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The Role of Coffee on Empowering People Economy in Pakpak Bharat Regency

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Abstract: The increasing demand for coffee either domestically or internationally is increasingly making coffee as an important commodity in the Indonesian economy. The commodity has a main contribution in generating foreign exchange and plays an important role on providing employment in downstream industry and the trade sector. Among the coffee producers of Indonesia, North Sumatra is one of the major producers and Pakpak Bharat Regency is one of the coffee-producing areas of North Sumatra. Even though coffee is a major commodity for the Pakpak Bharat Regency, as a whole, the contribution of coffee to the regency is still very small and the coffee production is relatively not increased even tended to decrease. Therefore, this research was conducted to find out cultivation techniques implemented by the local farmers of Pakpak Bharat, the role of coffee on the people economy and the coffee marketing in Pakpak Bharat. Based on the data collected, it can be said that Pakpak Bharat has a potential to be developed as a center of coffee production, considering the big number of farmers who cultivate coffee. However, it is found that the coffee farmers have averagely narrow land with traditional cultivation method as well as a lower bargaining power in marketing their product. Another problem is that the coffee only focused on the Northern region and the farmers with relatively larger land area have no interest to cultivate coffee. Therefore, it is required to implement a more intensive promotion and extension to improve farmers' skill and knowledge of coffee cultivation, to rearrange the marketing chain so that farmers can get a more efficient marketing and to expand the land for coffee planting.

Key words: Coffee, Pakpak Bharat, people economy, planting, product

INTRODUCTION

Coffee is consider as one of the five most important commodities in the world market and is categorized as the second most important agricultural commodity on the world (Ibrahim and Zailani, 2010). Moreover, Hadiyan Wijaya Ibrahim and Suhaiza Zailani mentioned that coffee is an important source of foreign exchange for many developing countries coffee has also the power to influence foreign exchange rate of the host countries. Indonesia, as one of coffee exporter, regards coffee as a commodity that play an important role on the country's economy. Indonesia is the third largest coffee producer of the world following Brazil and Vietnam (Saragih, 2013). In 2012, Neraca.co.id, the coffee export volume of Indonesia reached 10.62 million bags of total global coffee export of 113 million bags (one bag contains 60 kg). It increased by 72% in 2011 of 6.15 million bags. For note, Neraca.co.id wrote that based on the Association of Indonesian Coffee Exporters and Industry, the export value of Indonesian coffee beans in 2012 reached $1.25 billion, an increase of nearly 5 times compared to that of the export in 2004 in a worth of 251 million dollars. When compared to the value of export as a whole, the proportion also increased by 0.4% in 2004 to be 0.65% (190 billion dollars) in 2012 as well as when compared to the total non-oil export, by 0.5% to be 0.85% (153 billion dollars) whereas the contribution to the overall export of agricultural commodity decreased in 10.1% to be just 3:28% (38 billion dollars).

Besides export commodity, coffee is also an increasing commodity in domestic demand. Based on the result of the study by the Ministry of Industry, Central Bureau of Statistics and the Association of Indonesian Coffee Exporters and Industry (AICE), the increase in national coffee consumption occurred especially in large cities. Jitunews.com also wrote, in 2013, the domestic coffee consumption reached 1.0 kg/capita/year when compared to the result of the study LPEM UI in 1989 that coffee consumption was only 0.5 kg/capita/year, meaning

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that within 25 years, the consumption of coffee has been increased twice by the Indonesia society. However, the coffee consumption rateis still far below that of various countries of the world such as the United States in 4.3 kg of coffee consumption rate per capita/year, Japan of 4.3 kg per capita/year, Austria of 7.6 kg per capita/year, Belgian of the averagely 8.0 kg per capita/year, Norway of 10.6 kg per capita/year and Finland of 11.4 kg per capita/year.

Therefore, it is estimated that the domestic coffee consumption would continuously increase in future associated with the trend of lifestyle changes of the society, especially nowadays the coffee has become the most popular beverage in the world following water. It was also written by Beritasurabaya.net that it is >1 billion cups of coffee consumed by the world people every day, so that according to Gregory and Featherstone, ICO, Amsalu and Ludi by Saragih (2013), coffee is the mostly traded commodity in the world following oil. Ellen Pay also mentioned that coffee is the single most important tropical commodity traded worldwide, accounting for nearly half of total exports of tropical products.

The increasing demand for coffee either domestically or internationally is increasingly making coffee as an important commodity in the Indonesian economy because in addition to the main contributor of foreign exchange for the country, the commodity also plays an important role in providing employment in downstream industry and the trade sector by Saragih (2013). The increased demand for coffee either for domestic or export commodity is associated with the increasing production and acreage of coffee crops. In 2010, the total area of coffee plantation reached 1210.4,000 ha with the total production of 686.90 thousand tons while in 2011, the national coffee production of Indonesia reached 638.60 thousand tons in a total area of 1233.7 thousand hectares while in 2012, the national coffee production reached 698.89 thousand tons with the total acreage reached 1235.3,000 ha. According to Direktorat Pascapanen Dan Pembinaan Usaha, if grouped on large estates and smallholders, the composition of ownership coffee plantation in Indonesia is dominated by smallholder with a share of 96% of the total acreage in Indonesia, only 2% of which is the State-owned plantation and 2% is a larger private plantation. Direktorat Pascapanen Dan Pembinaan Usaha also mentioned that with the land area and production tend to increase yearly, the commodity becomes the main source of revenue of not <1.84 million household who mostly inhabited the rural areas so that besides supporting the growth of agroindustry and agribusiness, the coffee also plays great role on empowering people economy.

The coffee area spread over almost the entire Indonesian archipelago which the main producers are the Indonesian coffee triangle areas, those are the provinces of Lampung, South Sumatra and Bengkulu. In 2010, the coffee production of Lampung Province was as of 145,000 tons as of 138,000 tons of South Sumatra and Bengkulu as of 55,000 tons (Saragih, 2013). Saragih also mentioned that the productivity of North Sumatra coffee is the second highest with an average productivity of 1,022 kg/ha/year, following Aceh with the productivity of 1,158 kg/ha/year. Pakpak Bharat Regency is one of the coffee-producing areas of North Sumatra such other regions as Dairi, North Tapanuli, Simalungun, Karo, Humbang Hasundutan, Toba Samosir, Samosir.

For the Pakpak Bharat Regency, coffee is a major commodity besides gambier and palm oil, as written in the Badan Pusat Statistik Kabupaten Pakpak Bharat that for estate crops subsector in 2011, there were three commodities with largest area and production, those are gambier, coffee and palm oil. The area of gambier plants was 910 ha while the total area of coffee plants was 1.755.5 ha and for palm oil commodity was of 1,142 ha. All of the three commodities are owned by smallholders having relatively small land area. Indeed, if compared to other coffee producing district of North Sumatra, Pakpak Bharat production is far lower. In 2012, the total production of North Sumatra coffee was as much as 55,313 tons while the production of Pakpak Bharat for the same year was only 1,482 tons or simply by 2,679%. In fact, the production actually declined when compared to the previous 2 years of production, yielding of 1,492 tons in 2011 and of 1,528 tons in 2010 while for the North Sumatra as a whole, the production increased in 2010-2011 and then decreased in 2011-2012, namely 55 600, 56 747, and 55 313 consecutively by Badan Pusat Statistik Sumatera Utara. It means that the contribution of coffee production of Pakpak Bharat to North Sumatra is relatively fixed yearly.

The problem statement: Based on the data and explanation as mentioned above, it is shown that the demand for coffee tends to increase either domestically or internationally so that the coffee is considered to be commodity that has significantly prospective. Among the coffee producers of Indonesia, North Sumatra is one of the major producers and Pakpak Bharat is one of the regencies producing coffee in North Sumatra. Furthermore, for the people of Pakpak, coffee is the main plantation commodity and it is one of the main sources of livelihood in the regency. Considering the role of coffee, the coffee is required to be developed and improved in Pakpak Bharat. On the other hand, the contribution of Pakpak Bharat coffee is still very small and the coffee production is relatively not increased even tended to

decrease. Therefore, it is necessary to study the techniques of coffee cultivation by farmers, the role of coffee on people economy, the marketing of coffee commodity in Pakpak Bharat so that it can be identified the prospect of coffee in the District Pakpak. Therefore, this research aims to find out cultivation techniques implemented by the local farmers of Pakpak Bharat, the role of coffee on the people economy, and the coffee marketing in Pakpak Bharat.

MATERIALS AND METHODS

The data used were primary data and secondary data collected in cooperation with the Faculty of Agriculture of Medan Area University and the International Conservation. This study is categorized as descriptive research which is aimedto create a description of situationor condition of the object under study. Therefore, the study would not aim to analyze the relationship or correlation among variables, testing hypothesis, forecasting or getting the meaning and implication.

The collected data consisted of quantitative data and qualitative data. Quantitative data are in the form of the sale price of coffee, the farmers' coffee land area, coffee farmers' income and non-coffee farmers' income both household income and income per capita while the collected qualitative data included coffee cultivation techniques implemented by farmers, mechanism of coffee sales by the farmers and the coffee marketing chain. There were three methods of data collection.

Individual interview: The individual interview was conducted for the samples of household. The sampling method used a purposive in 4 sub-regencies. Determination of the four sub-regencies based on the total number of population, potential agriculture sector and the acreage of forestry. The four sub-regencies included Salak, Sitellu Urang Jehe, Kerajaan and Siempat Rube. Of the four sub-regencies, there were nine selected villages consisted of three underdeveloped villages and 3 developed villages. Of each village, it is planned to take samples of 60 households. In fact, however, the sampling was taken according to the current state of data collection of 586 households as detailed in Table 1.

The four sub-regencies were chosen to represent the Northern and Southern regions of Pakpak Bharat Regency. The sub-regencies representing the Northern regions are Salak and Siempat Rube while representing the Southern region are Kerajaan and STTU Jehe. All the four sub-regencies are considered to be able to represent any information required to describe the overall of Pakpak Bharat Regency.

Table 1: The amount of the sampled villages and households

Sub-regency	Village	Total sampled households
Salak	KutaTinggi	60
	BoangManalu	60
Siempat Rube	Siempat Rube I	60
	Mungkur	60
Kerajaan	Pardomuan	59
	SurungMersada	65
	Majanggut I	60
STTU Jehe	Kaban Tengah	80
	Malum	82
Total		586

Focus Group Discussion (FGD): Focus group discussion was conducted to obtain data through discussions by involving various related stakeholders. FGD was conducted for 1 day in the Capital of Pakpak Bharat Regency with 20 participants consisting ofPakpak Bharat local governments, representatives of farmers and non-governmental organizations.

In-depth interview with sources: Interviewing the sources was conducted to obtain data through interviews to interviewees associated in this study. The interviewees interviewed were the head of governmental agencies namely Department of Agriculture and Plantation; Regional Planning and Development Agency (BAPPEDA); the Office of Industry, Trade, Co-operatives, and Small Medium Enterprises; the Office of Regional Revenue; Finance and Asset Management and the representative of traders.

Description of Pakpak Bharat Regency: Pakpak Bharat Regency which lies in the Province of North Sumatera was the expansion of Dairi Regency in 2003. Pakpak Bharat Regency lies between latitudes 2°15'00"-3°32'00" North, and longitudes 90°00'-98°31'East. Administratively, the border of Pakpak Bharat to the North is Dairi Regency, to the East Samosir Regency, Dairi and Humbang Hasundutan to the South Central Tapanuli and Humbang Hasundutan to the West Aceh Singkil Regency. Pakpak Bharat Regency covers an area of 1.218 km^2 comprising of 8 regencies and 52 villages.

Pakpak Bharat is a region with a tropical climate which is actually influenced by its location that is near the equator. Pakpak Bharat Regency lies at an altitude of 700-1500 m above sea level with rugged topography. Average temperature is 28°C with average annual precipitation about 311 mm. Population of Pakpak Bharat in 2012 was as many as 41.492 people with a density of 34 inhabitants/km^2, consisting of 20.938 males and 20554 females and an average 4 inhabitants in every household.

Roads in Pakpak Bharat Regency based on the types of roads, pavements (43.77%), dirt road (40.02%), stone path (16.01%). The conditions of dirt roads and stone paths can be extremely muddy during rainy season. Communication access of telephones can only be found in Salak Sub-regency and Kerajaan Sub-regency with 240 customers in total. To access communication through cell phones, most locals (71.8) possess one. The others (28.9) do not own one due to various reasons such as financial constraints to afford one or the feeling of not needing one.

RESULTS AND DISCUSSION

Coffee cultivation technique: The type of coffee that is widely grown by farmers is Robusta and Arabica from local seed Pakpak Bharat. The farmers planted it due to they considered that the coffee is a long-term investment. Seed seeding of coffeeis made by farmers using polybags for about 3 months. Besides producing by themselves, seedlings are also purchased from the vendors as much as Rp. 3000 for each plant. The coffee farmers of Pakpak Bharat do not have large area, the average area of the coffee plant owned by farmers only 0.13 ha. Besides cultivating coffee, some farmers also do intercropping with chili plant. It is carried out to obtain additional income before production of coffee.

Most farmers do not too care for their coffee crops cultivated, in addition tothe limited capital reasons, farmers are also quite to relyon nature. However, there were also some farmers who care for the coffee plant based on the guidance and assistance of agricultural extension but the care was only minimally. The counseling conducted as provision of urea fertilizer and pesticides, the fertilization is usually carried out by farmers once in 6 months. The fertilizer used by farmers is a chemical fertilizer, some of which is subsidized by the government. Today most people already understand the dangers of the use of chemical fertilizers for plants and soil, therefore there are farmers who use organic fertilizers or even do not use fertilizer at all. Another reason to not use fertilizer is the limited capital owned. The protection to the coffee plant by farmers is not significant due to the pests and diseases found have only little influence on the growth and development of the coffee.

The harvesting activity was carried out for the coffee of >2 years since planting. Harvesting was generally conducted twice a month, taking into account the cost and labor efficiency. The coffee of Pakpak Bharat belongs to potential category due to it is still a relatively young age which is largely grown in 2006 which means the age is still about 8 years old. Coffee production in Pakpak Bharat generally is around 15 kg/week/ha or about 780 kg/ha/year, a figure which is far below the average productivity of North Sumatra coffee of 1022 kg/ha/year.

Table 2: The classification of actual land suitability of several villages for coffee crops in Pakpak Bharat Regency

Land mapping unit (SPT)	Classification
SPT-1	S2-nr, eh*)
SPT-2	S2-nr, a
SPT-3	S2-nr
SPT-4	S2-nr
SPT-5	S2-nr, a
SPT-6	S2-nr, a, eh*)
SPT-7	S3-nr, a, wa
SPT-8	S3-nr, a, wa

nr = nutrient retention, eh*) = erosion danger especially in the land with the slope of >50*, a = acidity

Land feasibility: For land suitability, based on the results of a survey and analysis of soil samples carried out for 8 points, it was classified into 4 categories namely; most suitable (S1), quite suitable (S2), marginally suitable (S3) and is not suitable (N). For the coffee plants, the result obtained was as in Table 2.

Based on the Table 2 it is known that of the location of samples from 8 points of soil samples, no one belongs to the category of "most appropriate" (S1) for the coffee plant. Majority of the location of samples are at the level of S2 in which various actions are required in order to overcome the restrictions related to soil conditions with some applications in cultivation techniques such as application of fertilizers, liming and others. It means that Pakpak Bharat, based on the potential soil, is still feasible for development of coffee plant, provided it is done with the support of cultivation techniques.

Coffee marketing system of pakpak bharat: The harvesting was carried out by the farmers by rotation daily, depending on the acreage owned. The farmers usually sell their coffee to the middlemen (rural middlemen) in the form of dry seed. And then, the rural middlemen usually buy it from 25-30 farmers and then sell it back to the wholesaler. Thus, the marketing chain of coffee in Pakpak Bharat has only one chain. The market players included the farmers, middlemen and wholesalers. The farmers sell their dried beans to the middlemen for Rp. 23.000. Then, the middlemen pack it and bring to the wholesalers in Sidikalang. The wholesalers in Sidikalang buy the coffee from the middlemen for Rp. 25.000 as shown in the scheme.

Furthermore, the analysis of the coffee marketing margins in accordance to the marketing chain in Fig. 1 can be seen in Table 3.

Based on Table 3, the price of dried beans of coffee among the farmers/producers was for Rp. 23.000/kg while

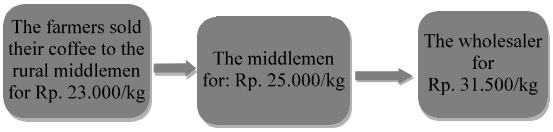

Fig. 1: The coffee marketing chain of Pakpak Bharat Regency

Table 3: The coffee marginal analysis of marketing chain

Type of activity	Unit (Rp./kg)	Percentage (%)
Farmer/Producer		
Sale price on harvesting[1]	23.000	73.02
Middlemen		
Purchasing price	23.000	73.02
Marketing margin	2000	6.35
Marketing costs[2]	500	1.59
Profit margin	1.500	4.76
Sale price	25.000	79.37
Wholesale		
Purchasing price	25.000	79.37
Marketing margin	6500	20.63
Marketing costs[3]	4500	14.27
Profit margin	2.000	6.36
Sale price	31.500	100.00

[1]Converted to dry seed of coffee, [2]transportation, loading and unloading, etc., [3]Drying, milling, packing, loading and unloading, transportation, etc.

the price level of wholesalers was of Rp. 31.500/kg. Price received by farmers/producersis 73% of the price at the wholesale level. The marketing margin at the middlemen level is as much as Rp. 2000/kg (6.35%) which is much less than that of wholesale level for Rp. 6500/kg (20.63%). Likewise, marketing costs at the middlemen level (Rp. 500/kg) is much more efficient comparing to that the wholesale level (Rp. 4500/kg) while the profit margin between the two players is not too much different.

Based on the interview with some rural middlemen, it was obtained that the marketing of agricultural products in Pakpak Bharat generally has the same chain for all commodities. There is only one chain, namely from the farmers to the middlemen then forwarded to the wholesalers who generally located in Sidikalang, although, there are some middlemen who sell dried coffee beans to coffee mills in Sidikalang. In general, the marketing center for agricultural commodities sold by thefarmers is in the capital of Dairi Regency not in the capital of Pakpak Bharat Regency, Salak. Salak only serves as a gathering place for intermediate merchants.

For the process of selling coffee crops from farmers to middlemen, the farmers actively contacted the middlemen to come take their crop that has been packaged as a dry bean coffee. Such a type of selling process makes marketing chain to become shorter because the marketing costs are smaller than the costs when farmers should bring the products by themselves to the middlemen. It also occurs as a result of inter-village location far from each other in Pakpak Bharat Regency.

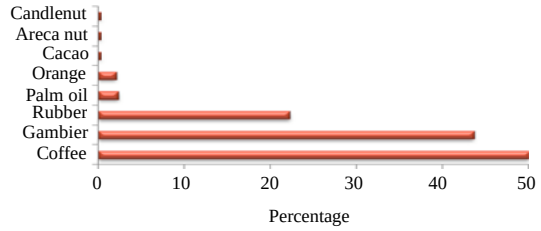

Fig. 2: The distribution of plantation crops cultivated by the farmers in Pakpak Bharat Regency

Regarding the coffee price, it is usually decided by middlemen, whereas farmers just accept the price that has been determined by the middlemen. The selling price is determined by the middlemen based on: the price specified by wholesalers in Sidikalang, the demand for coffee, transportation cost for taking coffee from farmers' place, road conditions, the weather and climate and of course the quality of coffee sold by farmers in particular with regard to the level of maturity of coffee, water levels and types of coffee. The quality of coffee sold by the farmers is determined by the middlemen by using a simple test, sorting dried coffee beans are dark and light colored in which if the dark dried beans is greater number than the bright one, the quality is considered to be lower and automatically the price is relatively cheaper. Thus, it can be said that the farmers have a weaker bargaining position in determining the price and they only functioned as a price taker.

Coffee position of Pakpak Bharat Regency economy and economic contribution of coffee to the people Pakpak Bharat: The data collected from the respondents about plantation crops, coffee is the most widely cultivated plant by Pakpak Bharat community compared to other plants such as gambier, rubber, oil palm and orange. The distribution of the plants cultivated by the community based on the samples can be seen in Fig. 2.

Based on Fig. 2, it is known that coffee is the most widely crops planted by farmers of approximately 50% of the farmers grow coffee. However, as shown in Table 4, the land area planted by coffee was very narrow in which of the 171 farmers who planted coffee, the average acreage of land was only of 0.14 ha. This number is very small when compared to the average of farmer's land used for plantation crop, amounting to 0.53, even still smaller when compared to the average of land for all samples including those who are landless that is 0.42 ha. Meanwhile, the average of land for plantation crop instead of coffee is amounted to 0.76 ha. The fact is actually in accordance to John Baffes which mentioned that all coffee is produced in the tropics, primarily by smallholders but most is consumed in

Table 4: The comparison of land area of coffee and land area instead of coffee

Groups	Total samples of farmers	Average land area (ha)	The smallest land area (ha)	The biggest income per capita (ha)
All respondents	586	0.42	0.00	4.00
Coffee farmers and farmers instead of coffee	457	0.53	0.03	4.00
Coffee farmers	171	0.14	0.04	0.54
Farmers instead of coffee	286	0.76	0.03	4.00

Table 5: Comparison of the total respondents who planted coffee, gambier and neither coffee nor gambier

	Village									
Commodity	SER1	SER2	SAL1	SAL2	KER1	KER2	KER3	STTU1	STTU2	Total
Neither coffee nor gambier	16	34	21	27	27	25	41	55	19	265
Cooffee	44	26	36	33	32	0	0	0	0	171
Gambier	0	0	3	0	1	34	24	25	63	150
Total	60	60	60	60	59	65	80	82	586	

SER = Siempat Rube, SAL = Salak, KER = Kerajaan, STTU = Sitellu Tali Urang Jehe

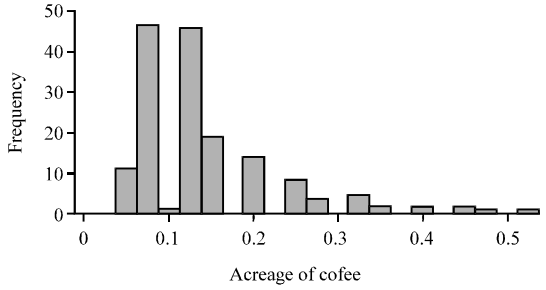

Fig. 3: The histogram of acreage of coffee plant of farmers

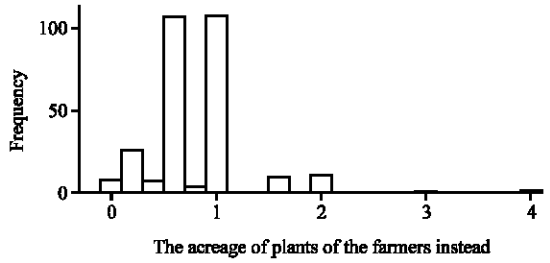

Fig. 4: The histogram of acreage of plants of the farmers instead of coffee

high-income countries. Lewin *et al.* (2004) also said that most of the world's coffee is produced by smallholders utilizing just a few hectares of land.

For more details, the distribution of land area used by farmers for coffee can be seen on the histogram as shown in Fig. 3.

Based on the histogram, it is shown that the distribution is skewed to the left. It means that much more respondents having narrow land for coffee rather than wide land and even the larger is the land the less is the farmer of coffee. Comparing to the distribution of land used for farmers instead of coffee as shown in Fig. 4, although equally skewed to the left but bigger number of coffee plants are cultivated on narrower land.

Besides the problem of the relatively narrow land used for coffee planting, another problem is the concentration of plants which are cultivated by farmers based on geographical area that is the majority of the coffee farmers are in northern region of Pakpak Bharat included Salak and Siempat Rube, whereas the Southern become a production center of gambier as found in Kerajaan and Sitellu Tali Urang Jehe.

The spread of coffee and gambier, the two most planted crops by the farmers in Pakpak Bharat Regency can be seen in the Table 5. In the Table 5, it can be seen that the sampled villages of Siempat Rube and Salak, no farmer who planted gambier unless of 3 farmers in Salak-1 (KutaTinggi Village). Otherwise, in the sampled village of Kerajaan and Sitellu Tali Urang Jehe, there only farmers of Kerajaan-1 (Majunggut I Villages) that planted coffee of 32 farmers, the remaining planted gambier or other plants.

There is no any certain reason why these two plants become concentrated on two of these acreage, whether because of habit or reason in accordance to the skills possessed by the community or because of the environmental suitability.

Furthermore on household income as shown in Table 6, it can be seen the result that the pattern of household income in line with the land area, namely the coffee farmer household income is lower than that of the overall household income and the income of farmers which do not plant coffee.

Based on the Table 6 above, it is shown that the average income of coffee farmer household was lower than that of farmer household instead of coffee. If it is made in the form of income per capital then the result is as shown in Table 7.

From the data in Table 7, the average income per capita of the coffee farmers is also lower than that of farmers instead of coffee, although, the difference is not significant. For the distribution of income, the pattern is also similar to the distribution of land area that is skewed

Table 6: The comparison of income of the household of coffee farmers and the household of farmers instead of coffee

Groups	Total samples of farmers	Average Income per capita	The lower Income per capita	The higher income per capita
All respondents	586	1,557,411	83334	25000000
Coffee farmers	171	1,308,672	83334	6800000
Non coffee farmers	414	1,660,151	191,667	25,000,000

Counted in rupiah in rupiahs per month

Table 7: The comparison of income per capita of coffee farmers and farmers instead of coffee

Groups	Total samplesof farmers	Average income per capita	The lower income per capita	The higher income per capita
All respondents	586	455,430	27,778	7,500,000
Coffee farmers	171	445,400	27,778	4,500,000
Farmers instead of coffee	414	459,707	33,333	7,500,000

Counted in rupiah in rupiahs per month

to the left. Furthermore, the household income and the household income per capita of farmer household instead of coffee seem more varied than those of the coffee farmer household which are indicated by the difference between the lowest and highest values. However, based on the histogram as shown in Fig. 5, actually the pattern of the distribution of coffee farming family income is more varied while the magnitude of the difference between the lowest and highest value on family income instead of coffee farmers is caused by outlier values that are too large. So, there are some respondents of farmer instead of coffee who have very high income much higher than the income of other respondents.

For the income per capita as shown in Fig. 6, the pattern is similar to the household income which the income per capita of coffee farmers are more varied than the income per capita of farmers instead of coffee. However, the farmers instead of coffee have outlier values which are far above income per capita as a whole.

Based on the findings, it can be said that coffee has an important role as an income source of the farmers, especially for them who have narrower land. However, the economy level of the coffee farmers is still low compared to that of farmers instead of coffee and non-farmers. The low income of the coffee farmers is due to the narrow land and low productivity of coffee which is relatively lower than that of North Sumatra as a whole. The low productivity of coffee is estimated to relate to the cultivation which is not optimal yet including seedlings, maintenance, harvesting and post-harvesting handling. Another problem is the low bargaining power of the farmers against the middlemen.

To improve the income of coffee farmers, what is usually done is to increase coffee production through improving farming techniques including maintenance and harvesting, post-harvesting as well as seed selection for the next planting. Another effort that can be done is to improve the bargaining position of farmers through the realization of a more efficient marketing chain so that farmers can obtain better prices and increase their income. If the coffee farmers' income increases, the farmers will be

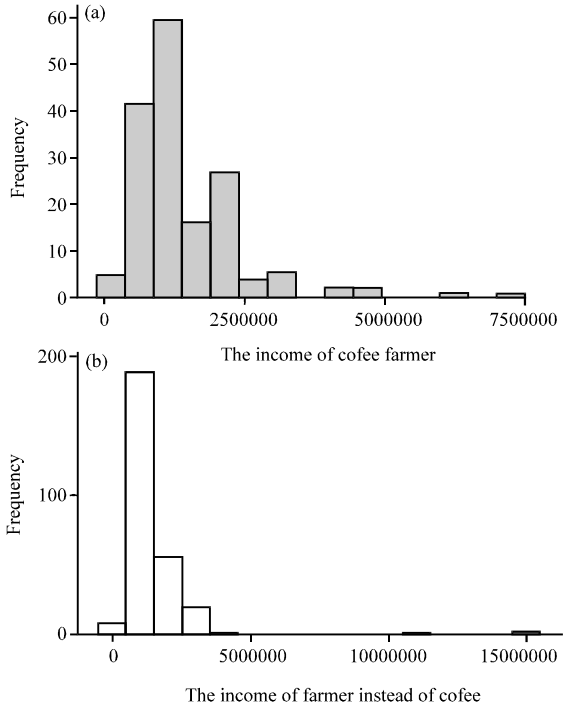

Fig. 5: a) The histogram of income of coffee farmer households and b) the histogram of income per capita of farmer household instead of coffee

more actively seek and maintain the coffee plant and will give an opportunity to farmers instead of coffee or non-farmers to switch to coffee farming. If this can be implemented then all at once will increase coffee production, increase the contribution of coffee Pakpak Bharat toward North Sumatra coffee production and will contribute to the national coffee production while increasing the empowerment of people economy in Pakpak Bharat Regency.

For that reason, the role of local government of Pakpak Bharat Regency is indispensable, especially for improving the coffee cultivation technique, handling post-harvesting through increasing the role and function of extension. Another role is to rearrange the coffee marketing chain by facilitating effective marketing

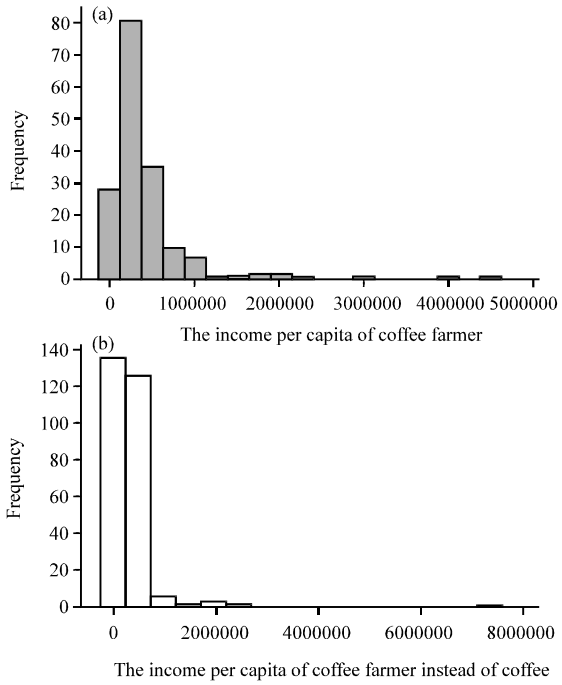

Fig. 6: a) The histogram of income per capita of coffee farmer households and b) the histogram of income per capita of farmer household instead of coffee

institutions to help farmers. Based on the potential magnitude of the demand for coffee, both for domestic and international markets, the expansion of coffee plants need to be thought, especially in the southern region in which were found to be very few people who grow coffee, so that is necessary to study why the land area for coffee plants are relatively small comparing to other plants. If it is economically feasible, the land used for instead of coffee plant can be converted to coffee plant, so that the coffee production of Pakpak Bharat can be improved and the contribution to the production of North Sumatra could be increased as well as the local economy can be more empowered.

CONCLUSION

Based on the above various findings, it can be concluded that the coffee plant has great prospects given the increasing demand trend for coffee. On the other hand, Pakpak Bharat as one of coffee producing regencies has a potential to be developed, considering the big number of farmers who cultivate coffee. However, they generally have averagely narrow land with traditional cultivation method and even with a lower bargaining power in marketing their production yields. In addition, the coffee only focused on the northern region and the farmers with relatively larger land area have no interest to cultivate coffee. For that reason, it is required: to implement a more intensive promotion and extension to improve farmers' skill and knowledge of coffee cultivation, to rearrange the marketing chain so that farmers can get a more efficient marketing and to expand the land for coffee planting. The local government is expected to facilitate the marketing institution to make a more effective extension and to study the possible development and expansion of coffee planting in Pakpak Bharat Regency as Munyuli (2014) reported that policy makers should strengthen environmental/agricultural extension service systems to better serve farmers. Moreover, it is a good idea to establish an effective cooperative whose members are coffee farmers in order to strengthen the coffee farmer bargaining position. The idea is in accordance with Neilson (2008) which wrote that an effective farmer organization through cooperatives certainly appears to offer numerous potential advantages to coffee farmers including collective marketing, labor sharing, revolving credit, bulk-buying and knowledge dissemination. Agricultural diversification is another method to help the farmers in increase their income because according to Godoy and Bennett (1988), many countries have attempted to promote agricultural diversification among coffee smallholders to reduce income variability, increase income and limit production, thereby increasing prices. Considering the size of the land for coffee planting, Munyuli (2014) mentioned that there was a positive relationship between the size of the coffee field and its production in terms of kilograms of coffee beans harvested per annum. Lastly, for farming orientation, Munyuli (2014) wrote that coffee production was much bigger in commercial farms and in organic farms than in traditional farms and this indicated that the production is related to cultivation system and to coffee field management system.

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