The measurement of cash flow on arabica coffee farmers

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Abstract. This study aims at determining the measurement of cash flows from farming and the amount of income of Arabica coffee farmers’ households in the study area. The determination of the area was carried out purposively from the population of Arabica coffee farmers who were 392 people and the sample was 40 people. Primary data collection was collected through making use of observation, questionnaire, and interview. The results show that: The average cash farm receipts for farming is IDR. 2,347,450, while the average farm net cash flow farming is IDR. 1,822,610. The average farm cash surplus is IDR. 2,556,900 and the average household net cash income is IDR. 2,480,044.

Keyword: cash farm receipt, farm net cash flow, farm cash surplus, household net cash income

1. Introduction
In general, global production and consumption of coffee has increased in the period 2012-2016. Indonesia experienced gains in coffee exports with average growth rates of 69 per cent and fourth place on the ranking as producers in the period 2012-2016 [1]. Studied about coffee from farmer household income each country, show that coffee farmers in Indonesia and Vietnam have the highest average farmer household income, whereas coffee farmers in Tanzania and Uganda have the lowest average farmer household income [2]. Based [3] has appeared the advantage of Voluntary Sustainability Standards (VSS) model for producer and consumer of coffee. The adoption of model increased benefit for producers of coffee. Based on [4] show that the share income from off-farm sources more than higher than farm sources. In the context of Indonesia country, the majority of Indonesian coffee smallholders are usually sell their coffee to local markets and commonly have a long-term connection with local traders or intermediaries [5] where as [6] show that many coffee farmers sold to individuals and self consumption.

There are many constrains to produce coffee. Based on [7], there are many constrains such as lack of competitiveness, poor access to market, lack of infrastructure, in adequate access to services, low
value addition, and in adequate technology transfer and research. In Tanzania, the coffee farmer constraint is failed to adhere to good agricultural post harvest practices and improvement whereas about 78% of the farmers interviewed expressed that taxes were key to reducing their income [8]. In Kenya, the socioeconomic factors are significantly to influence coffee productivity such as coffee farm size, family labor, land allocated and application of farm yard manure [9].

According to [10] show that the contribution of coffee to cash household about 37% of total cash income. In Uganda [11] source of income from coffee sales in village 2 (Mbale I) about 17.1 percent to total income. In Hawaii, labor is the highest cost for coffee farming, making up 39% of total cost for the farms. The next highest cost component is fertilizer and chemicals, which makes up 14% of total cost. [12] In Guetemala [13] show that coffee income is an important source to additional income and keep a family out of absolute poverty. The development of coffee production is measured by the expansion and productivity. North Sumatera is one of the coffee production in Indonesia. Based on the table1, the land area and coffee production come from eleven regencies. Humbang Hasundutan is the eight coffee producer, after Deli Serdang, Karo, and other regency[14].

Table 1. Land Area and Coffee Production in North Sumatera Province
by Regency of 2013

| No | District          | Area Area (Ha) | Production (Ton) | Productivity Ton / Ha |
|----|-------------------|----------------|------------------|-----------------------|
| 1  | Mandailing Natal  | 1.764,00       | 1.273,00         | 0.721                 |
| 2  | Tapanuli Utara    | 13.768,00      | 10.121,00        | 0.735                 |
| 3  | Toba Samosir      | 2.837,00       | 2.351,00         | 0.828                 |
| 4  | Simalungun        | 7.079,00       | 8.475,00         | 1.197                 |
| 5  | Dairi             | 10.617,00      | 9.543,00         | 0.898                 |
| 6  | Karo              | 5.890,00       | 8.543,00         | 1.450                 |
| 7  | Deli Serdang      | 700,00         | 548,00           | 0.782                 |
| 8  | Humbang Hasundutan| 11.325,00      | 5.896,00         | **0.520**             |
| 9  | Pakpak Barat      | 1.385,00       | 1.233,00         | 0.890                 |
| 10 | Samosir           | 4.193,00       | 2.712,00         | 0.646                 |
| 11 | Nias Barat        | 200,00         | 7,00             |                       |

**Total number**

| Year | Area | Production | Productivity |
|------|------|------------|--------------|
| 2013 | 59.578,00 | 49.052,00 | 0.823        |
| 2012 | 59.064,00 | 47.230,23 | 0.799        |
| 2011 | 59.144,67 | 48.354,25 | 0.817        |
| 2010 | 57.721,06 | 47.755,11 | 0.827        |

Table 2 showed all of the districts in Humbang Hasundutan Regency tried to product arabika coffee. Dolok Margu village is the third largest coffee producing village, about 184 Ha in 2010. Productivity of coffee in Dolok Margu village as much as 1,859 ton/ha/year, it was bigger than Lintong Nihuta district.
Table 2. Land Area, Production, and Productivity of Coffee In Dolok Margu Village, District Lintong Nihuta, Humbang Hasundutan Regency in 2010

| No | Village Name            | Land Area (Ha) | Production (Ton) | Productivity (Ton / Ha) |
|----|-------------------------|----------------|------------------|-------------------------|
| 1  | Tapian Nauli            | 206            | 374.92           | 1.82                    |
| 2  | Siponjot                | 192            | 310.40           | 1.616                   |
| 3  | Dolok Margu            | 184            | 342.20           | **1.859**               |
| 4  | Parulohan               | 182            | 327.60           | 1.800                   |
| 5  | Sibuntuoan Partur       | 164            | 311.60           | 1.900                   |
| 6  | Hutasoit I             | 127            | 273.60           | 2.154                   |
| 7  | Pargaulan               | 115            | 241.00           | 2.096                   |
| 8  | Hutasoit II            | 115            | 181.90           | 1.581                   |
| 9  | Naga Saribu V           | 109            | 219.40           | 2.012                   |
| 10 | Sitolul Bhal            | 109            | 196.62           | 1.803                   |
| 11 | Sigompul                | 103            | 205.30           | 1.993                   |
| 12 | Naga Saribu II          | 98             | 172.50           | 1.760                   |
| 13 | Naga Saribu IV          | 96             | 190.20           | 1.981                   |
| 14 | Naga Saribu III         | 96             | 182.40           | 1.900                   |
| 15 | Lobutua                 | 96             | 180.36           | 1.879                   |
| 16 | Sitio II                | 94             | 156.70           | 1.667                   |
| 17 | Naga Saribu I           | 90             | 162.20           | 1.802                   |
| 18 | Habeahan                | 91             | 163.80           | 1.800                   |
| 19 | Bonan Dolok             | 84             | 176.40           | 2.100                   |
| 20 | Siharjulu               | 74             | 106.00           | 1.432                   |
| 21 | Sigumpar                | 68             | 110.80           | 1.629                   |
| 22 | Sibuntuoan Parpea       | 31             | 55.20            | 1.781                   |

| Total | 2.524 | 4.641.04 | 1.76 |

Table 2 showed all of the districts in Humbang Hasundutan Regency tried to produce arabika coffee. Dolok Margu village is the third largest coffee producing village, about 184 Ha in 2010. Productivity of coffee in Dolok Margu village as much as 1,859 ton/ha/year, it was bigger than Lintong Nihuta district. One of the efforts to increase the productivity is the used of production factors, such as fertilizers, pesticides, and labor [7-9]. So that, the cash farm expenditure can be fertilizers, pesticides, and labor. Then, the farmers will spend their income on Arabica coffee farming, non-arabica coffee farming, and household needs. Cash farm income is the difference between cash receipts for farming and expenditure on farming. Furthermore, from Arabica coffee farming, farmers received non-cash income from farming in the form of cash, and farmers received cash income in the form of coffee to be directly consumed by farmers. In addition to income from Arabica coffee farming, Dolok Margu Village farmers also earned income from Arabica non-coffee farming, namely horticultural crops, livestock, rice fields and others [10]. So that Arabica coffee farming and non-arabica coffee farming income was the amount household income.

Furthermore, farmers would spend their income for the needs of coffee farming and household needs. Some coffee farmers used capital from credit at any time to develop their coffee farming, so that farmers spent their income to pay interest on loans or the amount of loans from financial...
institutions, and interest on loans was paid directly or could be deducted from the sale of farming products. Some problems faced by farmers in cultivating Arabica coffee farming in DolokMargu village, such as limited land area, capital, skills to cultivate arabica coffee, and cash receipts of Arabica coffee in DolokMargu Village. Based on the description, it is necessary to know the measurement of cash flow of Arabica coffee farmers in DolokMargu Village. So this study aims to determine the measurement of farm cash flow income for Arabica coffee farmers in the research area.

2. Research Methods
The method of measuring the study area was done purposively. The research area site was LintongNihuta District, Humbang Hasundutan Regency. It was chosen, since the area was one of the areas in Humbang Hasundutan Regency where the population accomplished coffee farming with the largest production among the districts in HumbangHasundutan Regency. The data that was used in this study consisted of primary and secondary data. Primary data was obtained through interviews and filled out questionnaires by respondents that had been prepared by the researcher, as well as direct observation. The primary data that was taken included the used input, input costs, the amount of Arabica coffee production, and other data related to this study. The population was farmers who have produced coffee, with the type of Arabica coffee found in the DolokMargu village, Lintong Nihuta District, Humbang Hasundutan Regency. The number of Arabica coffee farmers was 392 people. The number sample size used on the Slovin formula [15]. Based on Slovin formula the sample number that was obtained 40 persons. The research was conducted from September 2015 to August 2016.

This research was conducted by the method of data analysis:

\[
\begin{align*}
\text{Cash farm receipt} & = \text{Cash farm payment} + \text{Farm net cash flow} \\
& = \text{Cash farm receipt} - \text{Cash loans received by farming} - \text{Interest on loans and principal payment} + \text{Farm cash surplus} + \text{Farm receipts non farming} + \text{Household net cash income}
\end{align*}
\]

where 1 is cash farm receipt, 2 is cash farm payment, 3 is farm net cash flow, 4 is cash loans received by farming, 5 is interest on loans and principal payment, 6: farm cash surplus, 7 is farm receipts non farming, and 8 is household net cash income.

3. Result and Discussion
Cash farm receipt was defined as money value that received from sale of farm products. Table 3 show that the average cash farm receipt from Arabica Coffee I in dry season and Arabica Coffee II in rainy season. Based on coffee plant age, it shows that the higher average cash farm receipt when the plants aged 5 years. Cash farm receipt Arabica coffee in dry season and rainy season is IDR 1.123.000 and IDR 1.305.000 respectively.

| Plant Age | Number of Respondents | Cash farm Receipt I Arabica Coffee | Cash farm Receipt II Arabica Coffee |
|-----------|-----------------------|-----------------------------------|-----------------------------------|
| 3         | 1                     | 810.000                           | 928.000                           |
| 4         | 4                     | 668.250                           | 783.000                           |
| 5         | 8                     | 1.123.000                         | 1.305.000                         |
| 6         | 7                     | 859.500                           | 990.833                           |
| 7         | 6                     | 582.428                           | 696.000                           |
| 8         | 7                     | 744.428                           | 754.000                           |
| 9         | 7                     | 546.000                           | 628.333                           |
The main cash horticulture in this village is curly, although other horticulture such as cabbage, chili, beans, patota, tomatoes have been introduced. Table 4 showed that besides of coffee farming, the others farming is horticulture. The main cash horticulture in this village is curly, although other horticulturesuch as cabbage, chili, beans, patota, tomatoes have been introduced. In DolokMargu village the higher cash farm receipt is curly vegetables as much as IDR. 7,467,000, and at least of is potato as much as IDR. 386,111.

Table 4. Farm receipt of arabica coffee and horticulture farming September 2015 - August 2016

| Plant Age | Number of Respondents | Farm receipt from arabica coffee (IDR) | Farm receipt from Horticulture (IDR) |
|-----------|-----------------------|----------------------------------------|--------------------------------------|
| 3         | 1                     | 1.738.000                              | 840.000                              |
| 4         | 4                     | 5.805.000                              | 2.826.000                            |
| 5         | 8                     | 11.227.500                             | 6.189.000                            |
| 6         | 7                     | 11.102.000                             | 6.974.000                            |
| 7         | 6                     | 8.949.000                              | 5.421.000                            |
| 8         | 7                     | 10.329.000                             | 4.175.000                            |
| 9         | 7                     | 11.946.000                             | 5.926.000                            |

Table 5 showed that cash farm payment per Farmer of fertilizer as much as IDR. 1,692,000, when the plants aged 5 years, while per hectare as much as IDR. 1,859,000. The cash farm payment of pesticide IDR. 153,000 of each farmers, while per hectare as much as IDR. 1,478,000. Cash farm payment is defined as the amount that costed for buying goods and services of farming. In farming outlay, there are the number of labor, fertilization, and spraying. Family labor is an important source of labor supply for coffee farm operations. Based on data, demand for external labor less than 3 per cent from total respondent.

Table 5. Average cash farm payment of Arabica Coffee September 2015- August 2016

| Plant Age | Number of Respondents | Cash farm payment Per Farmer | Cash farm payment Per Ha |
|-----------|-----------------------|-----------------------------|--------------------------|
|           |                       | Fertilizer | Pesticide | Fertilizer | Pesticide |
| 3         | 1                     | 366.666   | 40.000    | 366.666   | 40.000    |
| 4         | 4                     | 1.162.500 | 105.000   | 1.859.000 | 1.478.000 |
| 5         | 8                     | 1.692.000 | 153.000   | 1.534.000 | 1.465.357 |
| 6         | 7                     | 1.126.000 | 125.000   | 1.127.000 | 1.400.000 |
| 7         | 6                     | 895.714   | 113.571   | 5.736.000 | 473.928   |
| 8         | 7                     | 803.750   | 99.375    | 1.070.000 | 417.812   |
| 9         | 7                     | 880.000   | 76.666    | 1.920.000 | 585.027   |

As shown in Table 6, the main source of cash farm receipt in September 2015-August 2016 is coffee farming. Table 6 showed that cash receipts from coffee farming I dan coffee farming II are difference, since cash receipts of coffee farming I as much as IDR. 711,450 in May or in dry season, while the cash receipts of coffee farming II as much as IDR. 827,225 in December or in rainy season. In DolokMargu Village, labor is the lowest cost for coffee farming, making up 2.16 % of total cash farm payment for the farms. The highest cost component is pesticide and fertilizer, which makes up 65 % and 33 % of total cash farm payment respectively.
The difference between cash farm receipts and cash farm payment was called farm net cash flow and was a measure of farming ability to product cash system. It means the ability of coffee farmer to product cash is IDR 1.822.610. Farm net cash flow is useful as a starting point for assessing possible farm debt.

Table 6. The measurement on cash flow Arabica coffee farmer

| No | Kind of | Total (IDR) |
|----|---------|-------------|
| 1  | Average cash farm receipts for farming |
|    | a. Coffee I in dry season | 711.450 |
|    | b. Coffee II in rainy season | 827.225 |
|    | c. Horticulture | |
|    | Total | 808.775 |
| 2  | Average cash farm payment |
|    | a. Fertilizer | 173.150 |
|    | b. Pesticide | 340.300 |
|    | c. Labor | 11.381 |
|    | Total | 524.831 |
| 3  | Average farm net cash flow | 1.822.610 |
| 4  | Average farm loan farming | 537.500 |
| 5  | Average interest on loans and principal payments | 89.525 |
| 6  | Average farm cash surplus | 2.270.585 |
| 7  | Average cash income off farming | 209.450 |
| 8  | Average household net cash income | 2.479.629 |

Some coffee farmers used capital from credit at any time to develop their coffee farming, so that farmers spend their income to pay interest on loans or the amount of loans from financial institutions, and interest on loans was paid directly or could be deducted from the sale of farming products. The average cash farming loan is IDR. 537.500. DolokMargu village farmers borrowed CU (Credit Union) with 2% loan interest per month. Loan interest and principal payments are IDR. 89.525. The number of farmers who borrowed as many as 7 people with different loans. The average farm net cash flow is added to farm cash loans farming and reduced by interest on loans and principal payments, the average excess cash in farming is IDR. 2.270.585. Farm cash excess is cash obtained by farming for household purposes. This farm cash excess must be positive if the farm must finance its own non-fixed capital.

The cash farm excess was added with cash income off farming such as labor wages obtained from the other activity besides of farming are defined as household net cash income. The amount of cash income off farming is IDR 209.450 and household net cash income is IDR 2.270.585. The amount of household net cash income cash available to farmer families for payments that are not related to farming.

4. Conclusion
The average cash farm receipts for farming was IDR. 2.347.450, while the average farm net cash flow farming was IDR. 1.822.610. The average farm cash surplus is IDR. 2.270.585, and the average household net cash income was IDR. 2.479.629.
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