



Multidimensional Poverty: Identification of Deprivation Characteristics of Papua's Population Poverty in 2020

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Abstract

Papua is a growing province with rich potential yet has the highest rate of poverty and lowest rank of HDI in Indonesia. As poverty has been measured limited on monetary alone, anti-poverty programs and policies have become limited. Although the first goal of the SDGs clearly states that poverty is a multidimensional problem. Thus, measuring multidimensional poverty in Papua is needed. This study uses a multidimensional poverty formulation (MPI) with the 2019 Seychelles framework compiled by OPHI and the Seychelles National Bureau of Statistics in four dimensions: Decent Living Standards, Health, Education, and Employment. Considering data availability, not all indicators are available in the March 2020 SUSENAS data, so a four-dimensional approach in 13 indicators is carried out to calculate multidimensional poverty in Papua. As a result, the percentage of Papuans who experienced multidimensional poverty (H) was 71.2 percent, with the intensity (A) as 47.3 percent. The results show 0.337 points in MPI (M₀), meaning that the average deprivation experienced by all residents in Papua Province is 33.7 percent of the 13 indicators from MPI. The dimensions with the most significant contribution are health (0.301), then employment (0.266), education (0.258), and a decent standard of living (0.175). Based on area classification, there is an imbalance between the contribution of multidimensional poverty at urban and rural levels with 0.220 and 0.780. This study found that Papuans experienced multidimensional poverty, the most deprived in the health dimension and indicators of school completion at least SMA or equivalent.

Keywords: deprivation; MPI; multidimensional poverty; Papua

1. Introduction

Sustainable Development Goals (SDGs) clearly state that poverty is more than just a lack of money. Understanding poverty in monetary terms alone ignores the vulnerabilities beyond income or expenditure. An accurate definition of poverty must consider all the deprivations people in poverty face across all areas. Sen (1981); Shorrocks & Townsend (1980); Streeten (1981) highlighted that the well-being of an individual is dependent on many dimensions of human life, such as housing, education, life expectancy, and income is just one of these dimensions. Monetary poverty alone is not sufficient to explain poverty.

Poverty measurement in Indonesia for the last two decades used the concept of the basic needs approach. The idea sees poverty as an inability from an economic point of view to meet basic food and non-food needs as measured in household consumption. Using monetary attributes alone falls short of capturing all deprivations poor households face. In recent years, multidimensional poverty measurement has made the trend following SDG's agenda on eradicating poverty in all its forms and dimensions.

As one of its largest provinces in Indonesia, Papua Province is a growing region with rich natural resources and is privileged by being granted special autonomy. Massive development of basic

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infrastructure is going underway in Papua also helped the economic growth in recent years. Although all the efforts the government has put into action, Papua still has the lowest poverty rate in Indonesia over the last decade. In March 2020, the percentage of poor people in Papua was 26.55% (Statistics Indonesia, 2020a). Although Papua has managed to reduce over 4% of poor for the past decade, the living condition of Papuans still got the lowest rank in many categories. Papua was even bestowed as the province with the lowest Human Development Index (HDI) in Indonesia. The non-monetary indicators, such as health (childbirth process), education (illiterate), housing, drinking water, sanitation, cooking fuel, and assets ownership, remain in Papua. Thus, the problem of poverty in Papua needs to be understood as the inability to achieve a minimum standard of living that is not limited to economic conditions alone but in more multifaceted areas of deprivation.

So far, the problem of poverty has been trapped by a narrow range of indicators, so poverty reduction strategies have become limited as well (Budiantoro et al., 2013). Since 2010, the United National Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI) have initiated a new poverty measurement through the Multidimensional Poverty Index (MPI), a multidimensional poverty measurement approach with the primary objective of photographing poverty conditions more holistically. This approach complements the traditional economic monetary policy by Statistics Indonesia, used to calculate poverty in Indonesia, including Papua.

Measurement of poverty with MPI is expected to provide a solution to the problem of poverty because it offers a broader perspective on viewing poverty. Multidimensional poverty portrays poverty from various dimensions such as quality of life, education, health, and employment. Thus, the anti-poverty programs and policies of the Papuan government will be more appropriate to increase the effectiveness of poverty alleviation programs in Papua because they have clear indicators in determining the success of the program.

There have been many studies about multidimensional poverty, starting with the seminal works of Shorrocks & Townsend (1980), Sen (1981), and Kwadzo (2010), that have devised different approaches to understanding poverty without relying on money alone. Amartya Sen in Budiantoro et al. (2013) criticizes the poverty measurement approach using monetary analysis, even though many other factors cause individuals and households to be deprived of poverty, such as access to education and health services and inadequate financial capabilities. Irawan et al. (2000) revealed that absolute poverty covers broad aspects ranging from low living standards, poor health levels, low levels of education, and food insecurity.

Alkire and Foster's Method (AFM) has been used in many studies for measuring multidimensional poverty, such as in Pakistan, Europe, and Sub-Saharan Africa. Those studies show multidimensional poverty incidence is significantly higher than monetary poverty incidence, which is consumption-based. This study also verifies that consumption alone does not sufficiently explain the deprivations faced by the poor. In 2014, Alkire et al. (2014) measured multidimensional poverty incidence in Indonesia. They use three dimensions: education, health, and standard of living. Wardhana (2010) also estimated the multidimensional poverty case in Indonesia and compared it to monetary poverty. He uses three dimensions, i.e., health, education, and living standard. This study reveals that the human assets in health and education contribute more than physical assets or living standards.

In practice, multidimensional poverty measurement has been modified from the original method. Hanandita & Tampubolon (2016) changed the dimensions of living with income. Health changed indicators of child mortality and nutrition with indicators of morbidity and mortality (length of illness and cause of death), and education from school participation as an indicator of illiteracy. Furthermore, Sumarto & De Silva (2014) modified the health dimension of the Alkire-Foster method by adding vaccine and birth attendant indicators and removing nutritional indicators.

In enriching the scope of dimensions in calculating multidimensional poverty in Papua, this study adopts the formulation in measuring multidimensional poverty (MPI) with the 2019 Seychelles MPI framework compiled by the Oxford Poverty and Human Development Initiative (OPHI) and National Bureau of Statistics of Seychelles in four dimensions, namely Decent Living Standards, Health, Education, and Employment. UNDP and OPHI, in measuring the MPI, refer to three dimensions and an additional one dimension to the 2019 Seychelles MPI, namely:

- a. Dimensions of Decent Living Standard
Poverty makes households unable to meet the standard quality of life following the SDGs. The first indicator of the dimension of a decent living standard is the density of houses. A household is considered poor if more than two persons per bedroom. The second indicator is housing. If a household does not have adequate walls, floors, or housing conditions, the household is considered poor. The third indicator is electricity. Households are classified as deficient if they have no electricity connection or are cut it off in the last 12 months. The fourth indicator is drinking water. If a household does not have access to proper drinking water or has been cut off in the last 12 months, it is considered poor. The last indicator, the sixth, is a crime. If a household member has experienced a crime in the last 12 months, it is considered poor.
- b. Dimension of Health
Poverty causes household health degradation. There are four indicators in the health dimension: malnutrition, obesity, narcotics/alcohol abuse, and early pregnancy. A household is considered poor if there are household members who are malnourished, most household members are obese, there are household members who are narcotics users or alcohol abusers, and there are household members who experienced pregnancy in their teens in the last five years.

- c. Dimension of Education
Poverty prevents households from getting a good education. A household is considered poor if members of the household are of school age who are not in school and have not received a high school education.
- d. Dimension of Employment
Poverty prevents households from having decent jobs. The three indicators on the employment dimension in the 2019 Seychelles MPI are the same workforce indicators on the SDGs. A household is considered poor if there are household members aged 15 years and over who are unemployed, and work in the informal sector. There are household members aged 15-24 years who are not working, not attending school, or attending training.

Thus, the authors propose using National Social and Economic Survey (Susenas) data conducted by Statistics Indonesia (BPS) every semester. It covers all provinces in Indonesia, so this research explores multidimensional poverty in Papua using the most available and most suitable data that represent actual Papua conditions well. However, not all these indicators are available in the March 2020 Susenas data. For example, the March 2020 Susenas data did not include obesity, drug and alcohol use, and teenage pregnancy. For this reason, the dimensions of health were compiled consisting of indicators of nutritional adequacy, ownership of health insurance, and immunization of children under five. In detail, the adjusted framework for the formulation of the multidimensional poverty index version of OPHI & National Bureau of Statistics of Seychelles (2020) is described in Table 1.

Table 1: MPI Dimensions and Indicators (OPHI & National Bureau of Statistics of Seychelles, 2020)

Dimension	Indicators	Deprived if
Decent Living Standard (A)	Adequate living space (A1)	average living area <7.2 m ² (Statistics Indonesia, 2019)
	Decent housing standard (A2)	unfit for occupancy if it does not have walls, roofs, and floors according to the criteria for a liveable house (Statistics Indonesia, 2015)
	A decent standard of living (A3)	the house is not electrified
	Decent drinking water (A4)	Does not have a proper drinking source according to Statistics Indonesia standards (2014)
	Crime Victim (A5)	For at least one year have been a victim of a criminal case
Health (B)	Nutritional Adequacy (B1)	Calorie intake is less than 2100 kcal and or protein is less than 57 grams per capita per day (Boer, 2017)
	Health insurance ownership (B2)	Not one household member has health insurance
	Immunization (B3)	At least one toddler in the household has received immunizations once
Education (C)	School Participation (C1)	There are children aged 7-18 years who have never/do not go to school anymore
	Minimum education level is up or equivalent to high school(C2)	There are people aged >= 18 years who did not complete education equivalent to high school or equivalent
Employment (D)	Unemployment (D1)	There are people aged >= 15 years who do not work
	Informal sector employment(D2)	There are working people who work in the informal sector with the ILO concept (Nazara, 2010)
	Not in Education, Employment, or Training (NEET) (D3)	There are residents aged 15-24 years who do not work, do not go to school, do not take care of the household, and do not carry out other activities other than personal activities during the past week (Irawati, 2019)

The dimensions and indicators used in this study are the development of the method of (Alkire et al., 2014). The purpose of using indicators that have been developed is to expand the scope of the multidimensional dimension of poverty. This consideration is based on the fact that there are still many other dimensions or indicators that are closely related to multidimensional poverty and are rarely included in the calculation, such as employment, living standard, social relations, environmental conditions related to illness, availability of free time, family harmony, democratic freedom, security conditions (Appelbaum 2001; Henry et al., 2004; Kim et al., 2013; Sharma & Adhikari 2020; Zucker & Weiner 1993). Although The World Bank has introduced the understanding of multidimensional poverty over the last decade, it is recently that the concept of multidimensional poverty has begun to be included among policymakers and decision-makers in Indonesia. Additionally, there has not been any detailed research for measuring multidimensional poverty in Papua in recent years. This paper intends to identify the deprivation characteristics of the poor in Papua using the modified Alkire-Foster method.

2. Research Methods

This study has four dimensions and 13 indicators for calculating multidimensional poverty in Papua Province in 2020. The dimensions and indicators used are detailed in Table 1 in the research framework. The source used in this research is data from the March 2020 National Socio-Economic Survey conducted by Statistics Indonesia.

The sample selection in the survey used a two-stage stratification technique with a sample framework of the 2020 Population Census results covering around 720,000 census blocks, each census block containing ten households. In the first stage, 40 percent of the census blocks were selected from the population census master frame by probability proportional to size (PPS) with the number of households resulting from the SP2010 in each stratum in the district. Next, several n census blocks are selected according to a systematic allocation in each urban/rural strata per district/city. Prior to sampling, an implicit stratification of the census block was carried out based on welfare strata. The second stage systematically selected ten households updated systematically with implicit stratification according to KRT education and the presence of ART under five and nine months pregnant. The sample of 10 households was then used, both as a Susenas sample and measuring nutritional status. Household updating is done when updating Susenas. Specifically for Papua, the number of samples covered in the March 2020 SUSENAS is 15,240 households spread over 29 districts and cities.

The data collection instrument is a questionnaire consisting of two types: the KOR module (social) and the KP module (economic). The KOR module contains basic information about household members such as type of education, occupation, migration, mastery of information technology, health complaints, ownership of health insurance, housing information, and other information. The KP module includes household members' food consumption, non-food expenditures, and household income/receipts. Survey officers conducted direct interviews with representative household members using the two questionnaires for two to three hours per household.

The calculation of the multidimensional poverty index uses the Alkire-Foster method of calculating the Multidimensional Poverty Index (MPI). The stages of calculating this method are as follows (Alkire et al., 2014; Sumargo & Simanjuntak, 2019):

a. Selecting the unit of analysis

The unit of analysis used can be individuals, households, communities, clinics, schools, villages, etc. In this study, the unit of analysis is the individual.

b. Choose dimensions

The freely chosen dimensions are carried out based on survey data, research data, consensus results (e.g., SDGs), national or regional policies, etc.

c. Selecting indicators

Indicators can be selected based on two rules: accuracy, which prioritizes many indicators so that the analysis can become the basis of policy, or parsimony, which uses

d. Set deprivation cutoff

The intersection point is needed for each indicator to identify the unit analysis that the indicator is deprived of.

e. Determine the weight of each dimension and indicator

Weighers consist of two, namely equal-weighted and unequal weighted. In this study, equal-weighted.

f. Calculate the deprivation score (c_i) experienced by each unit of analysis using equation 1.

$$c_i = \sum_{i=1}^d w_i I_i \quad 1$$

I_i is deprivation, zero if not deprived and one if deprived. w_i is the weight of the I variable with $\sum w_i = 1$

g. Setting the second intersection (k)

Alkire Foster set the intersection point (k) at 1/3. This is useful for determining the number of deprived indicators that can identify the unit of analysis experiencing multidimensional poverty or not.

h. Applying the second intersection point (k) to get the second poverty line.

The i -th unit of analysis will be considered poor if $c_i \geq k$. Otherwise, it is not considered poor, and all information is replaced with zero.

Counting H (multidimensional poverty headcount) by using equation 2:

$$H = \frac{q}{n} \quad 2$$

i. H is the proportion of the multidimensional poor population to the total population, q is the multidimensional poor population, and n is the total population.

j. Calculation of A (average poverty gap) by using equation 3.

$$A = \frac{\sum_{i=1}^q c_i k}{q} \tag{3}$$

ci(k) is the deprivation score of poor individuals.

k. Counting Mo (*adjusted multidimensional poverty*) by using equation 4.

$$M_0 = H.A \tag{4}$$

In this study, the multidimensional poverty index used the Stata/MP 15.0 software. Before doing the calculations, it is necessary to install the mpi packages. After that, the syntax used in calculating MPI in this study is as follows:

mpi d1(A1 A2 A3 A4 A5) d2(B1 B2 B3) d3(C1 C2) d4(D1 D2 D3) w1(0.05 0.05 0.05 0.05 0.05) w2 (0.083 0.083 0.083) w3 (0.125 0.125) w4 (0.083 0.083 0.083), cutoff (0.33), [pweight= weind]

MPI calculation for each area classification:

mpi d1(A1 A2 A3 A4 A5) d2(B1 B2 B3) d3(C1 C2) d4(D1 D2 D3) w1(0.05 0.05 0.05 0.05 0.05) w2 (0.083 0.083 0.083) w3 (0.125 0.125) w4 (0.083 0.083 0.083), cutoff (0.33) by (KLAS), [pweight= weind]

MPI calculation for each regency/city:

mpi d1(A1 A2 A3 A4 A5) d2(B1 B2 B3) d3(C1 C2) d4(D1 D2 D3) w1(0.05 0.05 0.05 0.05 0.05) w2 (0.083 0.083 0.083) w3 (0.125 0.125) w4 (0.083 0.083 0.083), cutoff (0.33) by (KAB), [pweight= weind]

3. Results and Discussions

3.1 Results

Based on the calculation of poverty using the Alkire-Foster method on the model that has been built (Table 2), it was found that the percentage of the population in Papua Province who experienced multidimensional poverty (H) in March 2020 was 71.2 percent with a multidimensional poverty intensity (A) of 47,3 percent.

Table 2: Multidimensional Poverty Index (MPI) Papua Province.

	Coefficient	Standard Error	95% confidence interval	
H	0.712	0.005	0.700	0.723
A	0.473	0.002	0.469	0.476
M ₀	0.337	0.003	0.330	0.343

Source: Statistics Indonesia, processed from the March 2020 National Social and Economic Survey (SUSENAS)

If the multidimensional poverty level (H) describes the percentage of the population affected by multidimensional poverty, then the multidimensional poverty intensity (A) describes the number of indicators that cause population deprivation. This means that the population of Papua who experiences multidimensional poverty is deprived of around six indicators out of 13 indicators collected in the MPI calculation. The MPI (M₀) calculation results show the figure of 0.337 points. That means the average deprivation experienced by all residents in Papua Province is 33.7 percent of the 13 indicators that make up the Multidimensional Poverty Index.

Multidimensional poverty index values can also be examined for both dimensions and indicators. The value of the multidimensional poverty contribution can show the order of indicators from the most contributing to population deprivation to the minor contribution. Based on Table 3, the dimensions that have the most considerable contribution to the multidimensional poverty of the Papuan population are the dimensions of health (0.301), followed by the dimensions of employment (0.266) and education (0.258), and finally, the dimension of decent living standards (0.175).

Although the overall health dimension has the highest contribution in the preparation of the multidimensional poverty index, when traced to indicators, the most significant indicator is the indicator for completion of education equivalent to high school or higher (0.188) from the education dimension, followed by the nutritional adequacy indicator (0.159) from the health dimension. In addition, the informal sector indicator on the employment dimension also has a significant role in multidimensional poverty with a score of 0.156 points.

When compared at the regional classification level, there is a disparity between the contribution of multidimensional poverty at the urban and rural levels. Based on Alkire Foster's calculations, the contribution of multidimensional poverty in urban areas is only 0.220, while in rural areas, it is up to 0.780 (Figure 1).

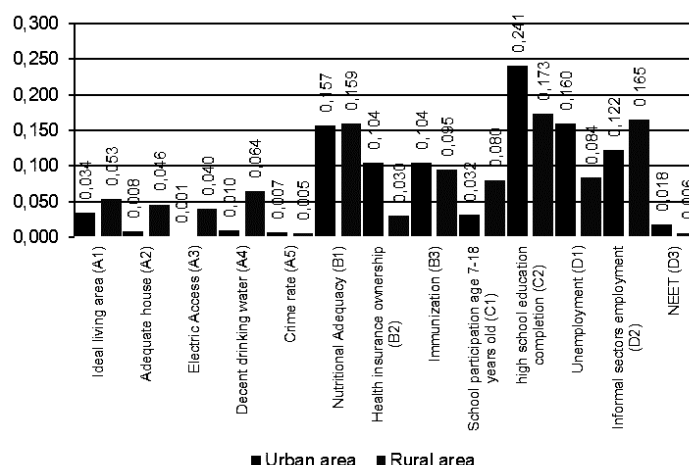


Figure 1. MPI Contribution based on Urban and Rural Area Classification in Papua Province, March 2020

Table 3: Multidimensional Poverty Index (MPI) Papua Province.

Dimension	M ₀	Indicators	M ₀
Decent Living Standard (A)	0.175	Ideal living area (A1)	0.049
		Adequate house (A2)	0.038
		Electric Access (A3)	0.031
		Decent drinking water (A4)	0.052
		Crime rate (A5)	0.005
Health (B)	0.301	Nutritional Adequacy (B1)	0.159
		Health insurance ownership (B2)	0.046
		Immunization (B3)	0.096
Education (C)	0.258	School participation age 7-18 years old (C1)	0.070
		Level of completion of education equivalent to high school or above (C2)	0.188
Employment (D)	0.266	Unemployment (D1)	0.101
		Informal sectors employment (D2)	0.156
		NEET (D3)	0.009
Total	1.000	Total	1.000

Source: Statistics Indonesia, processed from the March 2020 National Social and Economic Survey (SUSENAS)

An enormous contribution in calculating multidimensional poverty in urban and rural areas is the indicator of completion of education equivalent to high school or above, nutritional adequacy, employment in the informal sector, unemployment, and immunization. There are also distinctive multidimensional characteristics of poverty in the two regional classifications. For example, urban residents are more deprived of unemployment indicators, while rural areas are not too large. On the other hand, rural areas are more deprived of the contribution of the informal sector employment indicators, while urban contribution is more diminutive. In addition, there is a striking multidimensional deprivation of poverty in rural areas, such as school participation aged 7-18 years and several indicators incorporated in the dimensions of a decent quality of life.

Figure 2 is a thematic map showing the multidimensional poverty index at the regencies/city level in Papua Province. MPI is divided into three quantile groups based on the thematic, namely pink, red, and dark red. There are ten regencies with relatively low multidimensional poverty (pink). Furthermore, ten regions have a fairly medium multidimensional poverty index (red) and nine with a relatively high index value (dark red). Four regions with MPI values greater than 0.400 points are Mappi Regency (0.465), Yahukimo Regency (0.462), Puncak Regency (0.447), and Nduga Regency (0.440). In general, areas with a high level of multidimensional poverty are primarily concentrated in the central region of Papua.

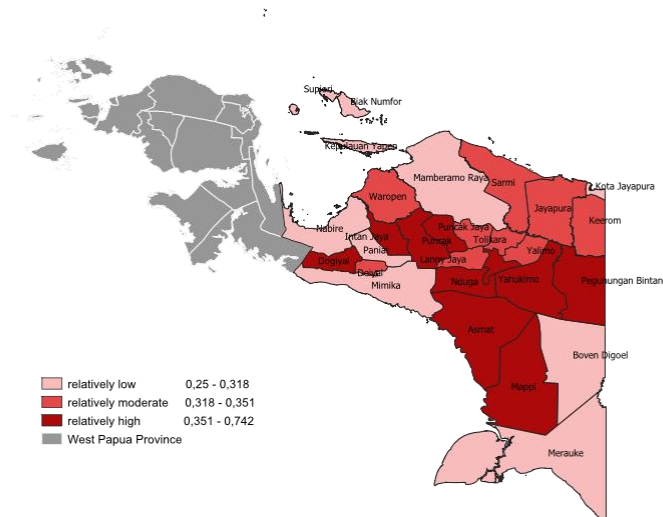


Figure 2. Multidimensional Poverty Index Thematic Map

Papua Province has the highest number of poor people in Indonesia. BPS noted that the number of poor people in Papua Province in March 2020 was 26.55 percent (Statistics Indonesia, 2020). This figure is prominent compared to the national poverty percentage, which is only 10.08 percent.

However, in this study, the number of people experiencing multidimensional poverty far exceeds monetary poverty (Po). This study found that approximately 2.435 million people in Papua experience multidimensional poverty. Compared to economic deprivation, the number of poor people calculated by MPI is 2.67 times greater than monetary poverty (Figure 3).

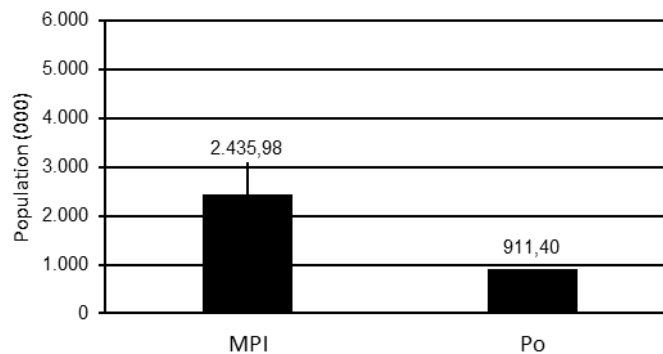


Figure 3. Comparison of the Number of Poor Populations by Two Poverty Indicators (in thousand people), March 2020

Differences in the number of poor people also occur at the regency/city level in Papua Province. Figure 4. provides comprehensive information on comparing the number of poor people in Papua between poverty calculation methods. The graph shows that the lowest number of multidimensionally poor people is in Supiori Regency with 14.98 thousand people, while the highest number is in Yahukimo Regency with 174.70 thousand people.

In general, the number of poor people in multidimensionality is more significant in the range of 1.5 to almost six times than the number of poor people in calculating monetary poverty. The regency has an almost negligible difference in the number of poor people in Paniai Regency at 1.86 times, and the largest in Jayapura Regency, which reached 5.81 times.

3.2 Discussions

This study is the first to detail the characteristics of deprivation experienced by Papuans in poverty using the Alkire-Foster method in 2020 since 2014, calculated by MPI Indonesia in collaboration with OPHI. The scope of the dimensions and indicators has also been expanded to cover more aspects of poverty deprivation that Papuans may experience. Several findings of the deprivation characteristics of the Papuan population will be explained one by one in the discussion of this study.

The results of the 2020 MPI calculation for Papua Province are 0.337 with a multidimensional poverty intensity of 0.473, and the percentage of the poor population is 71.2 percent. Compared to the situation in 2014, the MPI of Papua Province was 0.366 with a multidimensional poverty intensity of 0.493 and a poor population of 74.2 percent (MPI Indonesia, 2015). Although the two indices cannot be directly compared

due to differences in the coverage of dimensions and indicators, they can roughly show a decline in the poverty rate of Papua Province from 2014 to 2020.

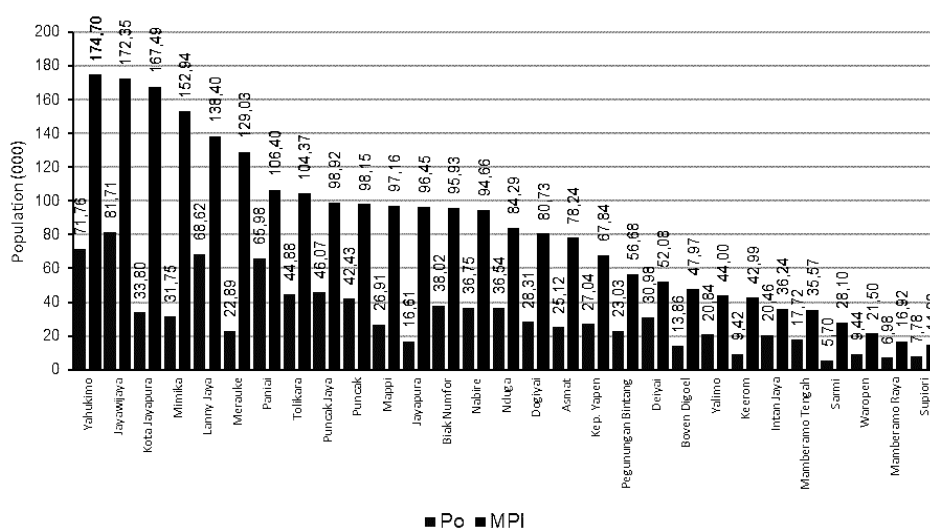


Figure 4. Comparison of the Percentage of the Poor Population of Two Poverty Indicators in Regencies/Cities in Papua Province (in thousand people), March 2020

Many people have assumed that education is the key to breaking poverty. In line with this opinion, this study finds that education is a factor that has an immense contribution to multidimensional poverty. The indicator for the level of completion of education at least high school equivalent by the population aged 18 years and over has contributed up to 18.8 percent of the poverty index, followed by indicators of nutritional adequacy (15.9 percent) and informal sector employment (14.8 percent).

Research by Awan et al. (2011) explained that educational attainment harms poverty in Pakistan. This is indicated by the reduced possibility of a person being poor if someone has a higher level of education. Plus, higher education is accompanied by a higher income than someone with lower education.

Furthermore, although education is not directly related to a person's level of well-being, education is the most crucial vertical mobility tool. Education is an investment and an opportunity to compete in getting a better life in the future (Ustama, 2010). Borjas (2016) on employment theory explains that someone willing to exchange his income today for education hopes to get payment in the future.

The education indicator independently has the highest significance. Still, in terms of dimensions, deprivation in the health dimension has the highest contribution to multidimensional poverty in Papua by more than a third (0.301). This finding is in line with Hidayat et al. (2020), who found that the health variable is one of the three components of the Human Development Index (HDI) that has the most influence in reducing poverty. In other words, the greater the health deprivation of the population in Papua Province will impact the rapid increase in multidimensional poverty.

The differences in the poor characteristics in urban-rural areas are also a concern in this study. The contribution of the unemployment indicator in urban areas (16.0 percent) is almost twice that of its contribution in rural areas (8.4 percent). The researcher argues that the agricultural sector in Papua Province, especially in rural areas, has a significant role in absorbing labor and reducing unemployment.

Statistics Indonesia (2021) noted that the Agriculture, Forestry, and Fisheries Sectors could absorb 69.10 percent of the workforce aged 15 years and over in Papua Province. This sector has the highest number of workers, followed by the trade and repair sector, accounting for 7.61 percent. The undeveloped agricultural industry in urban areas reduces the opportunity for the unemployed to find employment in the agricultural sector, thus causing the widening contribution of the unemployment indicator in multidimensional poverty in urban areas.

Of course, urban areas are not parts where the population is deprived of poverty, and rural residents also experience it in the informal employment sector. The contribution of the indicator of the rural population to informal sector employment is 16.5 percent, while the urban population is slightly smaller at 12.2 percent. Although it has a positive effect in reducing unemployment, the agricultural sector also has a negative effect in increasing the deprivation of the informal sector in rural areas. GTZ (Gesellschaft fur Technische Zusammenarbeit) and Bappenas in Nazara (2010) state that the informal sector brings income that tends to be very low, and poverty is the key. The agricultural sector, which is the informal sector, produces low added value, resulting in low income (Arham et al., 2020), and has a low level of productivity (Shilpi & Emran, 2016).

Returning to the multidimensional poverty index without the urban-rural classification, the researcher highlights that unemployment is not among the three indicators that have the most considerable contribution to the multidimensional poverty index. This is because the contribution of other indicators (individual education, nutritional adequacy, and employment in the informal sector) has a higher role.

In their research, Hidayat et al. (2020) found that unemployment did not significantly affect poverty. This effect is not significant because, in this study, almost half of the unemployed come from middle to upper economic families. Frances in Probosiwani (2016) emphasized that the unemployment indicator is not a sufficient measure of poverty because, in general, unemployed people are in better condition while the poor are not unemployed. The researcher argues that keeping someone unemployed in a reasonably prosperous family is possible, but it is almost impossible to keep an unemployed person in a low-income family.

One more thing that needs to be discussed is calculating the poor population using the extensive Alkire Foster method. The difference in the number of poor people from monetary and multidimensional poverty ranges from 1.5 to six times. The reasons for the high multidimensional poverty in Papua are as follows:

First the low level of education of the population of Papua Province in 2020. Based on Statistics Indonesia (2020b), only 29.12 percent of the population in Papua (aged 15 years and over) have completed a high school education equivalent or higher level. This means that 70.88 percent of the people in Papua complete education up to junior secondary level. Half of the population (50.77 percent) only finished elementary school. The low level of education at the high school level exacerbates the contribution of population deprivation to poverty due to education. Especially in the rural areas of Papua, there are still many people aged 7-18 years who are not in school. The contribution of the school participation indicator for children aged 7-18 to the poverty index reached 8.0 percent, while in urban areas, it was only 3.2 percent.

Second, deprivation of nutritional adequacy is the highest in the health dimension. The results of the research data show that around 81,326 percent of the Papuan population experience nutritional adequacy deprivation (see attachment). In other words, most of the population in Papua experience nutritional deficiencies, especially in daily calorie needs and protein adequacy. Malnutrition increases the chance of stunting in children. Papua, along with NTT, NTB, West Java, Central Java, and East Java, are provinces that have regencies with the most stunting cases (Boer, 2017).

Third, rural areas in Papua can be where pockets of poverty are located because poverty contributes to the multidimensional poverty index reaching 78.0 percent (urban 22 percent). In addition to severe deprivation in education, health, and employment, Rural areas are also experiencing complex deprivations of appropriate living standards. The contribution of decent drinking water deprivation reached 6.4 percent, the ideal area of residence was 5.3 percent, adequate housing was 4.6 percent, and housing electricity access reached 4.0 percent. Lack of proper drinking water can complicate the absorption of nutrients into the body, leading to increased cases of malnutrition (Boer, 2017).

4. Conclusion

Based on this research, some conclusions can be drawn: first, the population of Papua Province who is declared poor in multidimensional terms with Alkire-Foster's calculation is the most deprived in the health dimension and indicators of the level of completion education at least high school equivalent. Second, people in rural areas are generally more vulnerable to multidimensional poverty than urban areas. Third, the number of poor people based on the MPI calculation is 2.67 times greater than monetary poverty. This significant difference may be due to the high percentage of the population in Papua Province who only finished education until junior high school, the lack of adequate nutrition, especially calories and protein, and the standard of living of the Papuan population in rural areas. Then, the poverty calculation technique used by the Government of Indonesia is currently considered undercounting, causing the poor population in Papua to be lower than the MPI calculation. This undercounting is caused by the poverty calculation technique approaching only food and non-food household expenditures. At the same time, many social factors that need to be investigated have contributed to the poverty of the Papuan population, such as education level, type of work, unemployment, health insurance ownership, decent housing standards, crime victims, and other factors.

Multidimensional poverty calculation can be an alternative method to point out the poor's deprivation directly. Like Papua, based on the results of this study, both central and local governments should increase and improve educational facilities and teaching staff for secondary schools in Papua to achieve the implementation of 12-year compulsory education in Papua. As for the nutritional adequacy of the population in Papua, which is considered to be still lacking, the government should improve the distribution of food aid for the poor, such as the timely distribution of Rice for the Prosperous Population (RASTRA), and expand the scope of the Non-Cash Food Assistance (BPNT) program to remote villages in Papua. To make this happen, the local government in the Papua region must update the Ministry's Integrated Social Welfare Data (DTKS) from time to time.

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