Poverty Causes-Cocoa Smallholders Linkages : A Comparison of Two Villages in Indonesia[1)]

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Key words : Poverty Causes, Cocoa Smallholders, Indonesia

Abstract :

Two fundamental questions arise when identifying solution for the poverty. The first is how the poverty causes should be identified or described. The second is how the policy should be formulated. This paper deals with poverty-smallholders linkages by focusing on the poverty causes comparison of two villages (desa) in Indonesia. We employed (1) Foster-Greer-Torbecke (FGT) poverty indices for describing the poverty situation, (2) Path Analysis for extracting the direct and indirect effects of explanatory variables on "Household Income" as a Poverty proxy, and (3) Paired-Samples T Test to evaluate income differences. Some important findings are ; (1) the degree of poverty between Desa Compony and Desa Maddenra is relatively the same, but they have a differentiation in income structure meaning the causes of poverty are different ; (2) specifically, 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 are in Maddenra (β=.674) implying that encouraging cocoa production in Compong and coffee, cashew-nut and livestock production in Maddenra in particular (local government), can be strongly expected to reduce poverty directly ; (3) there are also common factors responsible for the poverty that requiring general policy options (national government). The options are expanding cultivated land area, providing government transfer-source income, and agriculture & non-agriculture extensions. Similarly, promoting social services utilization especially Public Health Center is also a potential way to help in poverty reduction efforts.

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1. Problem, Objective and Contribution

Poverty of cocoa smallholders in Indonesia is a very serious problem. Although the smallholders (92.64% in 2005) have been the main contributors to the rapid expansion of the Indonesian cocoa production, the proportion of cocoa smallholders whose income is below the poverty line still persists in two ways. *Firstly*, cocoa smallholders are originally poor. *Secondly*, the smallholders were moving out of poverty then fell into poverty again causing low purchasing power. Besides, some remaining crucial issues which are strongly associated with poverty reduction for cocoa smallholders stay behind. They are ; (1) the difficult aspect to improve income of cocoa smallholders through the agricultural and non-agricultural economic activities still becomes the classical problem challenge in the country ; (2) the average size of agricultural land ownership can not be expected to increase their production ; (3) cocoa smallholders suffer from inavailability of farm credit scheme for their farming ; as a result, they don't have options to finance their production, daily life desires except for lending capital input (money) from the brokers which most of them are called 'tengkulak'. Then the tengkulak's money will repaid by the smallholders in terms of cocoa products, but the price is determined by the tengkulak ; (4) the difficult access to social facilities such as education, public health services and clean water resources which causes low quality of their human resources in terms of education attainment and health. Van de Walle (1992) also identified that access to and utilization of public services has been a long standing issue in many developing countries, and Indonesia is no exception. Here too, the dimension along which one is concerned about utilization and access are between "poor" and "non-poor", but also along characteristics such as whether one lives in a rural or urban area, in Java or the Outer Islands ; and (5) the lack of access to market information for both farm input and output, agricultural extension, as well as non-agricultural business opportunity. One of the possible negative consequences of these aspects is that the smallholders are not able to expand plantation area in improving income. In addition, the poor situation of cocoa smallholders is also exacerbated by ; *firstly*, the government policies -including monetary policy such as high interest rates- were and still are, not suitable for the cocoa smallholder development in Indonesia. *Secondly*, the low quality of Indonesian cocoa beans, especially which are produced by the smallholders, is one of the crucial issues. Given the current situation, it is really necessary to conduct the research on poverty-smallholders linkages as a challenging and interesting issue in combating poverty of cocoa smallholders in the country. Two specific purposes of the paper

are. The first is to measure the proportion of cocoa smallholders whose income is below the poverty line and how severe the poverty situation is. The second is to compare the poverty situation between two villages in Indonesia. There are three primary contributions of the research output can be expected [for the smallholders, governments and researchers] ; (1) the output let us to get some crucial poverty causal factors and answer the question 'how severe the poverty situation is ?', (2) it also leads us to design policy formulation for poverty reduction of cocoa smallholders that can be applied by both the national and local governments in Indonesia (policy response), and (3) in addition, the output also gives an important impression for the further study dealing with poverty-smallholders linkages.

2. Previous Studies for Identifying Causality

Poverty is a complex phenomenon that cannot be seen by one view point meaning many factors associated with poverty itself, not only internal factor such as household human resource and production factors ownership (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. Islam (2006) described that poverty is multidimensional ; it encompasses not only what is called income poverty, i.e. deprivation of income/consumption such as the satisfaction of minimum level of food and other basic needs, but also limited access to health, nutrition, and education services, which aggravates the impact of income poverty, resulting in 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 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. 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 stan-

dards. Education is potentially important conduit for reaching relatively isolated rural households. Walle also gave a justification that education subsidies effectively reach the poor for two reasons ; poor families have more children, and richer families self-select their children into private school. 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.

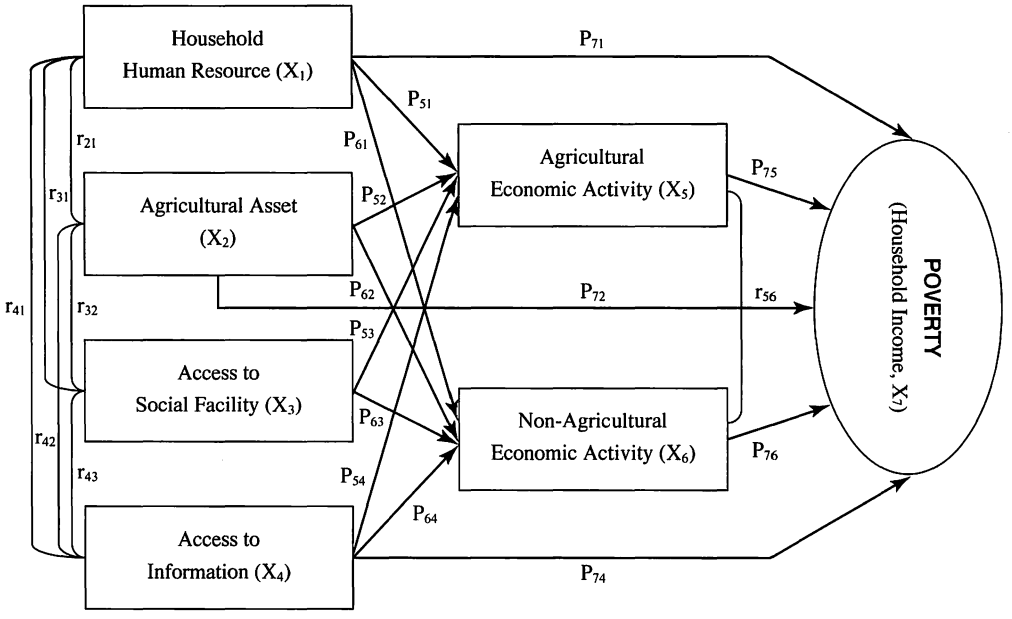
The next important factor in identifying poverty causality is access to information for the poor. So far, the study conducted by the CRIEC-World Bank (2002) in Indonesia reveals the importance of information availability. It was found that 30% of the households surveyed receive an income just sufficient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

Another crucial dimension associated with poverty in developing countries like Indonesia is both the role of agriculture and non-agriculture sectors in poverty reduction. This is not without clear arguments. A number of important studies support this aspect centers around a conclusion that the role of the sectors in general and their linkage in particular are extremely important in reducing poverty. To briefly justify this view point, some important studies that 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 "Lowest Income Level". He persuasively resulted a positive β value on this particular factor meaning the more the households at lowest income level are in village, the higher the dependency on agriculture is in the economic activity. This indicates what Salam found that the agriculture sector (rice field 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 highlighted that the sector is one of the possible important factors to help poverty reduction. These findings lead us to accept Sumarto & Suryahadi's findings that indeed agricultural growth has been the most important factor contributing to rapid poverty reduction experienced by Indonesia during the high growth pre-crisis period. In terms of 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 poverty gap, agricultural growth accounts for 51, 36, and 57% respectively of total, urban, and rural poverty gap reduction. Meanwhile, for poverty severity only the reduction in rural areas is calculated as only for these areas the coefficient is statistically significant. It appears that 49% of reduction in poverty severity 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 result shows that the output growth in agriculture appears to have the strongest impact ($-10.04dY_A$) on the change in poverty than those in the other two sectors ($-2.56dY_I$ and $-1.82dY_S$).

Smallholders indeed play an important role in encouraging Indonesian 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. Within this period, the average growth of production was 10.49% per annum (the highest of 21.55% 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 Estate (SE). The contribution of smallholders to the total production reached of 88.85% or around 476,924 tons in 2001 with growth by 23.76%, a substantial contribution for Indonesian cocoa production. Meanwhile the remaining shares, 6.32% or around 33,905 tons (with negative growth by 2.61%) and 4.83% or around 25,975 tons (with growth by 12.52%) are Government Estate (GE) and Private Estate (PE), respectively. Up to 2005, these three categories of producer had a fluctuated growth, especially GE declined of 24.17% in 2004 and PE of 9.53% in the same year. Fortunately, SE persisted on its production growth by 11.69% per annum (2001-2005)—it was higher than a national average of 10.49%—, while the GE had a negative growth (-6.77%), although the PE also still had a positive way (4.62%). The turmoil situation above reminds 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,

Figure 1. Hypothetical Model



Note : 1) An arrow indicates a causal relation and a curve indicates a correlation ; 2) P_{jq} is a path coefficient of X_j on X_q, while r_{jq} is a correlation coefficient between X_j and X_q.

the Indonesian cocoa production growth cannot be expected to place Indonesia the third largest cocoa producer in the world. This implies that poverty of smallholders could become crucial issues 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 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 lead us to hypothesize that the Dimension of Household Human Resource, Agricultural Asset, Access to Social Facility, Access to Information, Agricultural Economic Activity and Non-Agricultural Economic Activity affect poverty of cocoa smallholders (**Figure 1**).

3. Methodology

3.1. Research Site and Data Collection

The research was conducted in South Sulawesi Province, Indonesia. Two basic criterions of the research site are needed. They are; (1) the average percentage of cocoa smallholders and poor households for selecting district (*Criterion 1*), and (2) the same percentage in cocoa smallholders, but different in poor households for selecting village (*Criterion 2*). In order to reach these criterions, by putting the secondary data into 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 particular characteristics regarding the cocoa smallholders-poverty linkages. Quadrant I indicates high percentage in both cocoa smallholders and poor households. Quadrant II indicates low percentage in cocoa smallholders, but high percentage in poor households, and so on. The horizontal and vertical lines refer to their average. In **Figure 2**, there were 23 districts ('kabupatens') in the province. By Criterion 1, we selected Kabupaten Sidrap. In **Figure 3**, there were 71 villages ('desas') in Sidrap plotted.[4] Then, Desa Maddenra and Desa Compong were chosen to satisfy Criterion 2. We interviewed 70 households in Compong (26.40% of the total cocoa smallholder households) and 82 households in Maddenra (28.20% 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 is living below the Poverty Line and how severe the poverty situation is analyzed by using the Foster-Greer-Torbecke poverty indices. They are the Head-Count Index (HCI) and the Poverty Gap Index (PGI):

$HCI=\frac{A}{N}$, where A is the number of household are below the poverty line, N is the number of total households. $PGI=\frac{A}{N}\sum_{i=1}^{A}\left[\frac{Z-\bar{I}_i}{Z}\right]$, where Z is the Poverty Line (PL) and $\bar{I}_i$ is average income of the households below the PL. We employ the 2006 National Poverty Line (NPL) for rural area in South Sulawesi of Rp.98,946.00/capita/month issued by CBS.[5]

4) There were 105 desas 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 rural area, while kelurahan is located in and near capital city. Therefore, access to information and public services (like education and public health center) are easier for the kelurahans residing. All kelurahans were excluded from the Scatter Plot to satisfy the Criterion 2.

5) CBS is Central Board of Statistics in Indonesia. The board also issued the NPL for urban area.

Figure 2. XY Scatter Plot for Selecting District or 'Kabupaten'

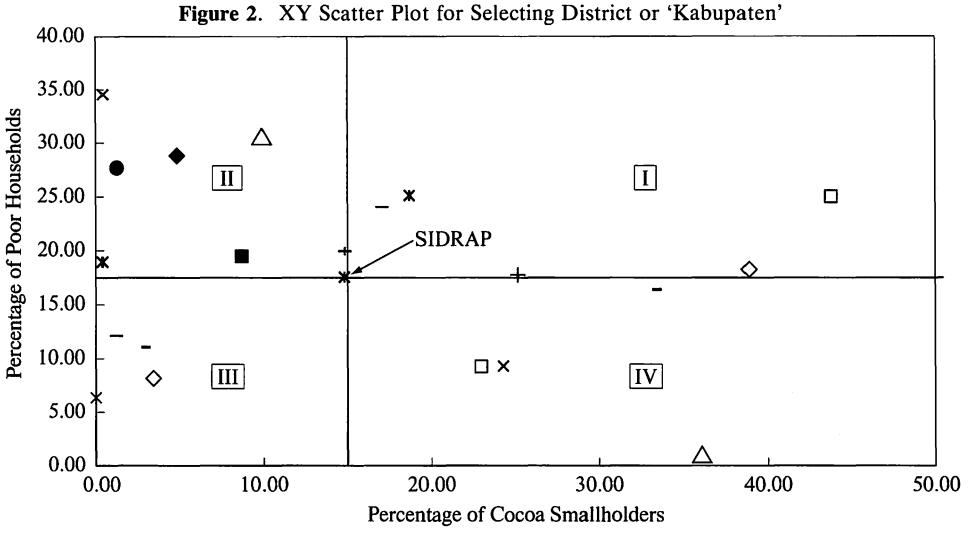
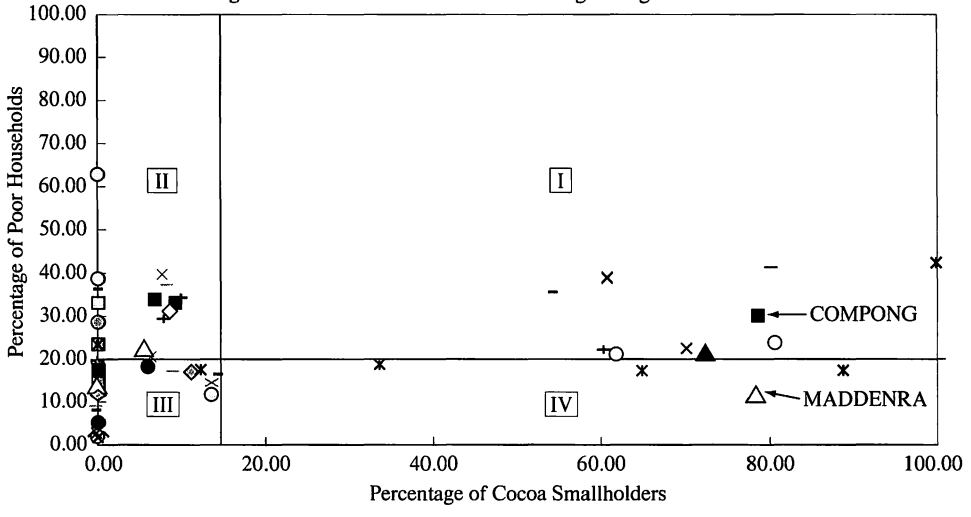


Figure 3. XY Scatter Plot for Selecting Village or 'Desa'



(ii) Multiple Regression as Path Analysis

A primary purpose of use Path Analysis (PA) in this paper is to distinguish between direct and indirect effects of independent variables on dependent ones. PA basically is standardized General Multiple Regression Analysis (GMRA). A multiple regression equation is a liniear model constructed by a dependent variable and a set of explanatory variables (Kawamura, 1978 : 228) to represent reality which can be formulated based on both theoretical framework and emperical evidence.[6] The fundamental different between PA and GMRA is only the nature of data. The data used in PA is standardized.[7] Therefore,

6) See Asher (1983) and Knoke et al. (2002) for a good discussion on PA.

7) The formula for variables standardization (named Z-score tranformation) is shown as follows. This ↗

the assumption used in PA principally is the same as GMRA assumption.

The general model of Path Analysis ;

$$Y_t=\beta_1X_{1t}+\beta_2X_{2t}+\cdots+\beta_kX_{kt}+E_t, \quad \text{for } Y_t,\ X_{it}$$

are standardized and $t=1, 2, \ldots, n$ yields the following form :

$$Y_t=\left(\sum_{q=1}^{K}\beta_qX_{qt}\right)+E_t$$

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

$X_1=E_1$ (Path Equation 1, PE 1)

$X_2=E_2$ (PE 2)

$X_3=E_3$ (PE 3)

$X_4=E_4$ (PE 4)

$X_5=P_{51}X_1+P_{52}X_2+P_{53}X_3+P_{54}X_4+E_5$ (PE 5)

$X_6=P_{61}X_1+P_{62}X_2+P_{63}X_3+E_6$ (PE 6)

$X_7=P_{71}X_1+P_{72}X_2+P_{74}X_4+P_{76}X_6+P_{75}X_5+E_7$ (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_{jq} is path coefficient of the independent variables and E_j is error terms. The estimated values in each one of the above path equations can be obtained (from **PE 5** to **PE 7**) by the formula $\hat{X}_j=\sum_{q=1}^{K}\hat{P}jqXq$, $(k<j)$; where a hat (^) indicates an estimated value. Thus, a path coefficient P_{jq} is 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 ($\mathbf{H}_0$) that "there is no significant impact of independent variables on dependent ones".

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

For testing goodness of fit and path coefficient, we regress all indices on the Poverty as dependent variable and 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.[8] We used the advantage of SPSS Program in calculating the observed F-value and coefficient of determination (R^2) in testing for goodness of fit. The higher R^2, the better estimates meaning the model is fit. From this perspective, R^2 heavily

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↘yields zero mean with a standard deviation of 1.0. This value transformation does not affect a correlation coefficient (Kawamura, 1978 : 220) which is given by :

$Zscore=(X_i-\bar{X})/SD$, 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.

8) However, the impact of independent variable on each of the two intermediate variables will not be explained in this article.

depends on the ability of equation specification in explaining the reality. If the observed F-value exceeds the criterion ones, we reject $\mathbf{H}_0$. The next stage was the test for significance of path coefficient, whether the observed path coefficients differs 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_{bi}) along with the path coefficient (P_{jq}) for each variable. If S_{jq}/S_{bi} exceeds the t-distribution, it is concluded that (P_{jq}) differs significant from zero.

4. Results and Discussion

4.1. Test for Goodness of Fit and Significance of the Path Coefficient

The overall test persuasively resulted in the rejection of $\mathbf{H}_0$ that "there is no significant impact of independent variables on dependent ones" as a whole. This could be proved that all path coefficients in the Path Equation (PE) 7 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 $\mathbf{H}_0$ that "there is no significant impact of the independent variables on intermediate ones". The regression results show the R^2 of each of the six path equations in Desa Compong. PE 7 is the path equation of the twenty-one independent variables (including intermediate) on "Household Income (X_7)" as dependent variable in this step of analysis. The R^2 of PE 7 reached 0.872. This figure tells us that 87.20% of the total variance of endogenous variable (Household Income) in general, can be explained so fairly robust by the all twenty-one explanatory (independent) variables. Meanwhile, in Desa Maddenra, the R^2 of PE 7 reached 0.814. It means that 81.40% of the total variance of "Household Income" in general, can also be explained so fairly robust by the all twenty-five explanatory variables. Thereby, we may say that the model constructed through the six dimensions in the research is good adequate in explaining the poverty situation. In other words, all six dimensions constructed (Household Human Resource, Agricultural Asset, Access to Social Facility, Access to Information, Agricultural Economic Activity, and Non-Agricultural Economic Activity) 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 regression result. In addition, the number of significant path coefficient might also help to identify the important explanatory variable. All path equations have at least three significant path coefficients in which the PE 7 has 10 significant variables (X_{62}, X_{61}, X_{53}, X_{52}, X_{51}, X_{37},

X_{33}, X_{32}, X_{31}, X_{24}) in Desa Compong and it has 11 significant variables (X_{62m}, X_{54m}, X_{53m}, X_{51m}, X_{42m}, X_{33m}, X_{27m}, X_{25m}, X_{22m}, X_{21m}, X_{12m}) in Desa Maddenra.[9]

4.2. Identifying Poverty Causes: A Comparison of Two Villages in Indonesia

This section deals with a comparison of the poverty situation between two villages or 'desa' and identifying important causes. A strong assumption here is that it was found (through **XY Scatter Plot** of **Figure 3**) that some desas are of the same in percentage of cocoa smallholder households, but they are different in 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. It means that around 34.28% of the cocoa smallholder households in Compong have an income/capita/month is below the National Poverty Line (NPL). Meanwhile the Poverty Gap Index (PGI) of the analysis is .10. It indicates that the average income of smallholder households falls short of the NPL. This situation is different from Desa Maddenra. The calculation reveals that the HCI in Maddenra is .0731 meaning that less than 10% of the cocoa smallholder households have an income/capita/month is below the NPL. In fact, the average income of all smallholder households in Maddenra is above the NPL resulting the PGI of zero (0) meaning 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 at all (as HCI revealed). The indices of PGI reveal that the depth of poverty in Compong is, severer compared to Maddenra.

It is true that the Paired-Samples T Test (**Table 1**) shows that the average household income was, however, higher in Desa Maddenra (compared to 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 in the acceptance of $\mathbf{H_0}$ that the population mean difference is equal to zero meaning *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, it is also true that they have a differentiation in terms of income structure or component meaning that the causes of poverty are different, not only the magnitude but also the sign of causes themselves.

For comparison ways, **Table 2** and **Table 4** are provided to see the poverty causes by different variable groups (intermediate and independent). It should be emphasized that the variables collected among two 'desa' (villages) *theoretically* should be the same for two

9) The PE 2, PE 3, PE 4, PE 5 and PE 6 are not shown here.

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

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

N=152

fundamental reasons. *Firstly*, in constructing the hypothetical model, it was obviously using the same dimension in identifying variables conceptually or dimensionally for two desa. *Secondly* and most importantly, the instrument used in collecting primary data (questionnaire) is also exactly the same, meaning variables collected for each of the five dimensions between two desa should be also the same. However, Correlation Matrix among variables in the beginning step of analysis persuasively displayed some dimensions that yields the different variables collected in two desa. This indicates that beside their similarity as common factor, these two desa also have a different social structure based on the dimensions constructed which is creating the different poverty causes, not only the magnitude but also the sign of causes itself.

At least, there are three ways to compare the poverty situation between two desas as well as identifying important causing factors. *The first* is identifying the common factors responsible for the poverty of two desa. 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 from the government (government transfer). It is true that the Indonesian government has been providing, not only financial support (cash transfer) such as Social Safety Net Program including Oil Price Compensation, but also the government subsidizes agricultural inputs such as fertilizer and chemical pesticide as well as farm equipment (especially paddy field) to the rural smallholders in which these two desa (Compong & Maddenra) are no ex-

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

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

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

ception. Therefore, it is a reasonable result that "Government Transfer-Source Income" appears to be a common factor in explaining the poverty situation for the two desa. This implies that the "Government Transfer-Source Income" can be significantly expected to combat poverty in the country. The important question to be answered here is that in which desa the variables have greater (important) effects (direct and indirect) on the 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 two desa. It indicates that the positive effect of "Government Transfer-Source Income" can be expected to reduce poverty in Compong and Maddenra. However (in terms of direct effect), Compong receives positive effect of "Government Transfer-Source Income" is slightly higher ($\beta = .167$) than its effect for Maddenra ($\beta = .147$).[10] This implies that the role of "Government Transfer-Source Income" in reducing poverty in Compong is more important than Maddenra. However, specifically (**Table 2**), 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 are in Maddenra ($\beta = .674$). A major implication of this finding is that encouraging cocoa production in Compong and coffee, cashew-nut and livestock production in Maddenra in particular, can be strongly expected to reduce poverty directly. Put it general ways. The variables that have the strongest positive impacts or effects directly in reducing poverty of smallholders is "Cocoa Production" in Compong and "Coffee, Cashew and Livestock Production" in Maddenra. It conveys an important message that the

10) The intermediate variables don't have indirect effects on "Poverty".

Table 3. Frequency Distribution of Family Transfer-Source Income of Cocoa Smallholders in Desa Compong and Desa Maddenra

Family Transfer-Source Income	Desa Compong		Desa Maddenra	
	Frequency	%	Frequency	%
Yes	31	44.29	34	41.47
No	39	55.71	48	58.53
Total	70	100.00	82	100.00

orientation of agricultural productions in economic activity (agricultural sector in 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 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' (village) but it is unidentified and/or insignificant for the other desa (the variable Family Transfer-Source Income, for instance). The defenition of variable Family Transfer-Source Income is household income from others household members who are working outside the country especially Malaysia (resulting remittances) and the members who are working outside the hometown for making money. However, the family transfer-source income for household in Desa Compong is much more diverse, not only from the members who work in Malaysia, but also other family members who have different type of economic activities in hometown (such as being a social/private teacher, craftsman and extracting rattan from forest, etc) for making money.

Unlike Desa Compong, the family transfer-source income for household in Desa Maddenra is more limited by having the only remittance and to be farm laborers wage resulting the number of smallholders who received family transfer-source income in two desa is also different, as clearly depicted in frequency distribution of **Table 3**. In the table, it is obviously that thirty-one out of seventy (44.29%) of smallholder households have family transfer-source income in Desa Compong, while thirty-four out of eighty-two (41.47%) in Desa Maddenra. Thus, in terms of percentage of household which have a family transfer-source income, Compong is higher than Maddenra. This then, enables "Family Transfer-Source Income (X_{61m})" also appears to have an impact (β weight) on the poverty of smallholders in Maddenra even though it is insignificant. This is a reason why even though "Family Transfer-Source Income" can be 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 Compong's smallholders only (β weight=.258 in **Table 2**). It is important to note that "Family Transfer-Source Income" was also identified in Madden-

ra, but insignificant meaning that it still has an impact but insignificant. It doesn't 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 influences poverty in both Desa Compong and Desa Maddenra, but the degree of the impacts or effects 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 were different. For example, (see **Table 2**), it is clearly presented that the variable "Coffee and Orange Productions" was identified in Compong. However, one substantive question we might rise is that even though "Coffee" was also identified in Maddenra, but why it was not clustered with "Orange Production" (as Compong has), rather, it was clustered with "Cashew and Livestock". The same thing happens on "Clove Production and Livestock". Another crucial question is that why "Cocoa Production" appears alone in Compong, but it was clustered with "Irrigated Paddy Field Production" in Maddenra.[11)]

Besides comparison of those 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 more focus on common poverty causes comparison, especially "Cultivated Land Area", Social Service Utilization" and "Agriculture & Non-Agriculture Extensions". It is clearly depicted in **Table 4** that the variable Cultivated Land Area with Farm Equipment has, not only a direct positive effect but also indirect ones. Its direct positive effect influences poverty in Maddenra ($\beta = .373$, a moderate effect), while for its indirect positive effect influences the poverty in both Compong (indirect effect of .353) and Maddenra (indirect effect of .078). A principal implication of this finding is that expanding cultivated land area could be expected moderately to reduce poverty directly in Maddenra. In addition, it also could be the next route to reduce poverty indirectly for smallholders in Compong and Maddenra. However, it should be underscored that its indirect positive effect 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 consider in reducing poverty in Compong indirectly.[12)]

Another common poverty causing factor is "Social Service Utilization". **Table 4** shows that the variable Social Service Utilization has a direct positive effect on the poverty in esa Maddenra ($\beta = .444$). In addition, it also has a negative effect on the poverty in both Desa Compong (indirect effect of $-.061$) and Desa Maddenra (indirect effect of $-.040$). These

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

12) Indirect effect explained here is total indirect effect.

Table 4. Common Poverty Causes Comparison between Desa Compong and Desa Maddenra by Independent Variables

No	Independent Variable	(β weight) on the Poverty			
		Desa Compong		Desa Maddenra	
		Direct	Indirect	Direct	Indirect
1	Cultivated Land Area with Farm Equipment	−	.353	.373	.078
2	Social Service Utilization	−	−.061	.444	−.040
3	Agriculture & Non-Agriculture Extensions	−	.288	.276	−.191

are also understandable facts. In Maddenra, social facilities such as primary public health center (so Dcalled PUSKESMAS), junior high school and public water for cooking are closer to smallholder residence compared to Compong's smallholders. 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 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), however, Compong still has a minimum degree of zero (Min=0) meaning there are smallholders who never used PUSKESMAS in Compong (unlike Maddenra, Min=1). In terms of maximum frequency, Maddenra has almost three times higher (Max=5) than Compong (Max=2) indicating that the degree of utilization of PUSKESMAS as 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 PUSKESMASs in Indonesia are located in the capital city of sub-district ('kecamatan') and/or village ('desa'), but PUSTUs are located in remote rural area. In this particular case, Compong is 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 effects of "Social Service Utilization" with β=.444 (see **Table 4**) due to a closer distance to those social facilities in general. However, it doesn't mean that all smallholders have better access. Frequency distribution shows that Maddenra still has 19% smallholders who further from those social facilities (say "DISTN_EDUC2"—distance to Junior High School—of 4 km as a maximum value in **Table 5**). This is a reason why "Social Service Utilization" has not only direct positive effect, but also negative indirect effect (even if in a negligible association of −.040) on the

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

	Desa Compong				Desa Maddenra			
	Min	Max	Mean	SD	Min	Max	Mean	SD
FRE_HEALT3 (Times/month)	0	2	.27	.588	1	5	1.91	.971
DISTN_HEALT2 (Km)	0	4	.89	1.149	*	*	*	*
DISTN_EDUC2 (Km)	.15	10.00	3.57	2.495	1	4	1.81	.873

Note : * unidentified

poverty in Maddenra.

The last common poverty causal factor (see **Table 4**), is "Agriculture & Non-Agriculture Extensions". It has direct positive effect in increasing household income meaning reducing poverty in Desa Maddenra ($\beta = .276$, a moderate effect). 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 productions (agriculture income) as well as non-agriculture income will be gained, the more total household income will have, meaning poverty reduction. 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").[13] The important implication is that expanding cultivated land area with farm equipment as well as improving agricultural and non-agricultural 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 effect in reducing poverty in Desa Compong, however, in an indirect way (indirect effect of .288, a moderate effect). The effect 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 effect becomes positive (.288). This implies that by stepping up agricultural and non-agricultural informations or extensions in Compong, the poverty of smallholders can also be expected to cope with indirectly.

An interesting point is that the variable Agriculture & Non-Agriculture Extensions also sends its indirect effect on the poverty in Maddenra, but in a negative way. It is important to re-note that the variable Agriculture & Non-Agriculture Extensions transmits its

13) Note as well that this statement based on the positive *moderate* effects directly, not across variables.

effect through the four intermediate variables i.e. "Coffee, Cashew and Livestock (indirect effect of −.155)", "Clove and Orange Productions (indirect effect of −.045)", "Cocoa and Irrigated Paddy Field Productions (indirect effect of .039)" and "Government Transfer-Source Income (indirect effect of −.030)". After effects decomposition, we found that the variable provides a negative indirect effect (total indirect effect of −.191) to the poverty due to the negative β weights of three intermediate variables mentioned above. Thus, even though the variable transmits its effect positively on "Cocoa and Irrigated Paddy Field Productions" meaning it has positive effect on cocoa and paddy field development due to a suitable access to information and agricultural technology (properly transferred and/or effective way in introducing technology by incentive), however, the variable also sends its effect negatively on "Coffee, Cashew and Livestock", "Clove and Orange Productions" and "Government Transfer-Source Income". In other words, it has a negative effect on these three variables reducing household income indirectly (in total indirect effect). This leads us to say that it cannot be expected to reduce poverty in Maddenra through these three intermediate variables mentioned above. It implies that (beside cocoa and paddy field existing technology), providing properly technology especially for coffee, cashew and livestock in Maddenra are also necessary to optimize the role of agricultural technology or extension in alleviating poverty indirectly.[14] This is obviously different from Desa Compong which already receives indirect positive effect of "Agriculture & Non-Agriculture Extensions".

5. Conclusions and Policy Response

Some principal findings include ; (1) the Head Count Index (HCI) of poverty in Desa Compong reveals that around 34.28% of the cocoa smallholder households in Compong have an income per capita is 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 situation 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 per capita is below the NPL. In fact, the average income of smallholder in Maddenra is above the NPL resulting the PGI of zero, meaning that there is no poverty gap in the community. Finally, the indices of PGI reveal that the depth of poverty in Compong is, severer compared to Maddenra ; (2) the degree of

14) Indirect effect of "Agriculture and Non-Agriculture Extensions" on the "Poverty" through "Clove and Orange Productions" and "Government Transfer-Source Income" is a negligible association.

poverty between Compong and Maddenra is relatively the same, but they have 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 productions are in Maddenra ($\beta = .674$). A major implication of this finding is that encouraging cocoa production in Compong and coffee, cashew-nut and livestock production in Maddenra in particular, can be strongly expected to reduce poverty directly. Put it general ways. 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. It conveys an important message that the orientation of agricultural productions in economic activity (agricultural sector in 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 considerably important in reducing rural poverty directly (pro-poor policy); (4) there are also common factors responsible for the poverty requiring general policy such as expanding cultivated land area, providing government transfer-source income, and stepping up agricultural & non-agricultural extensions. Promoting social services utilization especially Public Health Center is also a potential way to help in poverty reduction efforts in the country.

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