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MEASUREMENT OF POVERTY LINE IN INDONESIA: THEORETICAL REVIEW AND PROPOSED IMPROVEMENTS

Abstract

Poverty is essentially the inability to meet certain basic needs such as food, clothing, and shelter. The measurement of poverty commonly used in developing countries is absolute poverty, which compares household income or expenditures and the poverty line. The line is based upon the minimum expenditures or income needed to obtain: (i) a quantity of food to fulfill certain calorie needs; and (ii) the minimum non-food expenditures for a decent standard of living.

The poverty measurement method was updated in 1998. The update was made by enhancing the food basket and the non-food components based on the limited surveys in ten provinces. Calculation of the food poverty line is based on the minimum energy needs of the Indonesian people, namely 2,100 calories per day which was recommended by the 1978 National Workshop on Food and Nutrition (*Widyakarya Nasional Pangan dan Gizi*: WNPG).

This method resulted in expansion of the commodities in the food basket in each region, leading to 52 commodity types in the national food basket. The calculation of non-food poverty line is based on 51 commodities in urban areas and 47 commodities in rural areas which includes housing, clothing and footwear, health care, education costs, transportation, and various other goods and services.

People's consumption pattern in Indonesia has changed and is reflected in an updated minimum calorie consumption limit per capita of 2,150 calories. This change is the result of WNPG 2012 and is in accordance with the most recent Recommended Nutritional Allowance (*Angka Kecukupan Gizi:* AKG) in the Minister of Health Regulation No. 75/2013.

This article attempts to offer a proposed update of the calculation of poverty line, by comparing the food and calories poverty line calculation method, non-food poverty line calculation method, and the real method**.** This article also presents the simulation of poverty indicators calculation as the benchmark for the proposed improvement of future measurement of poverty line.

Key Words: Poverty Line, Poverty Measurement, AKG, Food, GKM,GKMN.

Section One: Introduction

Poverty alleviation is one of Indonesia's development priorities. This is in line with the first commitment of the Sustainable Development Goals (SDGs)–namely, to reduce poverty and hunger. The availability of accurate poverty rates in each region and at the national level constitute an absolute pre-condition for the formulation of poverty alleviation policies.

Having data on the poverty rate is useful for planning purposes in a number of areas:

(a) formulating national development policies and plans, which include poverty alleviation strategies; (b) setting geographical location-based goals and targeting individuals and households of the development program.

(c) determining the allocation of poverty alleviation programs;

(d) monitoring and evaluating development programs, including achievements of the National Medium-Term Development Plan/National Long-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional*: RPJMN/*Rencana Pembangunan Jangka Panjang Nasional*: RPJPN) and SDGs; and

(e) measuring performance of the central and regional governments.

Poverty is essentially the inability to meet certain basic needs such as food, clothing, and shelter. The measurement of poverty commonly used in developing countries is absolute poverty, which compares household income or expenditures and the poverty line. The line is based upon the minimum expenditures or income needed to obtain: (i) a quantity of food to fulfill certain calorie needs; and (ii) the minimum non-food expenditures for a decent standard of living.

Statistics Indonesia (*Badan Pusat Statistik*: BPS) is the agency authorised to calculate and map the poverty rate in Indonesia. BPS has been calculating the poverty rate since the early 1980s and publishing it officially for the first time in 1984 when it included the poverty rate in the period of 1976-1981. Since then, every three years, BPS calculated the population of poor people in Indonesia in conjunction with the collection of households consumption data through the National Socio-Economic Survey (*Survei Sosial Ekonomi Nasional*: Susenas). Since 2002, the poverty rate has been calculated each year by conducting a household consumption module survey through Susenas.

The poverty measurement method was updated in 1998 by enhancing the food basket and the non-food components based on the limited surveys in ten provinces. Calculation of the food poverty line is based on the minimum energy needs of the Indonesian people, namely 2,100 calories per day, which was recommended by the 1978 National Workshop on Food and Nutrition (*Widyakarya Nasional Pangan dan Gizi*: WNPG). This method resulted in an expansion of the number of commodities in the national food basket to 52 commodity types. Calculation of the non-food poverty line is based on 51 commodities in urban areas and 47 commodities in rural areas. The non-food basket includes housing, clothing and footwear, health care, education costs, transportation, and various other goods and services.

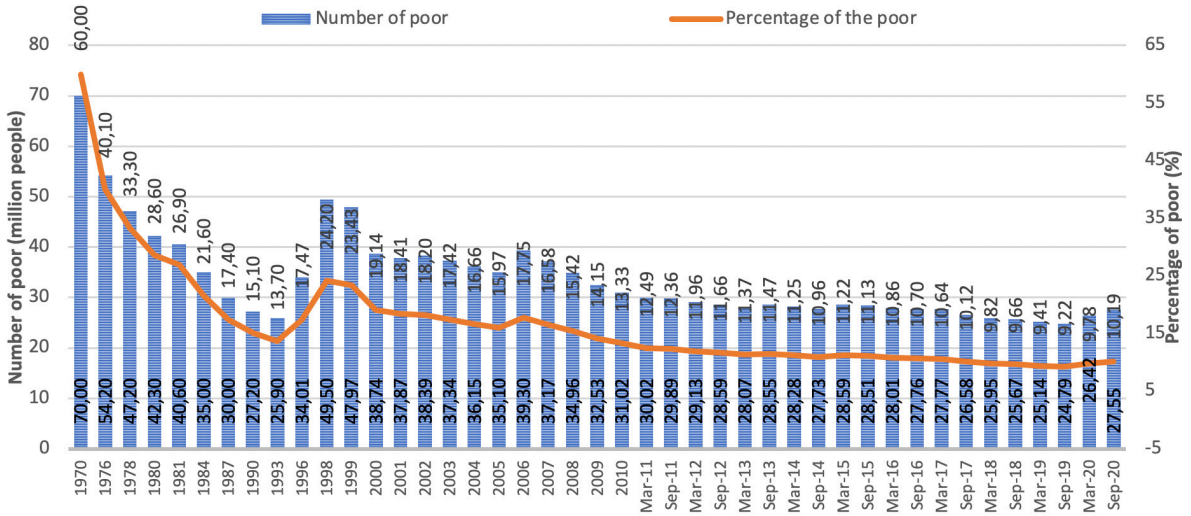
People's consumption pattern in Indonesia has changed and is reflected in an increase in the minimum daily calorie consumption per capita to 2,150 calories. This change is the result of WNPG 2012 and is in accordance with the most recent Recommended Nutritional Allowance (*Angka Kecukupan Gizi*: AKG) in the Minister of Health Regulation No. 75/2013. In addition, changes in people's consumption pattern in the last two decades indicate a significant shift both in quantity and quality, thus it needs to be accommodated in measuring

the poverty line. The new standard for calculating poverty need to be adjusted in line with the changes in people's consumption pattern so that the data is more factual, with comprehensive scope of commodities in all population groups, and reflect the people's basic needs.

1.1 Poverty Condition in Indonesia

The poverty rates in Indonesia from 1970 to 2018 are shown in Figure 1.1. The different poverty calculation methods between the pre-1996 period and the post-1996 period means that the poverty rate for the two periods cannot be compared directly. In 1970, the poor population totaled 70 million people, equivalent to 60 per cent of Indonesia's population at that time. The 1970-1990 period indicated a trend of decreasing poverty in terms of number and percentage. At the end of 1990, the absolute number of poor had fallen to 27.20 million people, equivalent to 15.10 per cent of the poverty rate. Between 1970-1996, the poor population witnessed a relatively drastic decrease, from 70 million to 22.5 million people. In percentage terms, the rate fell from 60 per cent to 17.47 per cent. The decrease occurred uniformly, both in urban and rural areas.

Figure 1.1: National Poverty Rate and Poor Population (1970-2018)



Sourcer: Statistics Indonesia, Few Editions

Note: The poverty line calculation methodology was refined in 1996

The number and percentage of poor people increased again between 1996 and 1998, the main reason being the impact of the political and economic crisis (krismon) which occurred during the period. The number of poor rose from a total of 34.01 million in 1996 (17.47 per cent of the population) to 49.5 million in 1998 (24.2 per cent). In 2005, the government decided to remove part of the fuel oil (*Bahan Bakar Minyak*: BBM) subsidy, which led to a twofold increase in the fuel oil price and a jump in the number of the poor population in 2006.

Section Two: Literature Study on Poverty[1]

Poverty is measured economically from income or expenditures. Amartya Sen, a Nobel Laureate in Economics, argued that poverty is usually indicated by the failure of an individual to obtain basic capabilities, which results in the lack of opportunity and choice to live in dignity. Sen's approach is measured by a multidimensional poverty index. The social exclusion approach categorises a person as poor if the person concerned is unable to participate in social life.

The World Bank (2000) defines poverty as a condition with an unattained decent living standard. Furthermore, the World Bank uses insufficient clothing, food, and housing; inability to access health care; and poor access to education, as indicators that categorise a person as poor or not. Meanwhile, the United Nations (UN) (1997) describes poverty as a condition related to the inability to fulfil basic needs. As with the World Bank, the UN also proposes several technical indicators which can be used to indicate whether or not a person is poor, such as malnutrition, illiteracy, poor health, poor clothing and housing, and helplessness.

From the various descriptions above, it can be concluded that the definition of poverty is a condition where a person's state of living is considered lower than the poverty standard known as the poverty line. There are two approaches in determining the poverty line–the absolute approach and the relative approach. By characteristics, poverty is divided into two categories, namely temporary poverty and chronic poverty. People who are included in chronic poverty are household expenditures in two periods who are always below the poverty line, while temporary poverty is those whose household expenditure in two periods only in one period their expenditure is below the poverty line. They became poor because the economy in general is deteriorating, resulting in an insufficient income to fulfil their minimum needs. This population group will be categorised as non-poor if the economic condition is improving because they are able to find jobs which provide better living

In almost all developing countries, the calculation of poverty tends to use the absolute approach. The World Bank sets the poverty line as an income of US$1.00 per day that represents the purchasing power standard in various countries. The absolute poverty line is the nominal value needed to fulfil the basic needs, which include the food group and the non-food group. According to this approach, poverty will be reduced when all of the people in a region experience increased income at similar levels. This condition is commonly known as inequality-neutral growth.

Conversely, in developed countries, the calculation of poverty commonly uses the relative approach–referred to as strongly relative poverty line. Such countries normally use constant value against the average value or median of the income of the people in a region.[2] If all of the people in a region experience income growth at similar levels, the poverty line will not change, and it will even be lifted. Among numerous developed countries, the United States is the only developed country that uses absolute poverty line in determining its poverty indicators.[3]

1 For this section, we use Ravallion and Chen (2011) as primary reference.

2 Normally, this value is within the range of 40 per cent to 60 per cent.

3 In 2017, the federal government categorised a household with four members as poor if their income is less than US$24,600 per annum.

2.1 Absolute Poverty and Relative Poverty

The difference between absolute poverty and relative poverty lies in the assessment standard. The indicators used in determining the standard of assessment of relative poverty are more subjective than the standard of assessment of absolute poverty. Relative poverty will depend on the subjective elements of the local population, while absolute poverty will depend on the basic needs established, both food and non-food.

2.1.1 Absolute Poverty

The concept of absolute poverty is related to the minimum decent living standard in a region in a particular period. In this concept, a person is considered poor if that person's life is deemed inferior to the decent living standard. Absolute poverty can be understood as the difference between a person's income level and the income level needed to fulfil their basic needs. According to the absolute poverty concept, a person is considered poor if that person is unable to fulfil their minimum primary needs, such as food, clothing, health, housing, and education, which are needed to enable a decent standard of living and optimum work. The minimum primary needs are usually translated into financial measures, given the numerous dimensions which must be fulfilled to describe a decent life.

One of the advantages of the absolute poverty concept is its ability to be compared across periods and regions, provided that the definition of poverty adhered to is not changed. For example, in the United States life is considered as poor or not depending on the household structure. According to the United States Bureau of Census, the minimum amount of income for a family of four members with no children under the age of 18 to be deemed as not poor in 2010 was US$22,541, while, for a family of six (four adults and two children), the minimum amount of income was US$22,162 per annum. By using this standard, the poverty rate was 15.1 per cent in 2014, an increase from 14.3 per cent in 2010. The unchanged definition of poverty has made the absolute poverty concept usable in assessing whether or not the poverty alleviation policies are successful.

The poverty line based on purchasing power parity (commonly known as the US$ per capita PPP) established by the World Bank is an example of the application of the absolute poverty concept. Extreme poverty is defined by the World Bank as living with an income level of less than US$1.90 per day. The reference population is the average consumption in 15 of the world's poorest countries, namely Malawi, Mali, Ethiopia, Sierra Leone, Niger, Uganda, The Gambia, Rwanda, Guinea-Bissau, Tanzania, Tajikistan, Mozambique, Chad, Nepal, and Ghana. The World Bank's objective in establishing the definition of poverty is to compare the poverty rates among countries, which shall influence the allocation of financial aid distribution to combat global poverty.

The indicator normally used as an indication of absolute poverty is Foster-Greer-Thorbecke. The equation is as follows:

$$FGT_{\alpha} = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right)^{\alpha}$$

When $\alpha=0$, the FGT indicator becomes FGT_0 or known as P_0 or the poverty rate. When $\alpha=1$, the FGT indicator becomes P_1 or known as the poverty gap index. When $\alpha=2$, the FGT indicator becomes P_2 or known as the poverty severity index.

2.1.2 Relative Poverty

Unlike the absolute poverty line that depends on the nominal amount needed to fulfil living costs, the relative poverty line depends on the people's consensus on the poorest cohort of a population. If a consensus is reached, the poverty line can be established. For example, the lowest 20 per cent of the group ranked on the basis of income or expenditure. The European Union categorises a person as poor if his/her income is below one-half of the average income for the population. For example, in France the average salary of private employees is €3,000 per month (Rp 47 million). A person is, therefore, considered poor if that person's income is lower than €1,500 per month (Rp 23.5 million).

The relative poverty line cannot be used for comparing the poverty rate across regions and periods as it does not reflect the same welfare level. For determining the program goals addressed to poor people, however, measures of relative poverty can be used. The indicator for determining relative poverty usually contains two classes of information, namely quantitative information which reflects distribution and information on the distribution itself. For example, 60 per cent of the people's median income and 20 per cent or 40 per cent of the people with the lowest welfare level.

2.2. Multidimensional Poverty

The concept of multidimensional poverty was proposed by the Human Development Report Office (HDRO) under the United Nations Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHDI) in 2010. It was published for the first time in conjunction with the 20th issue of the Human Development Report. The multidimensional poverty concept was introduced to assess whether countries are on course to achieving the Millennium Development Goals (MDGs). This concept is an alternative to measuring poverty using the monetary approach, which is not considered comprehensive. Since 2010, publication of the Human Development Report has continuously incorporated progress on the Multidimensional Poverty Index (MPI) indicator globally.

The concept of MPI views poverty not merely in monetary units, but attempts to comprehend other related aspects. MPI identifies underdeveloped community groups that usually encounter difficulties in accessing three important dimensions of life–health, education, and welfare, which are elaborated into ten indicators (Table 2.1). The community groups which feel unable to access at least 30 per cent of such indicators will be categorised as underdeveloped community groups.

Table 2.1: Dimension, Indicators, and Weight of MPI

Dimension	Indicator	Underdeveloped If in the Household...	Weight
Health	Nutrition	There is an adult aged over 70 or there is a child with insufficient nutrition requirement.	1/6
	Death of Children	There is a child who died within a period of five years prior to the survey.	1/6
Education	School Term	No member of the family aged over 10 has completed six years of basic education.	1/6
	School	There is a child of school age who does not attend school according to the level equivalent to eighth grade.	1/6

Dimension	Indicator	Underdeveloped If in the Household...	Weight
Living Standard	Cooking Fuel	The household cooks by using wood, charcoal, or coal.	1/18
	Sanitation	The household sanitation facility has not improved significantly (according to the reference of SDGs) or, if it has improved, the household is sharing with other households.	1/18
	Source of Drinking Water	There is no access to a source of safe and quality drinking water (according to the reference of SDGs) or, if it has access, the household must walk for at least 30 minutes from the residence.	1/18
	Electricity	There is no electricity.	1/18
	Housing	The materials used as roof, wall, and floor in the household are considered inappropriate. For instance, they still use natural materials such as clay or other simple materials.	1/18
	Ownership of Assets	Does not have more than one asset such as radio, television, telephone set, computer, livestock, bicycle, motorcycle, refrigerator, and car.	1/18

Each person assessed in the MPI is viewed from the fulfilment of the evaluated indicators. The assessment of indicators is in the form of a binary score (1 or 0). When a person is meeting the poverty assessment according to the MPI indicators, that person will get a score of 1. After being assessed against the ten indicators, the assessment is converted into an index figure by using the following formula:

$$C_i = \sum_{i=1}^{D} w_d I_d$$

With I_d=1, a person is considered to meet the criteria of MPI. w_d is the weight for indicator . MPI is the multiplication of the multidimensional head count ratio (*H*) and the intensity of poverty (*A*). With obtained from:

$$H = \frac{q}{n}$$

where is the number of individuals categorised as poor multidimensionally, while is the total population. As for the equation of :

$$A = \frac{\sum_{i=1}^{n} c_i(k)}{n}$$

where is the individual score and is the number of individuals with multidimensional poverty. The multidimensional poverty index or MPI is, therefore, calculated as follows:

$$MPI = H \times A$$

Section Three: Literature Study on Calculation of the Poverty Line

There are a number of approaches commonly used for calculating the poverty line–more or less related to the nutrition standard to be achieved.

3.1. Food Energy Intake versus Cost of Basic Needs

The most common approach used for calculating the poverty line is the food energy intake (FEI) method (Greer and Thorbecke, 1986). In this approach, the poverty line is determined by calculating the minimum consumption level needed to achieve the minimum life needs standard. The FEI approach does not require a combination of commodities that must be fulfilled to achieve this minimum standard, therefore, this approach is easy to apply and it is objective in choosing the commodities. The difficulty in using this method arises when the approach is updated to take into consideration the factors of regional variation and prices that vary over time due to the absence of a fixed combination of goods (fixed basket), therefore, the appropriate price index cannot be produced.

Under the cost of basic needs (CBN) approach, the poverty line is calculated in a particular period for a number of commodities with an unchanged (fixed) bundle. The poverty line in a different period is calculated by observing the price changes of the commodities in the bundle. The aggregation of the fixed allocation of food bundle and non-food bundle is known as the poverty line. The CBN approach attempts to address FEI's deficiency by taking into account the diversity between regions and periods.

Although the two approaches use different procedures in calculating the poverty line, FEI and CBN have their similarities. First, FEI and CBN are both based on a bundle that is considered to represent the food and non-food consumption of the people who form the reference population. Second, FEI and CBN attempt in such a manner to fulfil energy sufficiency at the level agreed by the people.

Section Four: Calculation of Poverty Line

Statistics Indonesia (Badan Pusat Statistik: BPS) first calculated the number and percentage of poor people in 1984. The calculation at that time covered the period of 1976-1981 by using data from the Consumption Module of the National Socio-Economic Survey (Survei Sosial Ekonomi Nasional: Susenas). Since then, every three years BPS has issued the data on the number and percentage of the poor population, disaggregated by urban and rural area. In 1993, BPS presented the data on poverty in Indonesia by province. Since 2003, BPS has provided data on the number and percentage of poor population routinely every year.

The primary data source used for calculating the number and percentage of the poor population is the consumption module in Susenas. The information on poverty obtained from the survey results only indicates the number and percentage of poor population in a region without identifying the name and address of individuals. This information on poverty is classified as macro poverty information.

BPS measures poverty by using the standard and concept applied in many countries, namely the basic needs approach. This approach calculates the minimum food needs of a household of 2,100 calories per person plus the most basic needs of the non-food group. On the other hand, insufficient expenditure or income to provide for a minimum decent life constitutes a monetary approach. The poor population is, therefore, the population with an average expenditure per capita each month below the poverty line (Garis Kemiskinan :GK).

The most difficult aspect in calculating the poor population is in determining the poverty line and ascertaining the same welfare comparability level if the line is calculated at different times. BPS is adapting the approach of a household's ability to fulfil the basic needs or the basic needs approach in calculating the poverty rate. BPS calculates the poverty line values of food and non-food separately in each province and according to urban and rural areas.

According to the UN survey, the expenditure approach in measuring poverty rate is actually used quite commonly by developing countries. Results of the 2004-05 survey of 84 countries indicated that:

- 49 countries (58 per cent) measure the poverty rate based on expenditure information. These countries include Albania, Armenia, Hungary, Macedonia, Moldova, Turkey, Iran, Sri Lanka, Cambodia, Bangladesh, and Myanmar.
- 25 countries (30 per cent) calculate poverty rate based on income data. These countries include Germany, France, Greece, Malaysia, and Thailand.
- 10 countries (12 per cent) measure poverty rate by using the expenditure and income approach. These countries include Lithuania, Russia, Republic of Korea, China, Vietnam, and Mongolia.

- In Indonesia, the expenditure records tend to emphasise more the economic condition or purchasing power of a household.
- Information on income tends to be unreliable for use as calculation basis.
    - For example, one of the indicators of income often used in developed countries is the income amount contained in the individual income tax return. If this data is used, problems will arise in the calculation in Indonesia. With a total population of approximately 256 million, only 27 million have a Taxpayer Identification Number (*Nomor Pokok Wajib Pajak*: NPWP). Out of the aforementioned total, only 10 million filed the Annual Tax Return (2017).

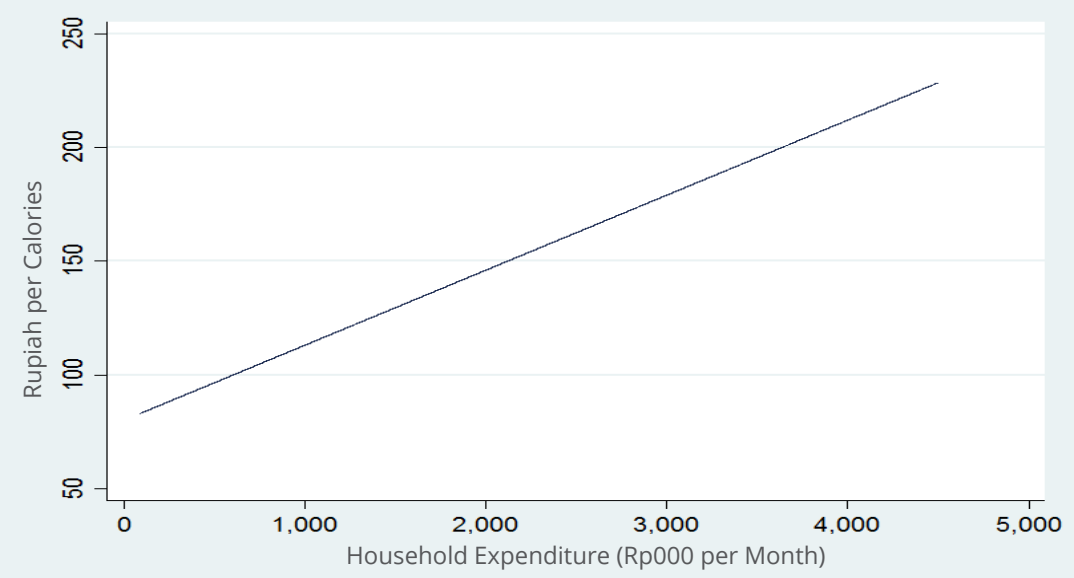
- Data collection in developing countries like Indonesia encounters difficulties in obtaining information on income for various reasons:
    - The respondents usually refrain from disclosing their actual income for fear of consequences from providing information on, among other things, taxes.
    - Around 60 per cent of the Indonesian people work in the informal sector with daily income and without an accurate income reporting basis. In addition, not all workers in the formal sector report accurately, nor hold an NPWP as the income tax basis.

4.1. Calculation of Temporary Poverty Line and Determination of the Reference Population

The first stage in the calculation to be undertaken by BPS in calculating the poverty line is determining the reference population group.

Determining the reference population is important in the calculation of poverty line in Indonesia as it will affect the extent of the poverty line. Selecting the reference population in the wealthy household group will result in a poverty line with a high value. This is because each household has a way of fulfilling the calorie requirement of 2,100 calories per day. In the wealthy household group, they will choose a food combination which leads to the calorie level of 2,100 calories which is totally different from the middle household group. The food group combination chosen will highly depend on the household's income level, therefore, the price per calorie consumed by a household is strongly correlated with its income level. Figure 4.1 shows the relationship between price per unit of calorie consumed and the household expenditure per capita per month obtained from the results of an estimation based on the Susenas data of March 2017. The above figure shows that the higher expenditure of a household, the higher the price paid for consuming one calorie unit.

Figure 4.1: Relation Between the Price per Unit of Calorie Consumed and Household Expenditure



In calculating the poverty line, BPS selects different reference populations. Table 4.1 summarises the reference group information used by BPS between 2014 and 2017. For example, in 2014, BPS chose the household group in percentile 8 (7.98 per cent) to percentile 28 (27.98 per cent) in the urban areas and the household group in percentile 13 (13.18 per cent) to percentile 33 (33.18 per cent) in rural areas. By using such groups, the poverty line is calculated. In 2014, the poverty rate reached 8.34 per cent in urban areas and 14.17 per cent in rural areas.

Table 4.1: Reference Population and Poverty Rate (2014-2017)

Year	Region	Reference Population Percentile		Poverty
		Lower Limit	Upper Limit	Rate
2014	**Urban**	7.98%	27.98%	**8.34%**
	Rural	13.18%	33.18%	**14.17%**
	Total	11.59%	31.59%	**11.25%**
2015	**Urban**	8.06%	28.06%	**8.29%**
	Rural	12.72%	32.72%	**14.21%**
	Total	10.37%	30.37%	**11.22%**
20016	**Urban**	5.86%	25.86%	**7.79%**
	Rural	10.11%	30.11%	**14.11%**
	Total	8.71%	28.71%	**10.86%**
2017	**Urban**	7.40%	27.40%	**7.72%**
	Rural	14.77%	34.77%	**13.93%**
	Total	11.61%	31.61%	**10.64%**

As shown in the above table, the reference groups used by BPS in calculating the poverty line vary and inconsistent and cannot be compared between periods. From the government's perspective, the changing reference population will lead to difficulties in evaluating the effectiveness of social assistance programs. It will be difficult for the government to identify the success of a social assistance program in reducing poverty or whether poverty decreased due to the selection of reference groups that are different from the previous period.

Before identifying the reference population in the calculation of poverty rate, BPS calculates an intermediate indicator, namely the temporary poverty line (Garis Kemiskinan Sementara: GKS). To calculate the GKS, BPS combines the poverty line information in the previous period and the inflation rate information in the current period. For example, to calculate poverty in March 2019 (t = March 2019), BPS requires information on the poverty line in the previous period (t-1 = September 2018) and the inflation rate between September 2018 to March 2019. The formula is as follows:

$$GKS_{t,j} = GK_{t-1,ij} \times (1 + \pi_{ij})$$

Subsequently, BPS will search for households in the Susenas data with the household expenditure value equal to the GKS value. These households will become the lower limit households in the reference population. For upper limit households, BPS will select the households with expenditure per capita equal to 20 per cent or more above the GKS value. The household group in between the upper limit and lower limit range is referred to by BPS as the reference population. The calculation of the food poverty line and non-food poverty line that together comprise the poverty line are based on the information contained in this reference population. The formula is as follows:

$$GKS \leq PR \leq GKS + 20\%$$

4.2. The Calculation of Food and Non-Food Poverty Lines

To calculate the food poverty line (Garis Kemiskinan Makanan: GKM), BPS gathers information on the expenditure pattern of the reference population for 52 food commodities. These had been determined as the basic commodities in 1998 and include basic commodities such as, among others, grains, tubers, fish, meat, eggs, milk, vegetables, legumes, fruit, oil, fat, and cigarettes. The GKM is calculated by using the following formula:

$$GKM_{jp} = \sum_{k=1}^{52} P_{jkp} \times Q_{jkp} = \sum_{k=1}^{52} V_{jkp}$$

GKM_{jp} is food poverty line of region *j* (prior to being equalised to 2,100 calories) in provincep. $p\ P_{jkp}$ is the price of commodity *k* in region *j* and province *p* . Q_{jkp} is the average quantity *k* of in region *j* and province *p* . V_{jkp} is the amount of expenditures for commodity in region *k* and *j* province *p* . *j* indicates the region (city and village) and *p* indicates province *p*.

The nominal value of expenditures for those 52 basic commodities will be adjusted to the value of calorie consumption and the target energy adequacy value of 2,100 calories per day per person. Such adjustment is to be made by using the following formula:

$$HK_{jp} = \frac{\sum_{k=1}^{52} V_{jkp}}{\sum_{k=1}^{52} K_{jkp}}; \qquad F_{jp} = \overline{HK_{jp}} \times 2100$$

where K_{jkp} is the calorie for commodity *k* in region *j* and province *p*. HK_{jp} is the average price of calorie for commodity *k* in region *j* and province *p*. F_{jp} is the minimum requirement in region *j* and province *p* , producing energy equal to 2,100 calories per person per day.

The non-food poverty line (*Garis Kemiskinan Non Makanan: GKNM*) is the summation of the minimum value of needs for selected non-food commodities, including housing, clothing, education, and health. The minimum value of needs for each non-food commodity/sub-group is calculated by using the ratio of commodity/sub-group expenditures to the total commodity/sub-group expenditures recorded in Susenas data of consumption module r_{kj}. Such a ratio is obtained from the results of the 2004 Survey of Basic Needs Commodities Package (*Survei Paket Komoditas Kebutuhan Dasar*: SPKKD) in six provinces.

The SPKKD was implemented to gather data on household consumption expenditures for each non-food commodity in a more detailed manner than Susenas data of consumption module. The GKNM is calculated by using the following formula:

$$GKNM_{jp} = \sum_{k=1}^{n} r_{kj} \times V_{jkp}$$

where $GKNM_{jp}$ is the minimum non-food commodity expenditure in region *j* and province *p*. V_{jkp} is the value of expenditure for non-food commodity/sub-group in region and province *p*. r_{kj} is the ratio of expenditures for commodity/sub-group *k* in region *j* .

The poverty line (GK_{jp}) for region *j* and province *p* is the summation of GKM (F_{jp}) in region *j* and province *p* and GKNM ($GKNM_{jp}$) in region *j* and province *p*. The equation is as follows:

$$GK_{jp} = F_{jp} + GKNM_{jp}$$

People having average monthly expenditures per capita lower than the poverty line in region and province are classified as poor (PM_{jp}). The percentage of poor people in province is calculated by using the following formula:

$$\%PM_p = \frac{PM_p}{P_p} \times 100$$

where $\%PM_p$ is the percentage of poor people in province *p*. PM_p is the number of poor people in province *p* and P_p is the total population in province *p* .

The number of poor people at the national level is a summation of the number of poor people at the provincial level which is calculated by using the following formula:

$$PM_I = \sum_{p=1}^{n} PM_p \quad ; \%PM_I = \frac{PM_I}{P_I} \times 100$$

where $\%PM_I$ is the percentage of poor people in Indonesia *I*. PM_I is the number of poor people in Indonesia*I*. $I.P_I$ is the total population in Indonesia *I*.

Section Five: Aspects that Can be Improved in the Poverty Line Calculation Method

5.1 The Use of Poverty Line Formula with Fixed Bundle and Median Price

Out of the six aspects proposed to be improved, two do not indicate the inter-time and inter-region comparability of welfare levels, as well as findings of figures exceeding the reasonable limits (outliers). To improve this aspect, the formula for food poverty line is used by adopting the Laspeyres concept, which considers that the quantity of food commodities within a certain period of time is the same, and the selection of median prices paid by households.

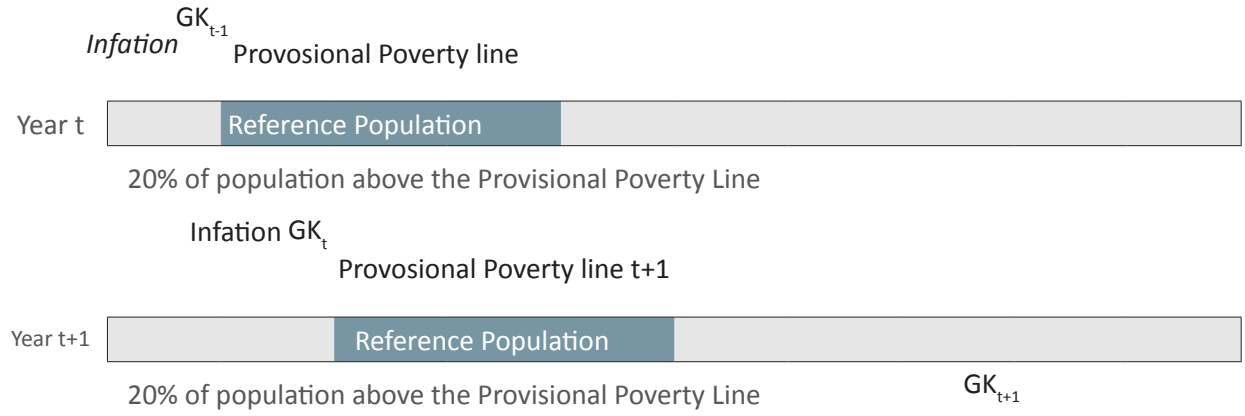
$$GKM_t = \left[\sum_{i=1}^{n} (\tilde{P}_{i,t} \cdot \bar{Q}_{i,td}) \times \frac{2150}{\sum_{i=1}^{n} \bar{C}_{i,td}}\right] + \tilde{P}_{cig,t} \cdot \bar{Q}_{cig,td}$$

GKM_t is food poverty line in year *t*. $\tilde{P}_{(i,t)}$ is the intrinsic median price per unit of commodity *i* in year *t*. $\bar{Q}_{(i,td)}$ is the average consumption quantity for commodity *i* in the base year *td*. $\bar{C}_{(i,td)}$ is the average consumption *i* of calorie in base period $\tilde{P}_{(cig,t)}$ is the median intrinsic price per unit of cigarettes in year *t*.$\bar{Q}_{(cig,td)}$ is the average quantity of cigarettes in base year *td.*

5.2 The Use of Comparable Reference Population

The percentile range in the reference population plays an important role in determining the poverty line. Since 2005, BPS has set the limit of the reference population at 20 percentile above GKS. GKS is calculated by using the poverty line of the previous period adjusted by the inflation rate (Figure 5.1). For example, the poverty line in March 2017 is Rp 374,478. With an inflation rate in the period March-September 2017 of 1.45 per cent, GKS in September 2017 is 1 + 0.0145 multiplied by Rp 374,478, namely Rp 379,907. This figure serves as the lower limit of the reference population, while the upper limit is GKS percentile limit plus 20 per cent.

Figure 5.1: Reference Population Designated Based on Provisional Poverty Line



The aforementioned metod does not provide a clear description of the limit of reference population. In that method, reference population is not clearly defined, depending on its contribution to inflation occuring in the previous period. As a consequence, inflation in the calculation of poverty line is double counted. First is the use of inflation as the basis for the calculation of GKS. Second is the use of nominal price in the recording of household consumption, which means that price changes have already been captured (implicit inflation).

Changes in the percentile of the reference population, whether higher or lower, are very elastic towards changes in poverty line, which affects the size of the poor population. The selection of reference population at a higher percentile tends to result in a higher poverty line. This would still happen even if the calorie content in the food basket is set at 2,100 calories per person per day. This is because there is a positive relationship between the expenditure groups and unit price of calorie being consumed. The higher the per capita expenditures of a person, the higher the unit price of calorie being consumed.

Table 5.1: Anvantages and Disadvantaged Between Static and Dynamics Population references.

Aspect	Static	Dynamic
Reference Population	Decile 1 to decile 3.	± 10 per cent of the population from P0 of the base year.
Designation Period	In the base year.	In the base year.
Advantages	Not depending on poverty rate in a certain period. Easier to be implemented.	More representative for the poor. Does not have any tendency to overestimate because it involves equal proportions above and below the poverty line.
Disadvantages	Most provinces in Indonesia have a poverty rate of below 15 per cent, so it may potentially overestimate. Less representative for the poor in several regions.	Depending on the poverty rate in the base year. Recalculated every change of base year.

5.3 Updating of the Number of Commodities

One criticism of the old food basket (used in the 1998 BPS method) is that it does not include several food commodities deemed essential. Food commodities constituting the components of poverty line have not been changed since 1998. In reality, technological and economic developments occurring in the last twenty years may have potentially instigated changes in people's consumption pattern. For example, a comparison of household consumption levels between 1998 and 2017 indicates that the proportion of grain consumption has fallen by 9.63 per cent, while processed food and drink consumption has risen by 10.46 per cent.

Table 5.2: Changes in Food Consumption Pattern (1998 and 2017)

Group of Commodities	1998 (%)			2017 (%)			Changes (Percentage Point)		
	Urban	Rural	Urban + Rural	Urban	Rural	Urban + Rural	Urban	Rural	Urban + Rural
Food									
Grain	10.63	20.73	15.56	4.34	8.83	5.93	-6.28	-11.91	-9.63
Tubers	0.72	1.29	1.00	0.40	0.85	0.56	-0.32	-0.44	-0.44
Fish	4.74	6.33	5.51	3.42	4.79	3.91	-1.32	-1.54	-1.61
Meat	4.00	3.33	3.67	2.46	2.33	2.41	-1.54	-1.01	-1.26
Eggs and milk	4.16	3.30	3.74	2.88	2.75	2.83	-1.28	-0.55	-0.91
Vegetables	3.52	4.69	4.09	3.42	5.32	4.09	-0.10	0.63	0.00
Legumes	2.25	2.97	2.60	0.95	1.33	1.09	-1.30	-1.64	-1.51
Fruit	3.02	2.58	2.81	2.18	2.25	2.20	-0.84	-0.33	-0.60
Oil and Fat	2.82	4.25	3.52	1.06	1.77	1.31	-1.76	-2.48	-2.20
Beverage materials	2.95	4.57	3.74	1.33	2.23	1.65	-1.62	-2.33	-2.09
Spices	1.53	2.38	1.94	0.80	1.18	0.93	-0.73	-1.20	-1.01
Other consumption	1.46	1.50	1.48	0.93	1.27	1.05	-0.53	-0.23	-0.43
Processed food and beverages	7.52	4.80	6.19	17.48	15.14	16.65	9.97	10.34	10.46
Tobacco and piper betel	**4.35**	**6.46**	**5.38**	**5.06**	**8.63**	**6.33**	**0.72**	**2.17**	**0.95**
Total Food (as % of overall commodity basket)	**53.73**	**69.30**	**61.33**	**46.70**	**58.66**	**50.94**	**-7.03**	**-10.64**	**-10.39**

Source: Susenas 1998 and 2017, processed.

Over the last 20 years, Susenas data indicates that the proportion of non-food expenditures has continued to increase. This increase is quite significant in the sub-group of housing, fuel, lighting, and water, which has increased by 5.66 per cent, as well as for various goods and services which increased by 2.17 per cent. On the other hand, expenditures for clothing including clothes, footwear, and head coverings, has fallen as a proportion of total expenditure by 1.28 per cent. The information used for calculating GKNM, therefore, needs to be updated so that it corresponds to the current condition.

Table 5.3: Changes in Non=Food Consumption Pattern (1998 and 2017)

Group of Commodities	1998 (%)			2017 (%)			Changes (Percentage Point)		
	Urban	Rural	Urban + Rural	Urban	Rural	Urban + Rural	Urban	Rural	Urban + Rural
Non-Food									
Housing, fuel, lighting, and water	23.52	13.08	18.42	26.29	20.06	24.09	2.77	6.98	5.66
Various goods and services	4.86	2.88	3.89	6.97	4.40	6.06	2.11	1.52	2.17
Education Expenses	6.04	2.57	4.35	3.92	2.48	3.41	-2.12	-0.09	-0.94
Medical Costs	2.07	1.80	1.94	2.74	2.36	2.61	0.67	0.56	0.67
Clothes, footwear, and head cover	4.07	4.52	4.29	2.97	3.09	3.01	-1.10	-1.43	-1.28
Non-consumable goods	2.77	3.60	3.17	5.36	4.94	5.21	2.59	1.34	2.04
Utilisation tax and insurance premium	1.52	0.79	1.16	3.23	2.36	2.93	1.71	1.58	1.76
Needs for parties and ceremonies	1.43	1.47	1.45	1.82	1.65	1.76	0.39	0.17	0.31
Total Non-Food (as % of overall commodity basket)	**46.27**	**30.69**	**38.67**	**53.30**	**41.34**	**49.06**	**7.03**	**10.64**	**10.39**

Source: Susenas 1998 and 2017, processed.

5.4 Minimum Per Capita Need for Calorie

The minimum limit of AKG for energy in the calculation of poverty line is still 2,100 calories per person per day. Changes in the types and quality of goods available in the market as well as the forms of people's activities may potentially change the minimum per capita need for calories per day. The 2012 WNPG set an amount of 2,150 calories as the minimum requirement of RDA per person per day.

This minimum limit of RDA was set by considering:

(a) That Susenas data on food consumption uses expenditure method. This means that most of the food expenditures are in a fresh (raw) condition at the purchase level (as purchased), not at the intake or consumption level (as consumed). The difference of food energy purchased and food energy consumed reaches 5-10 per cent because of losses (damaged, rotten, and left-overs).

(b) The difference of needs by 100 calories or only around 5 per cent of energy adequacy will result in a reduction in the poverty line and proportion of poor people. Meanwhile, many parties criticised that poverty line currently used officially is relatively low and needs to be increased.

5.5 Small Number of Samples and Commodity Price Outliers

A number of parties criticised that poverty line commodities are only consumed by less than one per cent of the population in Indonesia (Table 5.4). Meanwhile, a number of commodities are in fact not consumed in several provinces. By using the current commodity baskets of the poverty line, there is a potential bias in

the poverty line calculatiuon process caused by the relatively small number of samples for some of those commodities.

In several periods, such as in the 2015 and 2016 Susenas, there were outliers among the prices of food commodities which led to less accurate data. Table 5.5 presents some examples of ouliers found in the prices of several commodities in East Nusa Tenggara in 2015.

Table 5.4: List of Commodities with Inadequate Samples

Name of Commodity	Minimum Number of Samples	Median Number of Samples	Urban/Rural Province with Samples < 10
Dried cassava	0	1	62
Flank	0	0	59
Beef meat	0	4	53
Shelled corn/Rice	0	4	46
Sticky rice	0	7	42
Pork	0	3	40
Duck eggs	0	7	38
Mango	0	14	25
Milk fish	0	19	22
Tilapia fish	0	26	21
Free-range chicken	1	15	21
Unshelled peanuts	1	18	19
Powdered milk	1	20	18
Palm sugar	1	21	16
Zallaca	1	29	14
Beans	1	42	12
Powdered tea	1	59	10

Source: Susenas March 2017, processed.

Table 5.5: Outliers in the Unit Prices of Commodities in East Nusa Tenggara (2015-16)

Commodity	Unit	Unit Price by Percentile (Rp)								
		P1	P5	P10	P25	P50	P75	P90	P95	P99
Tamarind	gram	3	4	9	15	38	1,000	3,000	8,000	16,667
Salt	gram	1	4	4	5	9	21	450	800	1,000
Coriander/turmeric	gram	20	20	25	45	58	380	3,000	5,000	10,000
Pepper	gram	10	25	45	180	250	900	3,100	8,000	40,000
MSG	gram	11	32	37	50	100	250	1,000	2,000	6,200
Fermented shrimp paste	gram	4	15	15	22	71	200	500	1,000	1,000

Source: Susenas 2015 and 2016, processed.

Section Six: Proposal for Updating Poverty Line Calculation

The National Team for the Acceleration of Poverty Reduction (Tim Nasional Percepatan Penanggulangan Kemiskinan: TNP2K), in cooperation with BPS, the National Development Planning Agency, and the World Bank, has proposed to update the poverty line calculation method. Several aspects of the calculation proposed to be updated are presented in Table 6.1.

Table 6.1: Proposal for Updating the Poverty Line Calculation Method

Aspects	Proposed Improvement
Provisional poverty line (GKS)	Eliminate GKS calculation phase.
Different reference populations	Change reference population. The alternative reference population proposed is population group in decile 1 up to decile 3 and dynamic reference population, namely 10 per cent above and below the poverty line in the base year.
Change of consumption pattern in the food basket	Re-select food commodities to be used in the calculation of poverty line which meet the following criteria: • Commodities deemed essential. • Commodities consumed by 50-60 per cent of the reference population. • Commodities having calorie value higher than zero.
Non-food Poverty Line (GKNM) calculation method	Indirect approach is calculating non-food consumption by applying a statistical approach. One advantage of the indirect method is that it is simpler and can capture a wider range of non-food needs. As an indirect method, though, it may include expenditures on alcohol, tobacco, lotteries, certain religious ceremonies, and other categories that might be deemed (rightly or wrongly) inappropriate as constituents of a poverty line designed to measure ìbasic needs. Non-food consumption estimate is the difference between the total per capita expenditures of households in the reference population and the proportion of expenditures for food.
Minimum per capita calorie needs per day	• Minister of Health Regulation No. 75/2013 on AKG sets out that the minimum calorie need is 2,150 calories per capita per day. • Calculated the poverty line by comparing the use of the amounts of 2,150 and 2,100 calories per capita per day as the minimum calorie needs.
Too limited samples	Several solutions to such issue include among others: • Re-select commodities in the poverty line baskets. • Increase the number of Susenas samples. • Combine regions higher than province. • In this concept, several neighbouring provinces are to be combined in one zone so that they have one single poverty line. • Information and the results of simulation by using zoning approach are still being calculated by the World Bank. The results are to be conveyed on the next occasion.

6.1 Reference Population

The use of GKS is deemed unnecessary in determining reference population. The review team has proposed two alternatives for the selection of reference population, namely using decile 1-3; or percentile ±10 per cent of poverty rate (P0) in the year prior to base year (Figures 6.1 and 6.2).

Figure 6.1: Use of the Reference Population in Decile 1-3

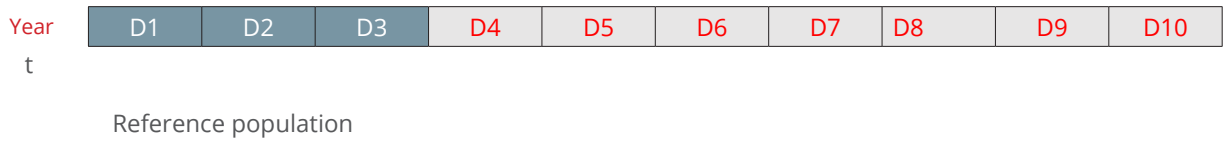
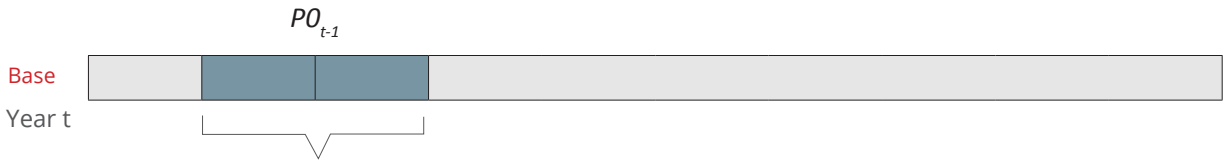


Figure 6.2: Use of Reference Population in Percentile of ± 10 Per Cent of P0 in the Year Prior to the Base Year



The advantage of using the reference population in decile 1-3 is that the determination of such a range does not depend on the previous year and is more consistent if compared to interim one. Use of this range does not, however, offer adequate representation of poor people in several regions having a poverty rate of less than 15 per cent, so measuring poverty in this range would potentially result in a figure beyond the expectation.

Use of the reference population in percentile ±10 per cent of the poverty rate in the year prior to the base year also has pluses and minuses. The advantage of this approach is that it is more representative of the poor in regions because it considers the differences in poverty rate across regions. Determining the reference population in this range still depends, however, on the poverty rate of the previous period. For example, if the base year selected is 2017, P0 used is 2016. In addition, this approach also has a weakness with regard to consistency in the determination of range. If the P0 of a province is less than 10 per cent, the reference population used is decile 1-2.

6.2 Updating of Food Poverty Line and Calories

Poverty Line Calculation Method: Food Commodity Basket

To accommodate changes in the food consumption pattern of the poor population in the last two decades, the poverty line food commodity basket needs to be update**d.** The commodity basket is updated by considering

the following criteria: (a) having calories (not zero); (b) having consumption (not zero) in all provinces, both in rural and urban areas; (c) constituting essential food in several regions; and (d) constituting essential food in certain times (seasonal).

Poverty Line Calculation Method: Calorie Value

The poverty Line is calculated by adding the weighted average expenditures for food commodities and multiplying them by the calorie multiplying factor. The food group value of 2,150 calories per capita per day is proposed based on the results of the 2012 WNPG review setting the aforementioned calorie value as the minimum level of RDA. Furthermore, cigarettes remain to be categorised as a food commodity, but expenditures for cigarettes are not included in the calculation with the calorie multiplying factor.

6.3 Non-Food Poverty Line Calculation Method

The proposed GKNM calculation is by using an indirect method based on the CBN approach developed by Ravallion (1998). CBN is based on the assumption that human beings will need to fulfill non-food basic needs to be able to perform their normal activities–such as the need for clothing, housing, and health, as well as the social need for participating in the community, such as schools and work, after they have fulfilled their needs for food to survive. Accordingly, the hierarchy of the fulfillment of basic needs is started with the fulfillment of the needs for food to survive, continued with the fulfillment of needs for non-basic food and other needs. Technically, GKNM can be estimated by using regression for the Engel curve of food proportion.

Lower Limit: The food poverty line is obtained by estimating the total expenditures of households whose total expenditures are equal to the food poverty line. The equation is as follows:

$$\frac{FS_i}{TC_i} = \alpha + \beta_1 log\left[\frac{TC_i}{FPL_i}\right] + \beta_2 log\left[\frac{TC_i}{FPL_i}\right]^2 + \gamma \cdot d_i + \epsilon_i$$

where FS_i is the proportion of food expenditures of householdi *i.*TC_i is the total expenditures of household *i.* FPL_i is food poverty line related to household *i.* d_i is dummy variable describing the location of the province as well as urban or rural areas where household *i* is located. The poverty line *PL* will be obtained by using the following formula:

$$PL = FPL \cdot [2 - (\alpha + \gamma)]$$

Lower limit of Non Food Poverty line : The value of the non-food poverty line is obtained by estimating the value of non-food expenditures in households whose value of expenditures is equal to the food poverty line:

$$\log(NF_i) = \alpha + \beta_1 log[\,F_i] + \beta_2 log[F_i]^2 + \cdots + \beta_n log[F_i]^n + \gamma \cdot d_i + \epsilon_i$$

where F_i is the total food expenditures of household *i*. NF_i is the total non-food expenditures of household *i*. d_i is a dummy variable describing the location of the province and by urban or rural areas where household is *i* located. Non-food poverty line will be obtained by putting F_i component in the forementioned model.

6.4 Use of the Real Method

Comparability Over Time and Between Regions

The poverty line should ideally be calculated by considering comparability over time and between regions. The current poverty line calculation does not include a comparison of prosperity levels over time and between regions because changes in poverty line may be caused by changes in the amount of goods and/or the prices of goods consumed. It is proposed to use the real approach concept of Laspeyres to use the quantities of goods and services that are deemed to be the same in several periods. In this approach, changes in poverty line in two such periods have been normalised by using an index of costs of living or price index. The change of base year can be made periodically in accordance with the agreement.

This approach has several advantages, among others:

(a) The use of the same quantities between times will result in a value of poverty that can be compared between times and between regions.
(b) Poverty line calculation is conducted only in the base year after being normalised by using the index of costs of living or index of prices. The poverty line in the subsequent period is to be calculated only by adjusting poverty line in the base year with inflation.
(c) It makes it easier for the government to evaluate the impacts of social protection programs on poverty alleviation.

Trends in the poverty line and poverty rate can be predicted by using the inflation rate published by BPS.

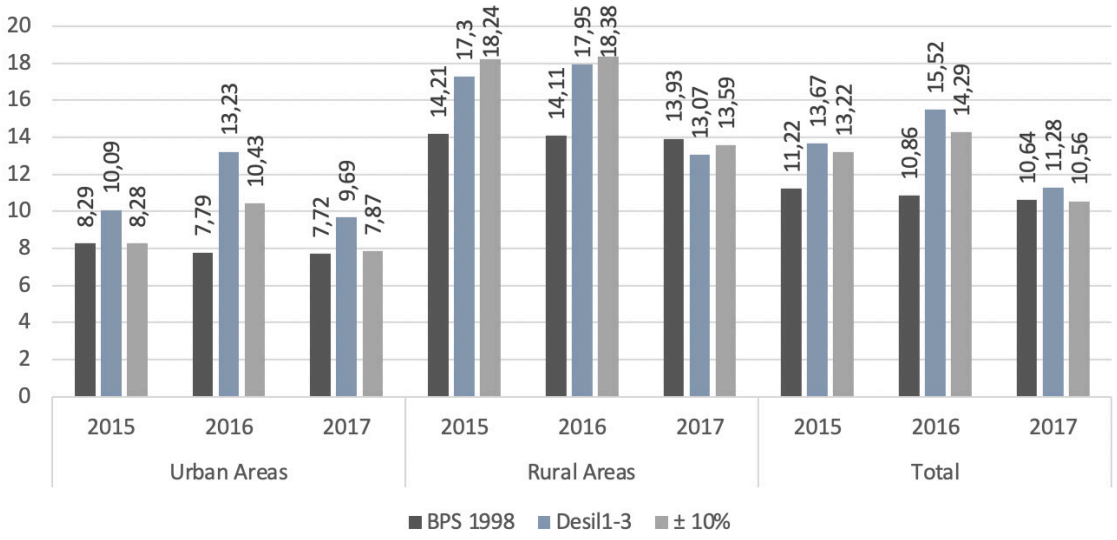
Section Seven: Simulation of Poverty Indicator Calculation

Use of the poverty line calculation simulation based on the above scenario for two reference populations–in decile 1-3 and ±10 per cent of P0 in the base year–results in a higher poverty line than the one released by BPS. In urban areas, the use of reference population in decile 1-3 results in a poverty rate which is higher than the use of reference population of ±10 per cent of P0 in the year prior to the base year. Meanwhile, in rural areas, the use of reference population of ±10 per cent of the initial P0 results in a poverty rate which is slightly higher than the use of reference population in decile 1-3.

Table 7.1: Results of Poverty Line Simulation (2015-2017)

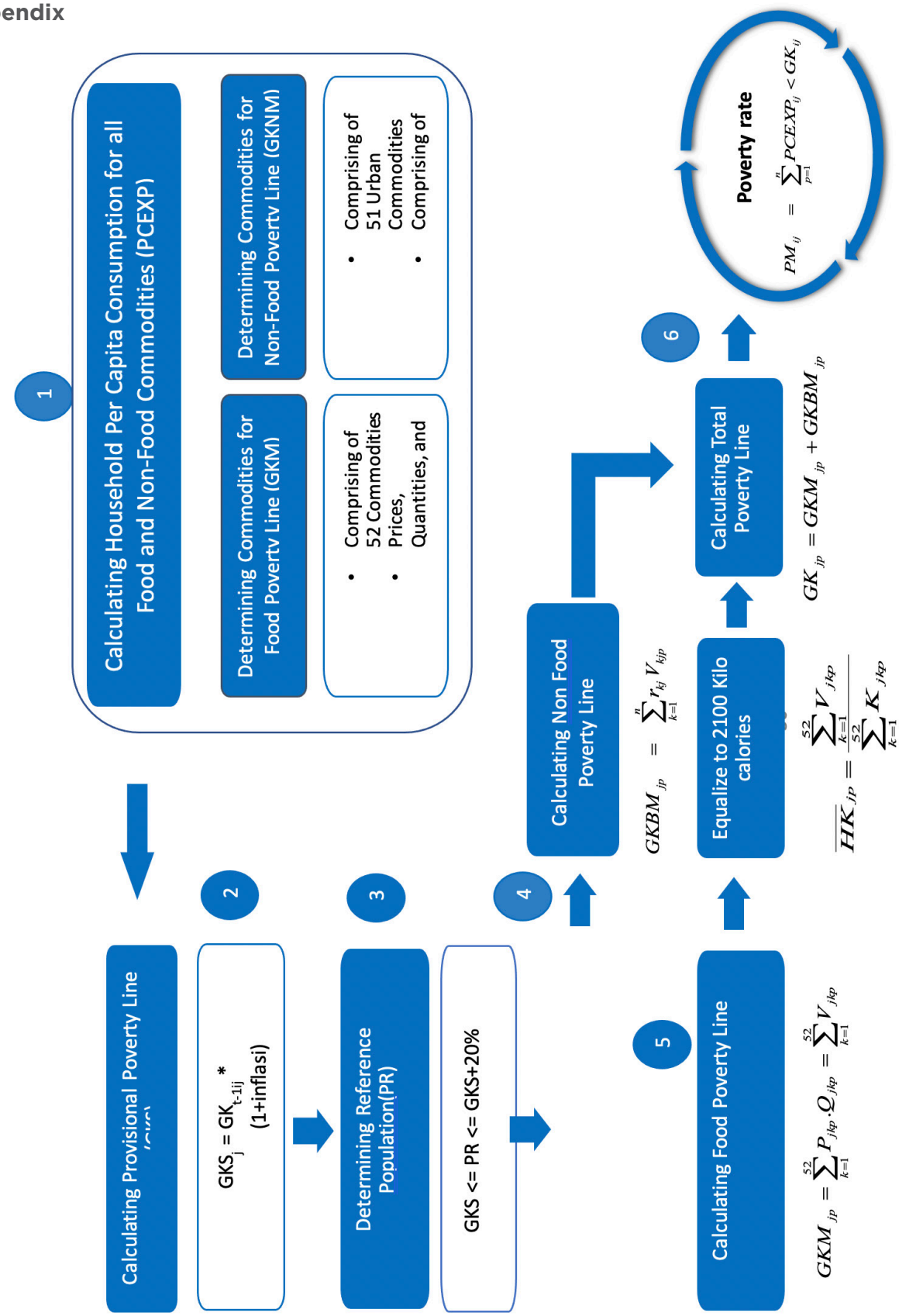
	Urban Areas			Rural Areas			Total		
Year	2015	2016	2017	2015	2016	2017	2015	2016	2017
BPS 1998	342,541	364,527	385,621	317,881	343,647	361,496	330,776	354,386	374,477
Reference Population	**Urban Areas: Simulation Value (Rp/Capita)**			**Rural Areas: Simulation Value (Rp/Capita)**			**Total: Simulation Value (Rp/Capita)**		
Decile 1-3	364,050	417,861	414,791	334,211	367,821	356,355	349,259	393,559	387,320
±10%	343,314	393,016	390,832	338,419	369,417	357,063	340,888	381,555	374,957
Reference Population	Urban Areas: Percentage Difference (%)			Rural Areas: Percentage Difference (%)			Total: Percentage Difference (%)		
Decile 1-3	6.28	14.63	7.56	5.14	7.03	-1.42	5.59	11.05	3.43
±10%	0.23	7.82	1.35	6.46	7.50	-1.23	3.06	7.67	0.13

Figure 7.1: Results of Simulation of Poverty Rates (%) (2015-2017)



Appendix

Figure 1A.1: Technical Flow of Poverty Line and Poverty Rate Calculations with BPS Method of 1998



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