Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?* 

Muhammad Arsyad  
Yoshio Kawamura

Abstract

One of the crucial debates arises when finding a solution for reducing rural poverty, is how the causes of poverty should be classified into the agricultural and non-agricultural economic activities. A strong assumption is that, agricultural and non-agricultural economic activities could be expected to reduce poverty, but it is difficult to determine the economic activities that have a strong positive impact on rural poverty reduction. This paper identifies the poverty causes of two villages (hereafter, 'desa') in Indonesia by interviewing 152 cocoa smallholder households. We employed a (1) Head Count and Poverty Gap Indices for describing the poverty situation, (2) Factor Analysis for constructing representative factors for the dimension, (3) Path Analysis for identifying the direct and indirect impacts of explanatory variables on household income as a poverty proxy, and (4) Paired-samples T-Test to evaluate the degree of poverty differences. It was found that; (1) statistically, there is no differentiation in the degree of poverty between Desa Compong and Desa Maddenra. However, there is a differentiation in income structure, meaning that the causes of poverty are different; (2) the orientation of cocoa production is strong and directly associated with the poverty in Compong, while for coffee, cashew-nut and livestock production are associated with poverty in Maddenra. A major implication of these findings is that encouraging cocoa production in Compong, and coffee, cashew-nut & livestock production in Maddenra can be strongly expected to reduce poverty directly, meaning that agricultural economic activity is still the pioneer to reduce rural poverty directly in the country.

Keywords: Agricultural Economics; Poverty; Smallholders; Indonesia

JEL Classification: I32, Q12, Q13, Q16, Q18

* This was intensively modified from the paper presented at the International Conference on Sustainable Community Development (ICSCD), organized by the Institute for Social Science Studies (IPSS) of Universiti Putra Malaysia (UPM) and 'Institute Sosial Malaysia (ISM)', Ministry of Women, Family and Community Development, held on 20th-22nd July, 2010 in Kuala Lumpur, Malaysia.
1. INTRODUCTION

Although the rapid expansion of Indonesian cocoa production has been mainly contributed by smallholders (92.64% in 2005), the proportion of smallholders whose income is below the poverty line is cyclical. Firstly, the smallholders are originally poor. Secondly, the smallholders were moving out of poverty then fell back into poverty, causing low purchasing power. In addition, some crucial issues strongly associated with poverty reduction among smallholder remain unsolved. These include; (1) the challenge to improve the incomes of smallholders through agricultural and non-agricultural economic activities, which still remains a major barrier to raising income in the country; (2) the average size of agricultural land as a constraint to increase farm production; (3) the smallholders suffer from unavailability of farm credit. As a result, they do not have options to finance production or daily life needs, except for lending capital input (money) from the brokers who are mostly called tengkulak. The tengkulak’s money is repaid by the smallholders in terms of cocoa products, but the price is determined by the tengkulak; (4) access to social facilities, such as education, public health services and clean water is another challenge, which causes low human resources quality in terms of education attainment and health; and (5) the lack of access to market information for both farm input and output. High Yielding Clone or agricultural extension, as well as non-agricultural business opportunities. In addition, the poor condition of smallholders is also exacerbated by: first, the government policies -including monetary policy, such as high interest rates- were and still are not suitable for the cocoa smallholder development in Indonesia. Second, the low quality of Indonesian cocoa beans, which are produced by the smallholders, is another crucial issue. Given the current situation, it was really necessary to conduct the research on the smallholders-poverty linkages as a challenging and interesting issue in fighting poverty among smallholders in the country. Two specific purposes of the paper are: first, to measure the proportion of cocoa smallholders whose income has fallen below the poverty line, and how severe the poverty situation is. The second is to compare the poverty situation between two desas in Indonesia, so that it is possible to identify how different the poverty situation is.

2. HYPOTHETICAL MODEL: STUDIES ON POVERTY CAUSES

Poverty is multidimensional; it encompasses not only what is called income poverty, i.e. deprivation of income/consumption, such as the satisfaction of a minimum level of food and other basic needs, but also limited access to health, nutrition, and education services, which
Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?

aggravates the impact of income poverty, resulting in high child mortality, short life expectancy, and illiteracy. In addition, the poor are vulnerable to shocks and risks and lack ability to cope with or overcome shocks. These individuals suffer not merely from a transient decline in income consumption and well-being, but also sink into deeper long-term endemic poverty. Different aspects of poverty reinforce one another. In a wider sense, poverty basically connotes a lack of choice and opportunities on the part of individuals to achieve an optimum exploitation or use of their potentials or capabilities; it implies lack of empowerment on their part to participate in or influence the decision-making process affecting their livelihoods and well-being (Islam, 2006).

All these indicate that poverty is a complex phenomenon that cannot be seen by one view point, meaning that many factors are associated with poverty itself, not only internal factors, such as household human resources and the ownership of production factors (say agricultural land for the poor smallholders) but also, more importantly, the impact of external factors, such as access to social services and information availability on the community across developing countries, in which Indonesia is no exception. For the distribution of the benefits from social services in Indonesia, Van de Walle (1992) in her study for the World Bank found that given existing patterns of use, education spending is more efficient at directly reaching the poor than is health spending. In the education sector, subsidies to primary and to a lesser extent lower secondary education are most likely to reach poorer households and raise their living standards. Education is potentially an important conduit for reaching relatively isolated rural households. Van de Walle also gave a justification that education subsidies effectively reach the poor for two reasons: poor families have more children, while richer families often send their children to better and more expensive private schools. Meanwhile in the health sector, subsidies to basic primary health care provide the best avenue for reaching the poor, but they are far from ideal as an instrument for doing so.

The next important factor in identifying poverty causality is access to information for the poor. So far, the study conducted by the CRIEC-World Bank (2002) in Indonesia reveals the importance of information availability. It was found that 30% of the households surveyed receive an income just sufficient for food requirements. The poor are usually farmers who lack assets, both land and equipment as well as information (market, technology, capital and business opportunity). The World Bank classified the main factor that determines the gap between the poor and the rich, namely access to information. This is one finding. Another interesting finding is from Kawamura’s study (2002) on the causal factor of poverty in South Sulawesi, Indonesia, by using an index “Transportation and Communication”. He found that “Radio
Communication Access” has no statistically significant path coefficient (βweight) in relation to the “Lowest Income Level” as a poverty proxy in his study, meaning there is no direct impact on poverty. However, “Radio Communication Access” shows a significant βweight in relation to the “Dependency on Agriculture” as one of the intermediate variables in his work. Thus, “Radio Communication Access” will eventually have an indirect impact on “Lowest Income Level” or poverty through the variable “Dependency on Agriculture”. The two studies above lead us to clearly state how important information accessibility is in identifying the poverty causal factors.

Another crucial dimension associated with poverty in developing countries like Indonesia is both the role of agriculture and non-agricultural sectors in poverty reduction. This is not without clear arguments. A number of important studies support this aspect which centers on the role of the sectors in general and their linkage in particular are extremely important in reducing poverty. To briefly justify this viewpoint, some important studies can be found in Kawamura (2002), Sumarto & Suryahadi (2003), Said & Sallatu (2004), Salam (2006), and Tambunan (2007). Kawamura in his estimation used the “Dependency on Agriculture” as one of the important poverty causal factors in terms of the “Lowest Income Level”. He persuasively found a positive β value on this particular factor, meaning that the more the households at the lowest income level are living in villages, the higher their dependency on agriculture as their main economic activity. This indicates what Salam found that the agricultural sector (rice production, cocoa production, on-farm labor and cocoa plantation area) is one of the most important sectors in dealing with the poverty in the forest community. Said & Sallatu also pointed out that this sector is one of the possible important factors to poverty reduction. These findings lead us to accept Sumarto & Suryahadi’s findings that agricultural growth has indeed been the most important factor contributing to rapid poverty reduction experienced by Indonesia during the high growth pre-crisis period. In terms of the poverty headcount, agricultural growth accounts for 66% of total poverty reduction, 55% of urban poverty reduction, and 74% of rural poverty reduction. In terms of the poverty gap, agricultural growth accounts for 51%, 36%, and 57% respectively of total, urban, and rural poverty gap reduction. Meanwhile, for the severity of poverty only the reduction in the rural areas is calculated as only for these areas the coefficient is statistically significant. It appears that 49% of the reduction in the severity of poverty in rural areas is due to agricultural growth. Tambunan’s study decomposes the percentage changes in poverty into three main sectors in terms of their shares in total employment, namely industry (I), agriculture (A) and services (S) in Indonesia. The results show that the output growth in agriculture appears to have the strongest
Reducing Poverty of Cocoa Smallholders in Indonesia:
Is Agricultural Economic Activity Still the Pioneer?:

impact (-10.04dYt) on the change in poverty than those in the other two sectors (-2.56dYt and -1.82dYt).

Smallholders indeed play an important role in Indonesia’s cocoa production. The Indonesian Statistics for Estate Crop and Estate Development Strategic Plan clearly show that the total production of cocoa at the national level reached 536,804 tons in 2001 and 748,828 tons in 2005. During this period, the average growth of production was 10.5% per annum (the highest of 21.6% was achieved in 2001). An interesting point is that most of this production (90.83% per annum during 2001-2005) was produced by the Smallholders Estates (SE). The contribution of smallholders to total production reached of 88.9% or around 476,924 tons in 2001 with growth by 23.8%, a substantial contribution for Indonesia’s cocoa production. Meanwhile the remaining shares, 6.3% or around 33,905 tons (with negative growth by 2.6%) and 4.5% or around 25,975 tons (with growth by 12.5%) are Government Estates (GE) and Private Estates (PE), respectively. Up to 2005, these three categories of producers experienced fluctuations in their growth, especially as GEs declined by 24.17% in 2004 and PEs by 9.53% in the same year. Fortunately, SEs persisted with its production growth by 11.69% per annum (2001-2005)—which was higher than the national average of 10.49%—, while the GEs had a negative growth (-6.77%), although the PEs still had a positive growth (4.62%). This situation above reminds us that the smallholders play a strategic role in Indonesian cocoa production. This conveys a message that the rapid expansion of Indonesian cocoa production cannot be separated from smallholders. In other words, without having the comparative advantage of cocoa smallholders, Indonesia’s cocoa production growth cannot be expected to place Indonesia as the third largest cocoa producer in the world. This implies that the poverty of smallholders could become a crucial issue for Indonesian agriculture in the future.

Using the Agricultural Censuses data, Booth (2004) identified that total incomes from all sources are broken down into agricultural wages, other income from agricultural activities, non-agricultural wages, and various types of self-employment activities in manufacturing and services. In addition, many households receive income from remittances, pensions etc. In 1993, wages and salary earnings were the largest single source of off-farm earnings and non-agricultural wage earnings were greater than those from agriculture. There is evidence of an inverted “U” relationship, in that both agricultural and non-agricultural wages account for a higher proportion of total agricultural household incomes for the middle income groups. All justifications mentioned above leads us to hypothesize that the Dimension of Household Human Resource, Agricultural Assets, Access to Social Facilities, Access to Information,
Agricultural Economic Activity and Non-Agricultural Economic Activity affects the poverty of cocoa smallholders (Figure 1).

**Figure 1**
Hypothetical Model

```
Household
  Human Resources
  \[ P_{11} \]
  \[ \beta_{11} \]
  \[ P_{21} \]
  \[ \beta_{21} \]
  \[ P_{31} \]
  \[ \beta_{31} \]
  \[ P_{41} \]
  \[ \beta_{41} \]

Agricultural Assets (X_1)
  \[ P_{12} \]
  \[ \beta_{12} \]
  \[ P_{22} \]
  \[ \beta_{22} \]
  \[ P_{32} \]
  \[ \beta_{32} \]
  \[ P_{42} \]
  \[ \beta_{42} \]

Access to Social Facilities (X_2)
  \[ P_{13} \]
  \[ \beta_{13} \]
  \[ P_{23} \]
  \[ \beta_{23} \]
  \[ P_{33} \]
  \[ \beta_{33} \]
  \[ P_{43} \]
  \[ \beta_{43} \]

Access to Information (X_4)
  \[ P_{14} \]
  \[ \beta_{14} \]
  \[ P_{24} \]
  \[ \beta_{24} \]
  \[ P_{34} \]
  \[ \beta_{34} \]
  \[ P_{44} \]
  \[ \beta_{44} \]

Non-Agricultural Economic Activities (X_3)
  \[ P_{15} \]
  \[ \beta_{15} \]
  \[ P_{25} \]
  \[ \beta_{25} \]
  \[ P_{35} \]
  \[ \beta_{35} \]
  \[ P_{45} \]
  \[ \beta_{45} \]

POVERTY

Note: 1) An arrow indicates a causal relation and a curve indicates a correlation; 2) \( P_{ij} \) is a path coefficient of \( X_i \) on \( X_j \), while \( \beta_{ij} \) is a correlation coefficient between \( X_i \) and \( X_j \).
```

3. METHODOLOGY

3.1. Research Site and Data Collection

The research was conducted in Sidrap District, South Sulawesi Province, Indonesia. Two basic criteria of the research site were needed. They are: (1) the average percentage of cocoa smallholders and poor households for selecting a district (Criterion 1), and (2) the same percentage in cocoa smallholders, but different in poor households for selecting a desa (Criterion 2). In order to meet these criteria, by putting the secondary data into an XY Scatter Plot, we got the research site (Figure 2 and Figure 3). Each figure is divided into four Quadrants (I, II, III and IV) which have characteristics regarding the cocoa smallholders-poverty linkages. It is assumed that Quadrant I indicates a high percentage in both cocoa smallholders and poor households. Quadrant II indicates a low percentage in cocoa smallholders, but a high percentage in poor households, and so on. The horizontal and vertical lines refer to the average.
Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?

In Figure 2, there were 23 districts (kabupaten) in the province. By Criterion 1, we selected Kabupaten Sidrap. In Figure 71 desa in Sidrap were plotted. Then, Desa Maddenra and Desa Compong were chosen to satisfy Criterion 2. We interviewed 70 households in Compong (26.4% of the total cocoa smallholder households) and 82 households in Maddenra (28.2% of the total cocoa smallholder households), so that the total sample was 152 households.

3.2. Analysis Methods

(i) Head Count and Poverty Gap Indices

The proportion of cocoa smallholders living below the Poverty Line and the severity of the poverty situation is analyzed by using the Foster-Greer-Thorbecke poverty indices. They are the Head-Count Index (HCI) and the Poverty Gap Index (PGI):

\[ HCI = \frac{A}{N}, \text{ where } A \text{ is the number of households below the poverty line,} \]
\[ N = \text{the number of total households.} \]
\[ PGI = \frac{A}{N} \sum_{i=1}^{A} \left[ \frac{Z - \bar{I}_i}{Z} \right], \text{ where } Z \text{ is the Poverty Line (PL) and } \bar{I}_i \text{ is the average income of the households below the PL.} \]
We employ the 2006 National Poverty Line (NPL) for the rural areas in South Sulawesi of Rp.98,946.00/capita/month issued by CBS.

(ii) Factor Analysis for Index Construction

Three subsequent steps are undertaken in the Factor Analysis. They are; 
(1) extracting factor to meet an initial solution or initial decision regarding the number of inputted factors underlying a set of measured variables in each of the dimensions studied by employing a Principal Component Analysis (PCA) as an extraction method (unrotated solution); 
(2) rotating factor by using Varimax Method—the most common rotation method—to create the results which are expected to be more interpretable as a final solution. The consideration is that an unrotated solution has an

---

2 There were 105 desa in Kabupaten Sidrap (data 2006), including kelurahan. Kelurahan is also the smallest governmental unit (just like desa) in Indonesia. However, generally desa is located in the rural areas, while kelurahan is located in or near a capital city. Therefore, access to information and public services (like education and public health center) are easier for the residents of a kelurahan. All kelurahan were excluded from the Scatter Plot to satisfy the Criterion 2.

3 CBS is Central Board of Statistics in Indonesia. The board also issued the NPL for urban areas.
unclear meaning, while the rotated factor matrix provides the clear cluster of variables in the dimension constructed; (3) constructing a Factor Matrix to calculate an "Index" as a new set of variables to be regressed.\footnote{For this purpose, we used SPSS Software to create factor score for all indices. See Arsyad & Kawamura (2009) for the procedure of index construction.}

Figure 2
XY Scatter Plot for Selecting a District (Kabupaten)

![XY Scatter Plot for Selecting Kabupaten](image)

Figure 3
XY Scatter Plot for Selecting Village (Desa)

![XY Scatter Plot for Selecting Desa](image)
(iii) Path Analysis

Path Analysis (PA) basically is a standardized General Multiple Regression Analysis (GMRA). A multiple regression equation is a linear model constructed by a dependent variable and a set of explanatory variables (Kawamura, 1978:228) to represent reality or a phenomenon which can be formulated based on both a theoretical framework and empirical evidence. The fundamental difference between PA and GMRA lies only in the nature of the data. The data used in PA is standardized. Therefore, the assumption used in PA principally is the same as the GMRA assumption. The general model of Path Analysis:

\[ Y_t = \beta_1 X_{1t} + \beta_2 X_{2t} + \ldots + \beta_k X_{kt} + E_t \]

for \( Y_t \), \( X_{it} \) are standardized and \( t = 1, 2, \ldots, n \) yields the following form:

\[ Y_t = \left( \sum_{q=1}^{k} \beta_q X_{qt} \right) + E_t \]

in which the direct impact of the independent variables on each of its respective dependent variable can be estimated by path equations:

\[ X_1 = E_1 \quad \text{(Path Equation 1, PE 1)} \]
\[ X_2 = E_2 \quad \text{(PE 2)} \]
\[ X_3 = E_3 \quad \text{(PE 3)} \]
\[ X_4 = E_4 \quad \text{(PE 4)} \]
\[ X_5 = P_{51} X_1 + P_{52} X_2 + P_{53} X_3 + P_{54} X_4 + E_5 \quad \text{(PE 5)} \]
\[ X_6 = P_{61} X_1 + P_{62} X_2 + P_{63} X_3 + E_6 \quad \text{(PE 6)} \]
\[ X_7 = P_{71} X_1 + P_{72} X_2 + P_{73} X_3 + P_{74} X_4 + P_{75} X_5 + E_7 \quad \text{(PE 7)} \]

The above equations yield a general form, \( X_j = \left( \sum_{q=1}^{k} P_{jq} X_q \right) + E_j \) for \( k < j \);

where \( P_{ji} \) is the path coefficient of the independent variables and \( E_j \) is the error term. The estimated values in each one of the above path equations can be obtained (from PE 5 to PE 7) by the formula \( \hat{X}_j = \sum_{q=1}^{k} \hat{P}_{jq} X_q, (k < j) \);

where a hat (\(^\wedge\)) indicates an estimated value. Thus, a path coefficient \( P_{ji} \) is

\[ Zscore = (X_i - \bar{X}) / SD, \] where, \( X_i \) is an observation of the \( i^{th} \) case in a variable \( X \), \( \bar{X} \) is a mean of variable \( X \), and SD is a standard deviation of a variable \( X \).
a standardized regression coefficient, which is $b_{jq}(S_{xj}/S_{xq})$. In this case, $b_{jq}$ is an unstandardized regression coefficient, while $S_{xj}$ and $S_{xq}$ are, respectively, the standard deviation of $X_j$ and of $X_q$ (see Kawamura, 1978). This solution leads us to test a Null Hypothesis ($H_0$) that "there is no significant impact of the independent variables on the dependent ones".

(iv) Test for Goodness of Fit and Significance of the Path Coefficient

For testing the goodness of fit and path coefficient, we regress all indices on the Poverty as a dependent variable. In addition, we also regress all indices on each of the intermediate variables so that the overall test for goodness of fit of the path equation on the intermediate variables could also be identified. We used the advantage of SPSS Program in calculating the observed $F$-value and coefficient of determination ($R^2$) in testing for the goodness of fit. The higher $R^2$, the better estimates mean the model is fit. From this perspective, $R^2$ heavily depends on the ability of the equation specification in explaining the reality. If the observed $F$-value exceeds the criterion ones, we reject $H_0$. The next stage was the test for significance of path coefficient, whether the observed path coefficients differ statistically from zero ($\alpha = .10$) by using the t-ratio. In obtaining the $t$-value, we estimate the standard error of the path coefficient ($S_{\beta_j}$) along with the path coefficient ($\beta_j$) for each variable. If $\beta_j/S_{\beta_j}$ exceeds the $t$-distribution, we conclude that ($\beta_j$) differs significantly from zero.

4. RESULTS AND DISCUSSION

4.1. Factor Analysis for Index Construction

The primary purpose of use Factor Analysis in this paper is to construct a representative factor for each of the six dimensions in the two desa which enables us to construct an index to be regressed. It was found that each of the six dimensions (Household Human Resources, Agricultural Assets, Access to Social Facilities, Access to Information, Agricultural Economic Activities, Non-Agricultural Economic Activities) has at least two representative factors as indices and at least one of the variables is strongly loaded on each representative factor.

However, the impact of independent variable on each of the two intermediate variables will not be discussed in this article.
4.2. Test for Goodness of Fit and Significance of the Path Coefficient

The overall test persuasively resulted in the rejection of $H_0$ that “there is no significant impact of the independent variables on the dependent ones” as a whole. This could be proved that all path coefficients in the Path Equation (PE) 1 are zero. In addition, it can also be identified that the significance test for each of the six path coefficient of the intermediate variables lead us to reject $H_0$ that “there is no significant impact of the independent variables on the intermediate ones”. The regression results show the $R^2$ of each six path equations in Desa Compong. PE 1 is the path equation of the twenty one independent variables (including intermediate) on “Household Income ($X_y$)” as a dependent variable in this step of analysis. The $R^2$ of PE 1 reached 0.872. This figure tells us that 87.2% of the total variance of endogenous variable (Household Income) in general, can be explained by all the twenty one explanatory (independent) variables. Meanwhile, in Desa Maddenra, the $R^2$ of PE 1 reached 0.814. It means that 81.4% of the total variance of “Household Income” in general can also be explained by the all twenty five explanatory variables. We may therefore state that the model constructed through the six dimensions in the research is adequate enough in explaining the poverty situation. In other words, all six dimensions which were constructed (Household Human Resources, Agricultural Assets, Access to Social Facilities, Access to Information, Agricultural Economic Activities, and Non-Agricultural Economic Activities) could be the important dimensions for the poverty of cocoa smallholders. This also leads us to argue that all significant variables collected could be the better direction for policy formulation dealing with poverty reduction in Indonesia.

The last test was the T Test for the significance of all path equations based on the regression results. In addition, the number of significant path coefficients might also help to identify the important explanatory variable. All path equations have at least three significant path coefficients in which the PE 1 has 10 significant variables ($X_{x1}$, $X_{x2}$, $X_{x3}$, $X_{x4}$, $X_{x5}$, $X_{x6}$, $X_{x7}$, $X_{x8}$, $X_{x9}$, $X_{x10}$) in Desa Compong and it has 11 significant variables ($X_{x11}$, $X_{x12}$, $X_{x13}$, $X_{x14}$, $X_{x15}$, $X_{x16}$, $X_{x17}$, $X_{x18}$, $X_{x19}$, $X_{x20}$, $X_{x21}$) in Desa Maddenra.\(^7\)

\(^7\)The PE 2, PE 3, PE 4, PE 5 and PE 6 are not shown here.
4.3. Poverty Causes: A Comparison of Two Villages in Indonesia

This section deals with a comparison of the poverty situation between two desa and identifying the important causes. A strong assumption here is that it was found (through XY Scatter Plot of Figure 3) that some desas are the same in the percentage of cocoa smallholder households, but they are different in the percentage of poor households, including Desa Compong and Desa Maddenra, where the research was conducted. The calculation reveals that the Head Count Index (HCI) of Poverty in Compong is .3428. This means that around 34.3% of the smallholder households in Compong have an income/capita/month below the National Poverty Line (NPL). Meanwhile, the Poverty Gap Index (PGI) of the analysis is .10. This indicates that the average income of smallholder households falls short of the NPL. This result is different from Desa Maddenra. The calculation reveals that the HCI in Maddenra is .0731 meaning that less than 10% of the smallholder households have an income/capita/month below the NPL. In fact, the average income of smallholder households in Maddenra is above the NPL, resulting in the PGI of zero (0) meaning that there is no poverty gap in the community. However, it is important to emphasize that this finding should not be interpreted to mean that there are no poor people there (as HCI revealed). The indices of PGI reveal that the depth of poverty in Compong is more severe than Maddenra.

It is true that the Paired-samples T-Test (Table 1) shows that the average household income in Desa Maddenra is higher than Desa Compong, but it was just Rp518.67/capita/year or Rp43,250/capita/month (around US$4.71/capita/month, $1=Rp9,167, rate in 2006) in mean difference, so that it allows us to accept Hot that the population mean difference is equal to zero, meaning that statistically there is no mean difference between these two desa in terms of household income as a poverty proxy in the analysis. All these indicate that the degree of poverty between Desa Compong and Desa Maddenra is relatively the same. However, they have a differentiation in income structure meaning that the causes of poverty are different, not only the magnitude but also the sign of the causes themselves.
Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?

Table 1
Paired-Samples T Test of Household Income between Desa Compong and Desa Maddenra

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Desa Compong</th>
<th>Desa Maddenra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>4,600</td>
<td>4,600</td>
</tr>
<tr>
<td>Maximum</td>
<td>62,500</td>
<td>76,850</td>
</tr>
<tr>
<td>Mean</td>
<td>2.07E4</td>
<td>2.12E4</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>15,372</td>
<td>12,939</td>
</tr>
<tr>
<td>90% Confidence Interval of the Difference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>-3449.642</td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td>4486.985</td>
<td></td>
</tr>
<tr>
<td>Mean Difference</td>
<td>518.671</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>.218</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>.828</td>
<td></td>
</tr>
</tbody>
</table>

N = 152

For comparison, we provide Table 2 and Table 4 to identify the poverty causes by different variable groups (intermediate and independent). We should emphasize that the variables collected among two desas theoretically should be the same for two fundamental reasons. Firstly, in constructing the hypothetical model, it was obviously using the same dimension in identifying variables conceptually or dimensionally for the two desa. Secondly and most importantly, the instrument used in collecting primary data (questionnaire) is also exactly the same, meaning that the variables collected for each of the five dimensions between the two desas should also be the same. However, the Correlation Matrix among variables in the beginning step of analysis persuasively displayed some dimensions that yield different variables collected in the two desas. In addition, the Factor Analysis also reveals that even if we put the same variables among two desa in the analysis (Household Human Resource Dimension, for instance), it still had a possibility of producing different factors or components resulting in different indices. This indicates that beside their similarity as common factors, these two desas also have a different social structure based on the dimensions constructed, which is creating different poverty causes.
At least, there are three ways to compare the poverty situation between the two desas as well as identifying the important causal factors. The first is identifying the common factors responsible for the poverty of two desas. In Table 2 it is clearly displayed that the variable Government Transfer-Source Income appears to be a common factor in each of the two desas. The meaning of variable Government Transfer-Source Income is household income transferred from the government (government transfer). It is generally true that the Indonesian government has been providing not only financial support (cash transfer), such as the Social Safety Net Program, including the Oil Price Compensation, and also the government subsidies for agricultural inputs, such as fertilizer and chemical pesticides, as well as farm equipment (especially for paddy field) to the poor households residing in the rural areas, of which these two desas (Compong & Maddenra) are no exception. Therefore, it is reasonable that “Government Transfer-Source Income” appears to be a common factor in explaining the poverty situation for the two desas. This implies that the “Government Transfer-Source Income” can be significantly expected to deal with poverty in the country. The important question to be answered here is that, in which desa the variables have greater (important) impacts (direct and indirect) on poverty. As clearly depicted in Table 2 (intermediate variables group), “Government Transfer-Source Income” appears to be a significant common factor in explaining the poverty situation in the two desa. It indicates that the positive impact of “Government Transfer-Source Income” can be expected to reduce poverty in Compong and Maddenra. However (in terms of direct impact), Compong receives a positive impact of “Government Transfer-Source Income” which is slightly higher ($\beta = .167$) than in Maddenra ($\beta = .147$). This implies that the role of the “Government Transfer-Source Income” in reducing poverty in Compong is more important than Maddenra.

*The intermediate variables don’t have indirect impacts on “Poverty”.*
Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?

Table 2
Poverty Causes Comparison between Desa Compong and Desa Maddenra by Intermediate Variable

<table>
<thead>
<tr>
<th>No</th>
<th>Intermediate Variable</th>
<th>(βweight) on the Poverty</th>
<th>Desa Compong</th>
<th>Desa Maddenra</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coffee and Orange Productions</td>
<td>.377</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Clove Production and Livestock</td>
<td>.195</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Cocoa Production</td>
<td>.557</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Family Transfer-Source Income</td>
<td>.258</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Government Transfer-Source Income</td>
<td>.167</td>
<td>.147</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Coffee, Cashew and Livestock</td>
<td>*</td>
<td>.674</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Clove and Orange Productions</td>
<td>*</td>
<td>.224</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Cocoa and Irrigated Paddy Field Productions</td>
<td>*</td>
<td>.249</td>
<td></td>
</tr>
</tbody>
</table>

Note: * unidentified in the same cluster of variable; **insignificant; shaded area is common causes.

However, specifically (Table 2), the orientation of cocoa production in agricultural economic activity is strong and directly associated with the poverty in Compong (β=.557), while for coffee, cashew-nut and livestock production the association with poverty in Maddenra is (β=.674). A major implication of this finding is that encouraging cocoa production in Compong and coffee, cashew-nut and livestock productions in Maddenra in particular, can be strongly expected to reduce poverty directly. Hence, the variables that have the strongest positive impacts directly in reducing poverty of smallholders are “Cocoa Production” in Compong and “Coffee, Cashew and Livestock Production” in Maddenra. This conveys an important message that the orientation of agricultural production in economic activity (agricultural sector in a broad sense) is strong and directly associated with the rural poverty phenomenon. This leads us to argue that even if the agricultural sector is not a single factor required to reduce poverty, the sector is still considerably important in reducing rural poverty directly.
The second important comparison way is focusing on the variable which is identified to influence poverty in one desa, but it is unidentified and/or insignificant for the other desa (the variable Family Transfer-Source Income, for instance). The definition of variable Family Transfer-Source Income is household income coming from others household members who are working outside the country, such as Malaysia (who transfer remittances) and the members who are working outside the hometown for earning money. However, the family transfer-source income for households in Desa Compong is much more diverse, not only having the members who work in Malaysia, but also other family members who have different type of economic activities in their hometown (such as being a social/private teacher, craftsman and extracting rattan from the forest, etc) for making money. Unlike Desa Compong, the family transfer-source income for households in Desa Maddenra is more limited (only remittances and farm laborers wage). As a result, the number of smallholders who receive the family transfer-source income in the two desas is also different, as clearly depicted through a frequency distribution in Table 3.

<table>
<thead>
<tr>
<th>Family Transfer-Source Income</th>
<th>Desa Compong</th>
<th>Desa Maddenra</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>31</td>
<td>44.29</td>
</tr>
<tr>
<td>No</td>
<td>39</td>
<td>55.71</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.00</td>
</tr>
</tbody>
</table>

In Table 3, it is obvious that thirty-one out of seventy (44.3%) of smallholder households have a family transfer-source income in Desa Compong, while thirty-four out of eighty-two (41.5%) in Desa Maddenra. Thus, in terms of the percentage of households which have a family transfer-source income, Compong shows a higher than Maddenra. This enables “Family Transfer-Source Income (Xstim)” to have an impact (β weight) on the poverty of smallholders in Maddenra even though it is insignificant. This is the reason why the variable Family Transfer-Source Income is one of the causal factors of poverty in Compong and Maddenra (since the variable was identified in two desa). However, the variable has a significant positive impact on Desa Compong’s smallholders (β weight =.258 in Table 2). It is important to note that the variable Family Transfer-Source Income was also identified in Maddenra, but it was
Reducing Poverty of Cocoa Smallholders in Indonesia: Is Agricultural Economic Activity Still the Pioneer?

insignificant, meaning that it has an insignificant impact. However, this does not mean that there is no impact at all. For this justification, we may say that the variable Family Transfer-Source Income is also a common factor influencing poverty in both Desa Compong and Desa Maddenra, but the degree of the impacts are different. This implies that diversity of family transfer-source income can also be expected to reduce poverty.

The third crucial comparison is that, the variables were identified in both Desa Compong and Desa Maddenra, but the cluster of variables was different. For example, Table 2 clearly shows that the variable “Coffee and Orange Production” was identified in Compong. However, one substantive question we might raise is that even though “Coffee” was also identified in Maddenra, it was not clustered with “Orange Production” (as Compong has); rather it was clustered with “Cashew and Livestock”. The same thing happens with “Clove Production and Livestock”. Another crucial question is why “Cocoa Production” appears alone in Compong, but was clustered with “Irrigated Paddy Field Production” in Maddenra.

Besides a comparison of these two desa by the intermediate variables, we will also compare them by the independent variables group. However, for a variety of reasons, including general policy formulation, we will focus more on the comparison of common poverty, especially “Cultivated Land Area”, “Social Service Utilization” and “Agriculture & Non-Agriculture Extensions”. This is clearly depicted in Table 4 that the variable Cultivated Land Area with Farm Equipment has not only a direct positive impact, but also indirect ones. Its direct positive impact influences poverty in Maddenra ($\beta=.373$, a moderate impact), while for its indirect positive impact influences the poverty in both Compong (indirect impact of .353) and Maddenra (indirect impact of .078). A principal implication of this finding is that, expanding cultivated land area can be expected moderately to reduce poverty directly in Maddenra. In addition, it could also be the next route to reduce poverty indirectly for smallholders in Compong and Maddenra. However, it should be underscored that its indirect positive impact on the poverty in Compong is four times higher than Maddenra. This conveys a crucial message that expanding cultivated land area is more important to reducing poverty in Compong indirectly.

---

*However, we will not answer these questions in this paper.

**Indirect impact explained here is total indirect impact.
Table 4
Common Poverty Causes Comparison between Desa Compong and Desa Maddenra by Independent Variables

<table>
<thead>
<tr>
<th>No</th>
<th>Independent Variable</th>
<th>(β weight) on the Poverty</th>
<th>Desa Compong</th>
<th>Desa Maddenra</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct</td>
<td>Indirect</td>
</tr>
<tr>
<td>1</td>
<td>Cultivated Land Area with Farm Equipment</td>
<td>-</td>
<td>.353</td>
<td>0.373</td>
</tr>
<tr>
<td>2</td>
<td>Social Service Utilization</td>
<td>-</td>
<td>-0.061</td>
<td>0.444</td>
</tr>
<tr>
<td>3</td>
<td>Agriculture &amp; Non-Agriculture Extensions</td>
<td>-</td>
<td>0.288</td>
<td>0.276</td>
</tr>
</tbody>
</table>

Another common poverty causing factor is “Social Service Utilization”. Table 4 shows that the variable Social Service Utilization has a direct positive impact on the poverty in Desa Maddenra (β=.444). In addition, it also has a negative impact on the poverty in both Desa Compong (indirect impact of -0.061) and Desa Maddenra (indirect impact of -0.040). These are also understandable facts. In Maddenra, social facilities, such as primary public health centers (so called PUSKESMAS), junior high school and public water for cooking are closer to smallholder residence compared to Compong’s smallholders.

Table 5
Descriptive Statistics of the Variable FRE_HEALT3, DISTN_HEALT2 and DISTN_EDUC2 in Desa Compong and Desa Maddenra

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRE_HEALT3 (Times/month)</td>
<td>0</td>
<td>2</td>
<td>.27</td>
<td>.588</td>
<td>1</td>
<td>5</td>
<td>1.91</td>
<td>.971</td>
</tr>
<tr>
<td>DISTN_HEALT2 (Km)</td>
<td>0</td>
<td>4</td>
<td>.89</td>
<td>1.149</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>DISTN_EDUC2 (Km)</td>
<td>.15</td>
<td>10.00</td>
<td>3.57</td>
<td>2.495</td>
<td>1</td>
<td>4</td>
<td>1.81</td>
<td>.873</td>
</tr>
</tbody>
</table>

Note: *unidentified

For instance, as clearly presented in Table 5, the average of “DISTN_EDUC2” (distance to the junior high school) in Compong is almost 4 km (Mean=3.57) with maximum distance of 10 km (Max=10).
Meanwhile in Maddenra, its average distance to the school is less than 2 km (Mean=1.81) with maximum distance of 4 km (almost three times is closer than Compong). We can also clearly see that even if the average of "FRE_HEALT3" (degree of utilization of PUKESMAS) in Compong (Mean=.27) is slightly higher than Maddenra (Mean=.191), Compong still has a minimum degree of zero (Min=0) meaning that there are smallholders who never used PUSKESMAS in Compong (unlike Maddenra, Min=1). In terms of maximum frequency, Maddenra is almost three times higher (Max=5) than Compong (Max=2) indicating that the degree of utilization of PUSKESMAS as a primary public health center in Maddenra is more accessible. This statement can also be supported by looking at "DISTN_HEALT2" (distance to auxiliary health center, so called PUSTU). PUSTU is obviously unidentified in Maddenra. It is a general phenomenon that PUSKESMAS in Indonesia are located in the capital city of sub-district (kecamatan) and/or desa, but PUSTUs are located in remote rural areas. In this particular case, Compong is a more remote rural area (having PUSTU) compared to Maddenra which is closer to the capital city of kecamatan (having PUSKESMAS). Therefore, it is a reasonable result that Maddenra’s smallholders receive the direct positive impacts of “Social Service Utilization” with β=.444 (see Table 4) due to a closer distance to those social facilities in general. However, this does not mean that all smallholders have better access. The frequency distribution shows that Maddenra still has 19% smallholders who are further located from those social facilities (say “DISTN_EDUC2”--distance to Junior High School-- of 4 Km as a maximum value in Table 5). This is the reason why “Social Service Utilization” has not only a direct positive impact, but also a negative indirect impact (even if in a negligible association of -.040) on the poverty in Maddenra.

The last common poverty causal factor (see Table 4) is “Agriculture and Non-Agriculture Extensions”. It has a direct positive impact in increasing household income, that is poverty reduction in Desa Maddenra (β = .276, a moderate impact). We may say that the higher the frequency of getting the information of technology/agriculture extension, non-agriculture jobs information and price information for input-output in agriculture, the higher the crops production (agricultural income) as well as non-agriculture income will be gained, the more total household income will have, which contributes to poverty alleviation. This indicates that, “Agriculture & Non-Agriculture Extensions” can also be expected to be the next important variable in reducing poverty directly after “Cultivated Land Area with Farm Equipment”. An important implication is that expanding cultivated land area with farm equipment as well as stepping

---

Note as well that this statement based on the positive moderate impacts directly, not across variables.
up agriculture and non-agriculture extension services in Maddenra could be the next important routes to help smallholders move out of poverty directly. In addition, the variable Agriculture & Non-Agriculture Extensions also has positive impact in reducing poverty in Desa Compong, however, in an indirect way (indirect impact of .288, a moderate impact). The impact of “Agriculture & Non-Agriculture Extensions” was transmitted to the poverty through the three intermediate variables (“Cocoa Production”, “Family Transfer-Source Income” and “Government Transfer-Source Income”) positively, so that the total indirect impact becomes positive (.288). This also implies that stepping up agricultural and non-agricultural information or extensions services in Compong, smallholders can also be expected to cope with poverty indirectly.

An interesting point is that the variable Agriculture & Non-Agriculture Extensions sends its indirect impact on the poverty in Maddenra, but in a negative way. It is important to note that the variable Agriculture & Non-Agriculture Extensions transmits its impact through the four intermediate variables i.e. “Coffee, Cashew and Livestock (indirect impact of -.155)”, “Clove and Orange Productions (indirect impact of -.045)”, “Cocoa and Irrigated Paddy Field Productions (indirect impact of -.039)” and “Government Transfer-Source Income (indirect impact of -.030)". After the impacts decomposition, we found that the variable provides a negative indirect impact (total indirect impact of -.191) to the poverty due to the negative β weights of three intermediate variables mentioned above. Thus, even though the variable transmits its impact positively on “Cocoa and Irrigated Paddy Field Productions”, meaning that it has a positive impact on cocoa and paddy field development due to a good access to information and agricultural technology, the variable also sends a negative impact on “Coffee, Cashew and Livestock”, “Clove and Orange Productions” and “Government Transfer-Source Income”. In other words, it has a negative impact on these three variables, reducing household income indirectly (in total indirect impact). This leads us to say that it cannot be expected to reduce poverty in Maddenra indirectly (through the three intermediate variables) mentioned above. It implies that (beside cocoa and paddy field existing technology), providing proper technology, especially for coffee, cashew and livestock in Maddenra, is also necessary to optimize the role of agricultural technology or extension in alleviating poverty indirectly. This is obviously different from Desa Compong which already receives indirect positive impact of “Agriculture & Non-Agriculture Extensions”.

12 Indirect impact of “Agriculture and Non-Agriculture Extensions” on the “Poverty” through “Clove and Orange Productions” and “Government Transfer-Source Income” is a negligible association.
5. FINDINGS AND POLICY IMPLICATIONS

Some principal findings of the research are; (1) the Head Count Index (HCI) of poverty reveals that around 34.3% of the cocoa smallholder households in Compong has an income/capita below the National Poverty Line (NPL). Meanwhile, the Poverty Gap Index (PGI) of the analysis is .10. This indicates that the average income of smallholder households falls short of the NPL. This result is different from Desa Maddenra. The HCI in Maddenra is .0731 which means that less than 10% of the smallholder households in Maddenra have an income/capita is below the NPL. In fact, the average income in Maddenra is above the NPL, resulting in the PGI of zero, meaning that there is no poverty gap in the community. The indices of PGI reveal that, the depth of poverty in Desa Compong is more severe than in Desa Maddenra; (2) the degree of poverty between Compong and Maddenra is relatively the same, but there is a differentiation in income structure, meaning that the causes of poverty are different; (3) specifically, the orientation of cocoa production in agricultural economic activity is strong and directly associated with the poverty in Compong ($\beta=.557$), while for coffee, cashew-nut and livestock production the association with poverty in Maddenra is ($\beta=.674$). A major implication of this finding is that encouraging cocoa production in Compong and coffee, cashew-nut & livestock production in Maddenra, can be strongly expected to reduce poverty directly, meaning that agricultural economic activity is still considerably important to reduce rural poverty directly in the province.

REFERENCES


Contributors of the Issue

Arief Anshory Yusuf: Faculty of Economics, Padjadjaran University, Bandung – Indonesia
arief.yusuf@fe.unpad.ac.id

B.Raksaka Mahi: Faculty of Economics, University of Indonesia
raksakamahi@yahoo.com

Kiki Verico: Researcher at LPEM FEUI and PhD Student at GSAPS, Waseda University, Tokyo
kverico@yahoo.com

Maddaremmeng A. Panennungi: Researcher at the Department of Economics, Faculty of Economy University of Indonesia
maddaremmeng.panennungi@ui.ac.id & maddaremmeng@gmail.com

Muhammad Arsyad: Department of Socio-economics of Agriculture/Agribusiness Faculty of Agriculture, Hasanuddin University, Makassar, Indonesia.
arsyad@unhas.ac.id

Williater Leonardo Batubara: Government Officer at Directorate for Export & Import Facilitation, Ministry of Trade Republic of Indonesia

Yoshio Kawamura: Professor of Agricultural/Rural Development Economics, Faculty of Economics, Ryukoku University, Kyoto, Japan
kawamura@econ.ryukoku.ac.jp

***