Population and Social Demographic Poverty: a Case Study in the Border Areas of East Kalimantan and North Sulawesi[1]

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Introduction

This paper discusses the social-demographic dimensions of poverty and is based on findings from a four-year research program (2006–9) conducted by PPK–LIPI in the border areas of East Kalimantan and North Sulawesi. The general objective of this study is to develop methods for measuring poverty using social-demographic variables: fertility, mortality, migration, education, marriage and occupation. This research used quantitative and qualitative approaches. The intention in using these two approaches was to enable comprehensive data to be gathered on multidimensional aspects of social-demographic poverty. The quantitative data were collected by using survey techniques; a sample of 400 households was taken from each area. Qualitative data were obtained from in-depth interviews, focus group discussions, observation and desk reviews. The findings show that some social-demographic variables are likely to be related (correlate) to household poverty; such variables as mean years of schooling of household members aged 15 years and above (below six years of education), the

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1   This summary is based on a research report by PPK–LIPI, 2006–7. The research was conducted by Ade Latifa, Aswatini, Haning Romdiati, Mita Noveria, Suko Bandiyono, Bayu Setiawan, Fitranita and Rusida Yulianti.

number of children born to the household (more than two) and children below five years of age who had died in the household. The regression results (factor analysis) reveal that about 43.1 per cent and 49 per cent of households are categorised as poor households in the border areas of East Kalimantan and North Sulawesi respectively.

There is a correlation between poverty and population. Therefore, to understand poverty, attention should be given to population problems as well. Rapid population growth induces poverty indirectly, especially in societies that have limited capacity to cope with life's vicissitudes. In some areas, poverty problems are more complex. Border areas in Indonesia, for instance, have more serious poverty problems than other areas, especially regarding the capability of the people to meet their basic needs (Bappenas 2004). In general, border areas have various economic resources (such as trade, agriculture, industry) and natural resources. However, such resources have not yet been exploited optimally to improve the general wellbeing of the population.

In fact, the change in the border regions' development paradigm, to transform them from the nation's backyard to it's front garden, is still not able to alleviate problems faced by these areas. This is mainly because of geographic circumstances (remoteness or isolation) as well as socioeconomic factors. It is well known that the border areas characteristically have inadequate transport, communication, education and health facilities (including family planning services) and low quality human resources. These factors influence how economic resources can be used to develop border areas. In the *Reformasi* era, the problems of the border areas were more intensively discussed, not only by academics but also by the public and politicians. Poverty is now becoming an issue that is getting more attention from research organisations and politicians.

The UNDP's concept (1997) of poverty was broad. Poverty does not have an economic (income) dimension only; it is a complex set of deprivations with many dimensions. Areas of poverty are areas with limited opportunities in terms of education, health, social choice and employment and reduced chances of living a full life. It is stated in *The Platform for Action and Beijing Declaration* that poverty has not only an

economic dimension but also social, cultural, political, environmental, health and education aspects (Suryawati 2005; Tokalau 2007). Empirical studies reveal that higher incomes do not always improve social-demographic conditions because there are non-economic dimensions to wellbeing.

This study attempts to develop an index for measuring social-demographic poverty. The variables include fertility, mortality, migration, education, marriage and occupation. Development of a social-demographic poverty index can broaden our knowledge and understanding of poverty, especially the non-economic dimensions. The social-demographic poverty index is closely related to income poverty (Merrick 2003). The index is also more realistic and stable, that is, it does not change easily because social-demographic conditions (such as the number of children, child mortality and migration) do not change in the short term from economic pressures such as inflation. Additionally, it is easier to collect social-demographic data than economic data (that is, expenditure) mainly because information about social-demographic conditions is easier for respondents to remember.

The research was in two border areas; East Kalimantan and North Sulawesi. Several villages were selected to study: Sei Nyamuk and Sungai Pancang in East Kalimantan; and Nanedakele, Nusa and Bukide in North Sulawesi. It is assumed that these villages are representative of border area life and conditions. Primary and secondary data were collected: primary data were collected by using quantitative and qualitative methods. A survey was conducted in each area using questionnaires. The number of households surveyed was a sample of 400 households selected by systematic random sampling. The respondents were the head of the household or an adult household member who knew the household circumstances. Qualitative data were collected using such techniques as in-depth interviews, field observation and desk reviews. At the household level, there were interviews with several members of the household, selected by considering social-demographic categories. At the society or macro level, interviews were conducted with key informants who had a broad understanding of the topic.

Initially, the study used eight social-demographic variables to measure social-demographic poverty. The selected variables were demographic variables (fertility, mortality and migration) and social variables (age of female at first marriage, female head of the household, child worker, years of schooling and occupation of household members). Therefore, by combining those two main variables (social and demographic) more comprehensive information is to be gained at the household level. However, based on statistical test results, there were only six variables that contributed significantly to the poverty of households. The other two variables (female head of the household and child worker) were not statistically significant in measuring social-demographic poverty, therefore these variables were not used for the poverty index.

Social-demographic Poverty Measurement

Poverty measurements focus on six social-demographic variables: (1) age at first marriage of wife or age of female head of household, (2) number of children, (3) number of children who died before they reached the age of 5 years, (4) years of schooling per number of household members aged 15 years or above, (5) occupation using total ISEI[2] index per number of household members and (6) number of household members aged 15 years or more who migrate to other districts to work or to look for work.

There are two steps when developing a social-demographic poverty index. First, analysing and formulating the correlation of selected social-demographic variables used to determine the poverty line and second, deciding where the poverty line should be from a social-demographic perspective.

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2 The occupation variable that was used in this research refers to the ISEI (Standard International Socio Economic Index of Occupational Status) index that was developed by Harry BG Ganzeboom and Treiman. Based on the ISEI model, each occupation has a value that was calculated based on the comparative aspects of occupation, income and education. According to the Ganzeboom calculation, the higher the value of the index, the higher the value of socioeconomy status. On the other hand, if the index has a low value, so too will be the value of socioeconomic status. The values of index range from 16, for worker occupations, to the highest value, 90, for judges.

1. Analysing and Formulating the Correlation of Social-demographic Variables

The first step is to define some social-demographic variables that theoretically (based on a literature review) relate to household poverty. These variables will be used to determine a social-demographic poverty line. These variables are:

X_1 = mean of the years of schooling of the household members (total years of schooling of the household members divided by the number of the household members aged to 15 years).

X_2 = mean of the occupation index of the household members (total value of the occupation index of the household members divided by the number of working household members).

X_3 = number of children.

X_4 = number of children who have died in the household before reaching the age of 5 years.

X_5 = number of the household members aged to 15 years who have migrated from the Sangihe–Nunukan District to work or to seek a job.

X_6 = age at first marriage of the head of household's wife.

Further analysis was conducted to learn the relation between social-demographic variables, by calculating the correlation matrix of those variables. Based on the correlation matrix of Nunukan Regency data, social-demographic variables that are statistically significant and have a positive correlation are X_1 with X_2, X_1 with X_5, X_1 with X_6, X_3 with X_4 and X_3 with X_5. Statistically significant variables that have negative correlation are X_1 with X_3, X_3 with X_6 and X_5 with X_6. The matrix correlation of Sangihe Regency data revealed that social-demographic variables that have a significant positive correlation are X_1 with X_2, X_2 with X_6, X_3 with X_4 and X_3 with X_5, while variables that have a significant negative correlation are X_1 with X_3, X_1 with X_4, X_2 with X_2 and X_2 with X_4. Based on the matrix correlation of those two regencies, it can be concluded that the correlation among social-demographic variables were statistically significant, even though the value of its correlation is not high.

The second step was to use factor analysis to find the correlation among X_1, X_2, X_3, X_4, X_5 and X_6. Factor analysis is a multivariate analysis to determine internal relations among a set of variables. This method is only considered to be an intermediate analysis (not final analysis). Those correlations among a set of variables can be represented by one variable called *factor*. Therefore, factor analysis can be applied as an intermediate analysis in determining a social-demographic poverty line, by utilising a factor that constitutes a linear combination of social demography variables: X_1, X_2, X_3, X_4, X_5 and X_6. Based on the result of factor analysis of Nunukan and Sangihe data, poverty line was determined by the following formula:

- The poverty line equation of Nunukan, East Kalimantan
  $$Z\_Kaltim = -0.190 X_1 - 0.105 X_2 + 0.502 X_3 + 0.393 X_4 + 0.210 X_5 - 0.335 X_6$$
- The poverty line equation of Sangihe, North Sulawesi
  $$Z\_Sulut = -0.427 X_1 - 0.405 X_2 + 0.315 X_3 + 0.308 X_4 + 0.066 X_5 - 0.146 X_6$$

The coefficient of X indicates its contribution to the social-demographic poverty line.

2. Determining Social-demographic Poverty Line

The calculation of the social-demographic poverty line used the formula of factor 1 (Z_Kaltim and Z_Sulut). The values, obtained by inserting the cut-off point value of variable X into both equations, will be considered as the social-demographic poverty line at the household level. This is also the demarcation line separating the two categories: poor and non-poor .

There are three steps:

A. Determining the social demography variables cut-off point

Based on the review results, we can use the number of household members as a demographic variable proxy to determine the cut-off value of social-demographic poverty when the number of members of the household is four. If there are more than four, it means that the

household is poor in terms of social demography. With repsect to the cut-off point, 44.8 per cent of the households in Nunukan Regency and 60.9 per cent in Sangihe have four members. Therefore the method to determine the cut-off value of each variable X is based on the cut-off point of the household members variable, by searching for the value of each social demography variable when the cumulative percentage of the value is 44.8 per cent for Nunukan Regency and 60.9 per cent for Sangihe Regency, by interpolation. The cut-off value of social demography variables for each regency can be seen in the table below:

Table 1
TheCut-off Value and the Coefficient of Social Demography Variables

Variables	Nunukan (KALTIM)		Sangihe (SULUT)	
	Cut-off point	Variable coefficient	Cut-off point	Variable coefficient
The number of household members (y)	4.00	-	4.00	-
The mean year of schooling of household members $\geq$15 years (X_1)	5.95	-0.190	5.72	-0.427
The mean occupation index of household members (X_2)	23.12	-0.105	15.72	-0.405
The number of children (X_3)	3.00	0.520	3.00	0.315
The number of children in the household who died before the age of 5 years (X_4)	0.00	0.393	0.00	0.308
The number of members of the household, aged 15 or more years who migrate to work or to seek a job (X_5)	0.00	0.210	0.00	0.066

The age of the head of household's wife at her first marriage (X_6)	17.77	-0.335	23	-0.146

B. Calculating the poverty line by inserting the cut-off value of all variables X into the poverty line equation (Z_cut-off), that is:

- Nunukan Regency, East Kalimantan:

Z_cut-off = -0.190 X_1 - 0.105 X_2 + 0.502 X_3 + 0.393 X_4 + 0.210 X_5
           - 0.335 X_6
= -0.190(5.95) - 0.105(23.12) + 0.502(3) + 0.393(0) + 0.210(0) - 0.335(17.77)
= -7.95

The social-demographic poverty line of East Kalimantan is: -7.95

- Sangihe Regency, North Sulawesi:

Z_cut-off = -0.427 X_1 - 0.405 X_2 + 0.315 X_3 + 0.308 X_4 + 0.066 X_5
           - 0.146 X_6
= -0.427(5.72) - 0.405(15.72) + 0.315(3) + 0.308(0) + 0.066(0) - 0.146(23)
= -11.22

The social-demographic poverty line of South Sulawesi is: -11.22

C. Determining the category for each household, poor or non-poor, by using criteria as follows:

- Nunukan Regency, East Kalimantan :

Calculating the value of poverty line for each household by using equation as follows:

Z_Kaltim = -0.190 X1 - 0.105 X2 + 0.502 X3 + 0.393 X4 + 0.210 X5
           - 0.335 X6

A household is categorised poor if the Z_Kaltim value of the household $\geq$ -7.95

A household is categorised non-poor if the Z_Kaltim value of the household < -7.95

- Sangihe Regency, North Sulawesi:

Calculating the value of poverty line for each household by using the following equation:

Z_Sulut = -0.427 X_1 - 0.405 X_2 + 0.315 X_3 + 0.308 X_4 + 0.066 X_5 -
           0.146 X_6

A household is categorised poor if the Z_Sulut value of the household ≥ -11.22

A household is categorised non-poor if the Z_Sulut value of the household < -11.22

Z_Kaltim and Z_Sulut equations were used to obtain the social-demographic poverty index of each household. Finally, the household distribution will be obtained based on social-demographic poverty condition by comparing these values (Z_Kaltim or Z_Sulut) with social-demographic poverty line (Z$_{cut-off}$) of each regency as can be seen in the table below:

Table 2

The Distribution of the Household Sample in the Research Areas of Nunukan Regency, East Kalimantan, and Sangihe Regency, North Sulawesi, based on Social-demography Poverty Condition

Household category based on social demography condition	Frequency	Per cent
Nunukan Regency, East Kalimantan		
Poor	155	43.1
Non-poor	205	56.9
Total*	360	100.0
Sangihe Regency, North Sulawesi		
Poor	165	49.4
Non-poor	169	50.6
Total **	334	100.0

Note: * cases missing 40 out of 400 samples

          ** cases missing 65 out of 399 samples

Source: The Study of Population and Poverty in Border Areas, East Kalimantan and North Sulawesi. PPK–LIPI. 2007.

Research Issues Related to Social-demographic Poverty

Sebatik case

The estimated result of social-demographic poverty index shows that the proportion of poor households in Sebatik is 43.1 per cent; the rest are considered non-poor households. Using analysis factor techniques,

it is known that a highly significant that contributes to the social-demographic poverty index is 'the number of children that were born in the household' (0.502). Another variable that is a quite strong indication of poverty is 'the number of children in the household who died before the age of 5 years (0.393).

Regarding the cut-off value of the 'live born children' variable (three children), which was obtained by interpolation, so, the higher the fertility (more than three children) in such households, the higher is the possibility that those households will be considered poor in terms of the social-demographic index. The mean number of children still alive in the research areas is 3.5 and based on the survey, 42.16 per cent of households had more than three live-born children. Empirical studies indicated that a large number of children in a family causes low investment in resources for those children. In other words, the more children there are, the less money there is for their education, health etc.

The survey did not collect data on recent fertility only but it included the whole live-born children in the families. It is known that where a high percentage of households had more than two live-born children that this was related to difficulties in getting help from family planning services. At the time, many families living in the plantation areas were unable to use family planning services, because not every village had a family planning post. As well, the relatively high fertility rates are also caused by parents' desire to have children of both sexes. So if a family already had three male children, it would tend to have more children until they had a girl. In some families there is a desire to have at least two boys. If one were to die, they would still have one male child in the family. Consequently, the fertility rate in the Sebatik research area tended to be high.

One other factor that indicates a high level of social-demographic poverty in Sebatik is infant mortality. Data showed that 16 per cent of households had experience the death of infants and children under the age of five years. From the in-depth interviews, it was learnt that for some couples a child had died because they could not get proper or prompt medical treatment. For other families, more than one child had died under the age of five years. Such families lived in plantation areas, away from a village and where there was not a medical or health service.

Even now, there is no hospital in the Sebatik district. People who need medical treatment at a hospital must go to Nunukan or Tarakan Town. In the Sebatik district, there is one only primary health care facility (*puskesmas*), which also functions as a treatment facility. As well as the limitations and difficulties of current health care facilities, many people in the area do not give a high priority to their health. According to the head of Sebatik Puskesmas, many people there consider it more important to use their money for a pilgrimage than for health.

Other interesting findings are related to the relatively low mean years of schooling of household members aged more than 15 years. The survey of the 400 households revealed that most people aged more than 15 years (approximately 67 per cent) had a standard of education below the cut-off point year of schooling (5.95 years). There are several possible reasons for this. One is an aberrant sample; the inclusion of people who were older is one possibility. There were 15 per cent of household members aged more that 45 years who were at school age before education was compulsory and who might not have been able to continue at school. A high proportion of people surveyed were not able to finish basic education.

Another reason for low mean years of schooling was the wish of many parents for their their children to marry at a young age. A consequence of this was that these children were not able to continue their education. In the research area, there was still a practice of marrying, especially for girls, at around the age of 12 years. One sad case was found in the research area; a young girl, just about to finish her basic education, was forced by her parents to leave school to be married. It was considered 'taboo' to refuse the marriage proposal for the girl, even though it meant her having to leave school

With male children too, there was the tendency of drop out of school, though the percentage was lower where the program of Operational School Assistance was available. Good employment prospects (assisting fishermen, working in the local ports) encouraged many boys to leave school early. Besides, there was the example of many migrants from Sulawesi who had become successful entrepreneurs in Sebatik even though they had basic education only; this influenced some parents and

their children to go to work rather than stay at school. The benefits of education were not certain, the benefits of employment were. The successful entrepreneurs became the role models for some people. Education, on the other hand, was not the first priority for most of the children. There are few people who see the long-term benefits of education. There is a common assumption that elementary literacy and numeracy is all that is necessary for employment. Building schools and education infrastructure is not enough; it is also important to inrease parents' knowledge of the advantages of education and to encourage them to allow their children to remain at school.

The econometric methods used by the Central Office of Statistics (BPS) to measure poverty are based on expenditure per capita. Using the BPS system shows that 32.7 per cent of the households would be classified as poor (see Table 3). This method gives a lower figure for impoverished households than does the social-demographic method, which indicates that the percentage of poor households in the area is 43.1 per cent. This suggests that some social demography variables can be utilised to learn more about poverty conditions related to social-demographic factors and can be used to complement the household expenditure or income indicators used by BPS.

Table 3
The Distribution of the Household Sample in the Research Area of Nunukan Regency, East Kalimantan, and in Sangihe Regency, North Sulawesi, based on Expenditure Criteria (BPS method).

Household category based on expenditure criteria (BPS)	Frequency	Per cent
Nunukan, East Kalimantan		
Poor•	121	32.7
Non-poor	249	67.3
Total*	370	100.0
Sangihe, North Sulawesi		
Poor	241	70.7
Non-poor	100	29.3
Total**	341	100.0

Note: * cases missing 30 out of 400 samples
       **) cases missing 58 out of 399 samples
Source: The Study of Population and Poverty in Border Areas, East Kalimantan and North Sulawesi. PPK–LIPI. 2007.

Nusa Tabukan case

The result of social-demographic poverty index using the factor analysis method shows that there were 49.4 per cent of households in the three study areas in Nusa Tabukan considered to be poor households. Among the six social-demographic variables used to compute the poverty index, occupation and education variables are likely to be important contribution to such an index (both variables have a contribution value of 0.427). This might be because most of the poor household members work as fishermen or farm-hands on small land holdings and, according to the ISEI, those occupation have low value (between 15 and 16). For example, almost all fishermen the border areas of Sangihe and the Philippines used motor boats that were equipped with small engines (called 'pump-boats'), some fishermen used a smaller boat (the local term is *londe*). Those who worked in the agricultural sector are mostly landless peasants. Although small number of peasants cultivate nutmeg and coconut, their plantations are considered to be small farms. In other words, they are categorised as peasants with small land holdings, or to use the ISEI classification, they are farm-hands, that is, peasants without agricultural technology.

The income from those two occupations (fisherman and peasant) is generally low. This is partly because most fishermen in the three research areas used motor boats equipped with small engines only (13 horsepower), some of them used *londes*. Their fishing techniques, using nets and hooks and line, are also categorised as traditional. Consequently, their fishing ground is limited to close to the shore. This situation leads to their getting small catches, so their income from fishing is sufficient only for their daily needs. In addition, smaller catches and increasing fuel prices is making it more difficult for them to make a living. Even in fishing households that included members who worked as farm-hands on cassava plots, the extra employment gave them only enough for their own needs.

Many poor households, identified from the social-demographic poverty index, particularly those in the fishing and agricultural sectors, have limited access to natural resources and to efficient fishing technology. The Nusa Tabukan District, comprising three villages, has great

potential; there are rich resources to support a fishing industry. However, these riches cannot be exploited optimally because of the poor quality of the area's human resources (indicated by the use of traditional fishing techniques, little capital and poor knowledge). The fishing is greatly dependent on seasonal conditions, bad weather means no fishing. Other natural factors influencing occupations in these areas are the limited natural resources and the small supply of cultivated farmland. Generally, the natural resources potential is limited to primary forest (which includes wild sago palm that could be utilised for food production). There are no other natural resources that could be exploited to develop an agricultural sector. The topography is steep, most of this area is mountainous, and the peasants are able to cultivate a small area only and that with with only a few varieties of plants.

Another social-demographic variable that contributes to poverty in Nusa Tabukan is that the workforce is poorly educated. This is shown by 'the low mean years of schooling of the household members'. The mean years of schooling of household members aged 15 years or more is 5.72. The 2007 survey result showed that about 48.2 per cent of household members had not yet completed their basic education. The percentage of household members who had finished their secondary education was only 7.7 per cent and 6.4 per cent finished high school.

These findings indicated that many children left school when they finished their basic education because there were no secondary schools in the villages. There were two secondary schools only in Nusa Tabukan District; at Nusa and Bukide island. To continue their education, students have to go to 'Sangihe Besar' island, which means they need money for transport and accommodation. Not only that, parents have to spend more money for their children's daily needs in a boarding house. The popular phrase in this society to describe such situations is 'parents should maintain two kitchens'. These economic handicaps make it difficult for parents to afford to educate their children beyond their home village, so many children leave school too early.

Using the BPS measurement of poverty, approximately 70.7 per cent

of households in this area are poor households.[3] This figure was much higher than that obtained by using the social-demographic index, which gave a figure for poor households of 49.4 per cent (see Table 3). This indicates that most households in the three study areas could not optimally meet their food and non-food basic needs (such as education, health, electricity, transport and social needs). The relatively low level of social-demographic poverty in Nusa Tabukan compared to Sebatik, is because of several factors: the influence of the high age at first marriage of the wife of the household head or female head of household, and fewer household members aged 15 years or more who have never migrated from the regency. The factor analysis results have shown that the contribution of the variable of the age at first marriage to the social demography poverty level was only 0.146 (Sebatik is 0.335), while the contribution of the migration variable was 0.066 (in Sebatik 0.210).

Conclusion

The development of a social-demographic poverty index is expected to become a method of measuring poverty that complements a simple economic calculation. Data used for compiling a social-demographic poverty index are easier to gather because the information needed is easier for repondents to find or to remember. The implication from this is that the infromation will be more accurate. This study is important because the success of poverty alleviation depends on having a broad quantum of knowledge of all the factors that affect or cause poverty.

Policies that only focus on economic empowerment only are not sufficient to improve social welfare, they should be accompanied by social and cultural empowerment. Therefore, the welfare of a society is not just the economic and material aspects, the quality of life or living has social-demographic dimensions that must be considered and, where necessary, improved; that is, the general impediments to a full life must

3   The poverty line is the minimum income deemed necessary to achieve an dequate standard of living. Since income data are unreliable in Indonesia, BPS uses expenditure data as a proxy of income for defining a poverty line. The poverty line is calculated by food and non-food expenditure per capita. The estimate data for poverty population are calculated for rural and for urban areas. The poverty line for the rural area of Sangihe District in 2005 was Rp136 004.000/month/capita).

be removed or ameliorated. More research is needed though much data have been collected nationally for policy makers to make a start.

Findings from these two research areas indicate that social development, especially in social-demographic aspects, should be made a priority. Improvements in family planning and health services as well as education can alleviate or ameliorate poverty problems. Increasing job opportunities is not the only path to a better life but it is the way to reduce economic poverty. Knowing what has to be done is one thing, doing it another. Policy makers must ensure that eradicating poverty moves past the research and planning stages. Improving peoples quality of life requires a third stage; action.

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