [5] the first transmigration program in Indonesia occurred in 1905 with resettlement

from Java to Bagelen Village, Gedong Tataan District, Pesawaran Regency, Lampung. Resettlement continued until 1941 to western regions such as Pringsewu and Wonosobo nearby Kota Agung.

In year 1930 migrants from South Sumatra (including Semendo and Ogan) have been inhabited Northern and Western Lampung including at District of Way Kanan (Kasui), West Lampung (Sumberjaya), and Tanggamus (Talang Padang, Air Naningan, Pulau Panggung, Ulu Belu). Meanwhile, new comers of java migrant are welcome to work at Lampung and Semendo's land tenure as farmers that replanting shrub plots for free, as sharecroppers, or as wage-laborer. One day they are eventually able to buy a piece of land of their own, usually through a series of small payments especially the end of the coffee harvest season [6].

Priyono [7] reported that to earn a living, spontaneous migrant farmers from Java and South Sumatra cleared forests in more remote areas including at Sub-district of Air Naningan, Pulau Panggung, and Ulu Belu which bordering to the KPLH Batu Tegi and KPLH Kota Agung Utara. In Tanggamus, the pioneer period of forest clearing for coffee plantation occurred in the 1950s, followed by period of acceleration in the 1970s, and a period of reformation in 1999-2000. Since 2017 coffee plantations in forest areas in Tanggamus have received legality with the existence of a community forest utilization business permit (IUP HKm) which today has been received by 40 farmer group associations (Gapoktan).

Semendo migrants of new coming or new married are supposed to open forest that usually remote and isolated to plant coffee. It is a tradition called as "nyusuk" meaning to work and live in a hut at isolated farm that far away from the village [8]. Production of coffee fields achieve the peak yield (called as ngagung) when the plants are 5-6 years old and followed by the years of decreasing yield. When the yield is low, the fields are abandoned and becoming shrub. Semendo farmers then clear another forest. Sometimes java migrants from nearby district or sub-district come to buy the abandoned coffee fields or shrubs to cultivate vegetable and coffee [9]. Migrant Farmers (ethnics of South Sumatera, Java, and Sunda) that are succeeded in coffee farming will go back to their homebased village to stay while regularly come back to maintain and to harvest coffee.

The transformation of swidden fields into permanent field of coffee plantation [10] is brought about by the increasing amount of labor needed for weeding, pruning, fertilizing and harvesting that pushed influx of spontaneous migrants. Labor arrangements (daily wages, contracts, and sharecropping) enable the migrants to accumulate savings and to buy their own gardens [6]. Labor is the main component of coffee farming costs. Prasmatiwi [11] reported that labor costs (from outside the family) and transportation costs for harvested produce contributed 72.1% to the total cost of coffee farming. Evizal [9] reported that total labor was 117 – 154 man-days, depending on intensity of plant maintenance. Nevertheless, Sari [12] reported that harvesting labor reached 53-81% of the total labor man-day. According to Suryatna [13] the need for labor in coffee plantations is seasonal, especially during the harvest season in April - June. Furthermore, labor for routine maintenance is needed around August - September and around November – December.

The aims of the study were to characterize coffee farming management as impact of the distance of farmers' home to coffee field especially in Tanggamus District, Lampung Province, Indonesia.

2. Material and Method

This research was conducted in Sumberejo Sub-district of Tanggamus Regency using survey method and Focused Group Discussion, considering that Sumberejo was the population center and the main coffee producer among Talang Padang ex-subdistrict region (Talang Padang, Sumberejo, and Gisting). Pains [6] classified densities >500 people/km² as settlement centers, usually as the center of rice production. The areas especially of piedmont have fertile soil and high rainfall that can be planted with food crops, coffee vegetables and pepper with good results, which is called a pioneer area. Besides as producer area of paddy, Sumberejo is the largest producer of coffee among Talang Padang ex-subdistrict region. As population is increase and land is scarce, farmers move to the areas of low populated but the main producer of coffee in district of Tanggamus (see Figure 1). By means of motorbike transportation, farmers able to manage coffee plantation in a location far away crossing sub-districts [7].

The study involved 3 villages that chosen purposively (Village of Sumermulyo, Margoyoso, and Argopeni), with 71 respondent of coffee farmers that determined using simple random sampling method,

and 3 series of FGD on April 2019 until September 2020 involved key persons from farmer groups. Data was analyzed using both descriptive and quantitative method.

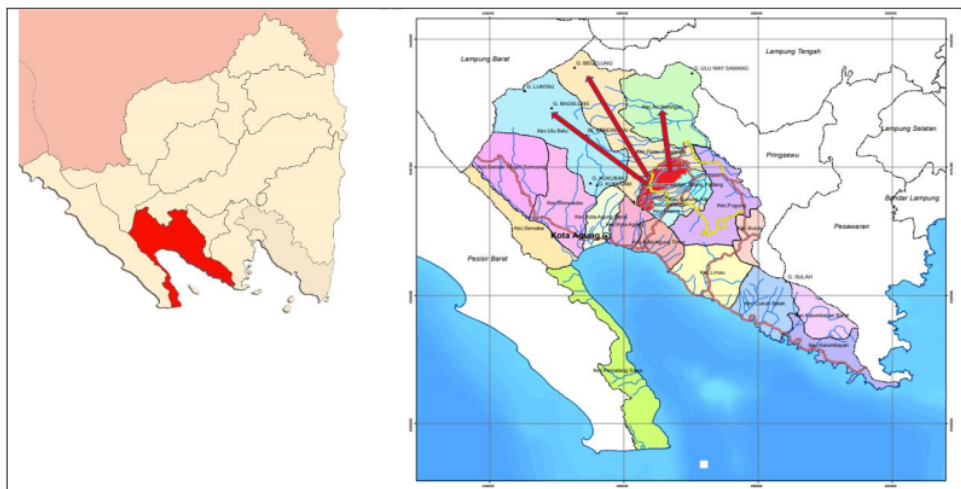


Figure 1. Location study site of Sumberejo Sub-district of Tanggamus District, Lampung Province (right in red color) with red arrows showing direction of migration of long-distance coffee farming

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3. Results and Discussion

3.1. Coffee farm characteristics

Based on the distance of coffee field from home of permanent residence (domicile), coffee field management are categorized into (1) close to home (<5 km), medium distance from home (5-19 km), and long distance from home (>20 km). As many as 94% of the sample of coffee farmers in Sumberejo Sub-district are Javanese. Almost half of the farmers grow coffee quite far from home (23.9%) and even very far from home (25.4%). Farmer goes to work in coffee plantation by motorbike (82-100%) (Table 1).

If the location of the garden is far enough, 75% of farmers can still return home in the afternoon, 25% of farmers usually stay overnight. If the location of the plantation is very far away, 100% of the farmers must stay on site until the work is completed. It can be concluded that if the distance of the coffee plantation is very far (≥ 20 km from home) the farmers do seasonal migration. When farmers come to work, they are on site primarily for weed control, pruning, fertilizing, and coffee harvesting. After the work is done, they stay at home. They generally (76.5%) come to the garden once a month or in two months. Meanwhile, farmers who plant coffee close to their homes, they come to the garden almost every day (4-7 days a week).

Farmers who have coffee plantations near their homes generally (59%) get it from their parents' inheritance. Meanwhile, 62% of farmers who have coffee plantations with medium distance from their homes obtained it from buying shrubland to plant coffee or buying existing coffee plantations to be rehabilitated. On the other hand, for coffee plantations far away from home, 59% of farmers get it from buying an existing coffee plantation and 35% of farmers get it from buying shrubs to grow their own coffee starting from seed transplanting.

Table 1. Characteristics of farm occupancy

No	Characteristic	Distance of coffee field from home		
		Close (<5 km)	Medium distance (5-19 km)	Long distance (\geq 20 km)
1.	Farmers number (%)	50.7	23.9	25.4
2.	Ethnic (%)			
	Jawa	94.1	93.7	94.1
	Semendo	5.9	6.3	0
	Lampung	0	0	5.9
	Sum	100	100	100
3.	Transportation to coffee farm (%)			
	On foot	17.6	6.3	0
	Motorcycle	82.4	93.7	100
	Sum	100	100	100
4.	Migration (%)			
	Daily migrant	100	75	23.5
	Seasonal migrant	0	25	76.5
	Sum	100	100	100
5.	Coffee farm occupancy (%)			
	Buy shrub to plant coffee	5.9	31.2	35.3
	Buy existing coffee	35.3	31.2	58.8
	Parents' inheritance	58.8	37.6	5.9
	Sum	100	100	100
6.	Frequency of working in farm (%)			
	4-7 times per week	91.2	75.0	17.6
	1-3 times per week	8.8	12.5	5.9
	1-2 times per month	0	12.5	41.2
	1 time per 2 months or more	0	0	35.3
	Sum	100	100	100

Table 2. Characteristics of coffee fields

No	Characteristic	Distance of coffee field from home		
		Close (<5 km)	Medium Distance (5-19 km)	Long distance (\geq 20 km)
1.	Coffee land area (ha)	0.83	1.0	1.5
2.	Coffee age (year)	28.6	26.1	19.8
3.	Coffee plant category (%)			
	Pre-yielding (<4 year)	0	0	5.9
	Young (4-10 year)	11.7	12.5	23.5
	Mature (11-25 year)	26.5	12.5	41.2
	Old (>25 year)	61.8	75.0	29.4
	Sum	100	100	100
4.	Amount of plant per field	1610	1937	3555
5.	Coffee population (ha ⁻¹)	2053	2083	2456
6.	Number of clones per field	2.1	1.9	2.1
7.	Amount of grafting tree (%)	72.5	67.2	62.1

Long-distance coffee plantations are characterized by larger landholdings (1.5 ha on average), higher coffee stands per hectare (2,456 trees on average), and are dominated by mature coffee trees (41%) and younger coffee trees (29%). In contrast, close and medium-distance coffee plantations are characterized by smaller landholdings (1 ha or less), lower coffee stands per hectare (about 2,000 trees per ha), and

are dominated by old coffee trees (62-75%) (Table 2). These findings show that there are almost no new plantings of coffee plantations. There are few new plantings on coffee plantations that far distance from home which land still available. Javanese migrants rarely buy shrub land or old coffee land to established young coffee plantation as reported by Kusworo [8].

Generally, instead of new-planting or replanting, farmers prefer rehabilitating coffee plantations by pruning and grafting using local superior coffee clones [14] including intra and inter-specific grafting systems [15]. Data shows that on average 62-73% of coffee trees owned by farmers have been improved by grafting and cloning. Farmers applies methods of coffee grafting both using water shoots or using fruit branches [16].

3.2. Coffee fields maintenance and conservation

The data also shows that the practice of maintaining coffee plantations that are far from home is almost the same as plantations that are close to home. The application of organic and inorganic fertilizers is still in low doses. However, coffee plantations that are far distance from home are more frequently sprayed with herbicides and yet have more manual weeding (Table 3).

Table 3. Chemicals, weeding, and manure

No	Characteristic	Distance of coffee field from home		
		Close (<5 km)	Medium Distance (5-19 km)	Long distance (≥ 20 km)
1.	Not apply fertilizer (% farmers)	23.5	25.0	17.6
2.	Dose of Fertilizer			
	Dose of Urea (kg ha ⁻¹)	125.6	85.4	69.5
	Dose NPK Phonska (kg ha ⁻¹)	64.6	79.2	82.7
	Dose ZA (kg ha ⁻¹)	13.2	34.4	23.5
	Dose of NPK Mutiara (kg ha ⁻¹)	9.5	7.8	7.7
	Dose KCl (kg ha ⁻¹)	3.9	3.1	5.9
	Total dose of fertilizer (kg ha ⁻¹)	216.9	209.9	189.3
3.	Dose of herbicide (l ha ⁻¹)	4.9	5.5	6.6
4.	Frequency applying herbicide			
	apply herbicide (% farmers)	20.6	6.3	5.9
	1-2 times per year (%)	50.0	43.8	35.3
	3-4 times per year (%)	23.5	31.3	52.9
	>4 times per year (%)	5.9	18.8	5.9
	Sum (%)	100	100	100
5.	Frequency of manual weeding			
	manual weeding (%)	5.9	12.5	11.7
	1 time per year (%)	2.9	6.2	0
	2 times per year (%)	58.8	68.8	41.2
	3-4 times per year (%)	32.4	12.5	47.1
	Sum (%)	100	100	100
6.	Dose of manure (kg ha ⁻¹)	691	225	294
7.	Dose of fee skin (kg ha ⁻¹)	85	1017	123
8.	Dose of fungicide (l ha ⁻¹)	0	0	0
9.	Dose of insecticide (l ha ⁻¹)	0.4	0.1	0.004

Coffee plantations that far distance from home is not supported by soil pit and terrace for soil conservation (Table 4), but all of coffee fields are conserved by shade trees. The more distance from home the lower shade trees population (335, 286, 167 trees ha⁻¹ respectively for close, medium, and long distance from home). More divers of MPTS is found in coffee plantation that located close to home residency. Beside banana, black pepper are the most preferred of MPTS. In Lampung Province black pepper is commonly planted on shade trees of coffee plantation and become a coffee – black pepper multiple cropping [17][18].

As many as 53% of long-distance coffee plantations have no legume trees for shading. These practices need to be improved. However, legume shade trees are very importance for N fixation [19] and for enhancing soil nutrient especially under organic cultivation [20]. Planting legume shade trees is a key variable of coffee agroecosystem productivity [21][22] and a pillar of sustainable coffee agroecosystems [23]. It is contrast to what farmers practicing in Sumberjaya Sub-district of West Lampung District (bordering with Ulu Belu Sub-district) where legume tree species were the most preferred as coffee shade tree mainly of *Gliricidia sepium* and *Erythrina sububrams* [24].

Table 4. Shade trees and conservation

No	Characteristic	Distance of coffee field from home		
		Close (<5 km)	Medium distance (5-19 km)	Long distance (≥ 20 km)
1.	No legume trees (%)	29.4	37.5	52.9
2.	Legume trees 1 species (%)	44.1	50.0	35.3
3.	Legume trees 2-3 species (%)	26.5	12.5	11.8
	Sum	100	100	100
4.	Amount of legume trees (ha ⁻¹)	188.0	93.8	53.5
5.	No MPTS* (%)	2.9	6.2	17.6
6.	MPTS 1 species (%)	26.5	56.3	58.8
7.	MPTS ≥ 2 species (%)	70.6	37.5	23.6
	Sum	100	100	100
8.	Amount of MPTS (ha ⁻¹)	120.7	117.9	99.5
9.	No wood trees (%)	41.2	50.0	47.1
10.	Wood trees 1 species (%)	20.6	25.0	17.6
11.	Wood trees ≥ 2 species (%)	38.2	25.0	35.3
	Sum	100	100	100
12.	Amount of wood trees (ha ⁻¹)	25.9	74.3	15.3
13.	Not built soil pit (% farmer)	44.1	31.2	100
14.	Not built terrace (% farmer)	97.1	100	100

Note: * Multipurpose Tree Species

3.3. Coffee yield

In the last 4 years the coffee yield achieved by the sample farmers was about 0.7-0.9 ton per hectare. The closer distance from home the lower the coffee yield. Coffee plantations which far distance from home is situated at highland which its soil is still relatively fertile so that the yield achieving 0.8-1.0 ton per hectare. This high yield seems to encourages farmers to plant coffee even though it is very far away, namely across sub-districts and even across districts. The yield of coffee plantations that are close (44% farmers) or medium distance from home (44% of farmers) ranges 0.4-0.7 ton per hectare per year. Meanwhile, coffee plantations that are located very far away generally (41% of farmers) get a yield of >1 ton per hectare (Table 5). Lower yield of coffee fields at Air Nanningan Sub-district has been reported by Fitriani [25] that attained less than 0.4 (ton ha⁻¹) coffee bean, but yield of MPTS is significantly increased land productivity.

Table 5. Coffee yield in 2016-2019

No	Characteristic	Distance of coffee field from home		
		Close (<5 km)	Medium Distance (5-19 km)	Long distance (≥ 20 km)
1.	Yield in the last 4 years (kg ha ⁻¹)	757.1	772.9	941.0
2.	Yield category			
	< 400 (kg ha ⁻¹)	8.8	6.2	23.6
	400-700 (kg ha ⁻¹)	44.2	43.8	17.6
	800-1000 (kg ha ⁻¹)	23.5	25.0	17.6
	>1000 (kg ha ⁻¹)	23.5	25.0	41.2
	Sum (% farmers)	100	100	100
3.	Yield in 2016 (kg ha ⁻¹)	770.5	739.6	1025.9
4.	Yield in 2017 (kg ha ⁻¹)	770.5	739.6	1025.9
5.	Yield in 2018 (kg ha ⁻¹)	702.1	730.2	849.0
6.	Yield in 2019 (kg ha ⁻¹)	775.6	839.6	934.7

3.4. Long distance coffee farming

As many as 38% of the sample farmers have coffee plantations outside the Sumberejo Sub-district (Figure 2). From FGD it concluded that in 1999-2000 many farmers migrated to the areas, including to Datar Lebuay Village, Air Naningan District as workers in coffee plantations. Migrants came from more densely populated areas such as Pringsewu (Pringsewu Regency), Talang Padang, Sumberejo, Gisting (Tanggamus Regency), from the south side and Gedung Surian (West Lampung Regency) from the west side.

By saving the wage and selling livestock at their home village, they were able to buy 1 ha of coffee plantations from local farmers of ethnic Ogan or Semendo. Savings from coffee yields plus wages as farm labor, migrant farmers then could buy and increase the plantation area to 2-3 ha. Coffee yields depend on the intensity of maintenance and the weather conditions. Yield of 1-2 tons per ha was achieved in 2012 with the condition of the plantation has been rehabilitated in 2008 by pruning and grafting. The money earned from coffee harvest was used to build houses and buy land to grow vegetables around Sumberejo Sub-district. As migrant workers, they stay 2 weeks or even 2 months at the location. During the harvest season, there are many jobs available, namely coffee harvesting services including picking coffee, transporting motorcycle taxis (loading coffee berries and beans), and pulping plus hulling. Coffee harvesting attracts waged migrants to come and work.

If all use commercial services, harvesting requires high costs. The man-power to pick coffee is IDR 50,000 per large sack which can produce 22-25 kg of dry coffee beans (equivalent to 10 kg of dry beans per 100 kg of coffee bean production). Motorcycle transportation to bring fruit from the garden to the hut is IDR 5,000 per sack (equivalent to 1 kg of dry beans per 100 kg of coffee bean). Pulping and hulling costs is 4 kg of coffee beans per 100 kg of coffee production. Motorcycle transportation to bring coffee bean from the hut to the market is IDR 1,000 per kg of coffee (equivalent to 5 kg of coffee per 100 kg of coffee bean). The total cost of harvesting is 20% of the kg of coffee bean production.

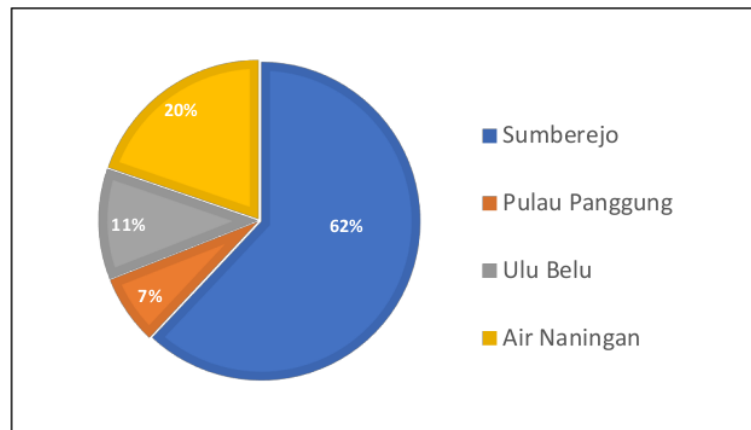


Figure 2. Percentage of farmers migrate outside Sumberejo Sub-district

4. Conclusions

This study concluded that:

- (1) As many as 49% of sample farmers grow coffee located medium or long distance from home. They go to work in coffee plantation by motorbike and usually (25-76%) as seasonal migrant. Migrant farmers stayed on site primarily for weed control, pruning, fertilizing, and coffee harvesting. They generally (76.5%) came to the garden once a month or in two months. Meanwhile, farmers who plant coffee close to their homes, came to the garden almost every day (4-7 days a week). As many as 38% of the sample farmers have coffee plantations outside Sumberejo Sub-district mainly at Sub-district of Air Nangingan and Ulu Belu.
- (2) Long-distance coffee plantations are characterized by larger landholdings (1.5 ha on average), higher coffee stands per hectare (2,456 trees on average), and are dominated by mature coffee trees (41%) and younger coffee trees (29%). In contrast, close and medium-distance coffee plantations are characterized by smaller landholdings (1 ha or less), lower coffee stands per hectare (about 2,000 trees per ha), and are dominated by old coffee trees (62-75%). The more distance from home the lower shade trees population. However more divers of MPTS are found in coffee plantation that located close to home residency
- (3) The yield of coffee plantations that are close or medium distance from home ranges 0.75-0.77 ton per hectare per year. Meanwhile, coffee plantations that are located far distance from home get a yield of 0.94 ton per hectare. The total cost of harvesting is 20% of the kg of coffee harvested. Coffee harvesting attracts waged migrants to come for job.

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