Spatial Phenomenon of Multidimentional Poverty in Sumatera Island

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Abstract

This research aims to analyze the conditions and developments, and factors affecting the provincial Multidimentional Poverty in Sumatera Island. The analysis methods that used in this research are spatial concepts and non-spatial concepts. The independent variable that used are Open Unemployment Rate, Per-capita Spending Rate, and The Level of Proper Sanitation. Results of this research suggest that Multidimentional Poverty shows a trend that decreases each year. Additionally, there is spatial autocorrelation of Multidimentional Poverty in the Province of Sumatera Island. Based on the estimation result, there is a positive significant effect of Open Unemployment Rate on Multidimentional Poverty without spatial concepts. And also, Per-capita Spending Rate as well as The Level of Proper Sanitation show a negative significant effect on Multidimentional Poverty without spatial concepts.

I. Introduction

Based on data quoted from the Central Statistics Agency (BPS). The average poverty rate in Indonesia for the 2016-2018 period is 10.44%. In 2016 there were 28.01 million or 10.86% of poor people. Then in March 2017 there were 27.77 million or 10.64% of the poor. Meanwhile, in March 2018 there were 25.95 million people or 9.82% of the poor population. It can be seen that within 3 years the government succeeded in reducing the poverty rate from 10.86% to 9.82%. But of course this is very small because in a period of 3 years the poverty rate in Indonesia has only decreased by no more than 2%, and the average poverty rate is still above double digits.

The Indonesian government and other countries in the world have agreed on the Millennium Development Goals (MDGs) in 2000. In the agreement, governments around the world will strive to reduce the poverty rate to 7.5% in 2015. Based on the facts, the target of alleviation poverty agreed in the MDGs did not materialize.

The approach used to measure poverty levels by the Central Statistics Agency is known as the economic approach. Poverty based on this economic approach only looks at one indicator. The indicator that becomes the reference is expenditure per capita per month. This approach is also a reference for almost all countries in the world, where almost all countries in the world use a monetary approach in measuring poverty levels.

The problem of poverty cannot be measured only by using an economic or monetary approach. So far, the existing poverty rate is calculated using a monetary approach or calculation. However, as already mentioned, the problem of poverty is not only a matter of the economy or income, it is only a matter of spending. The problem of poverty is also related to the behavior or characteristics of society such as apathy, surrender, helplessness that makes a person trapped in poverty. Measurement with a monetary approach also does not describe things outside the economy such as health, education, infrastructure, sanitation

and to meet the living needs of the population. Though these factors are quite influential significantly in improving the welfare of the community.

The Sumatra Island has 10 provinces in it, but 4 of them are included in the category of the 12 poorest provinces in Indonesia 2018. They are Aceh, Bengkulu, South Sumatra, and Lampung. With a population of 57,940,351 people on the island of Sumatra (BPS, 2018) making it the second island in Indonesia.

Sumatra Island is also the island with the second largest poverty rate in Indonesia. In 2018 the number of poor people in Sumatra Province touched 5.98 million people, the second largest after Java Island with 13.34 million people. Based on data quoted from BPS, in 2016 to 2018 the highest average number of poor people was in North Sumatra Province with more than 1,350,000 poor people. Meanwhile, Bangka Belitung Province is the province with the lowest average of 72,000 people.

In analyzing poverty, it must include spatial elements. This is because poverty has dependencies, which means that poverty that occurs in a region or region will affect or affect the level of poverty in other regions. Poverty is also a complex problem. Poverty has a spatial dimension because it is caused by external factors such as climate, topology of an area, infrastructure and access to other areas. Poverty is also not a random thing but has a regional pattern. This phenomenon is called the poverty trap where there is a strong relationship between geography and poverty.

Amartya Sen criticized the measurement of the poverty level with an economic approach in general in 1987. According to Sen, the monetary approach cannot represent or describe the whole problem of poverty. According to him, poverty is not only related to purchasing power parity, income or consumption. However, there is a wider dimension of poverty (Budiantoro et al., 2013).

The poverty approach with a new method was introduced by the United National Development Program (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI). In 2010, UNDP and OPHI formed an approach to measure poverty levels called the Multidimensional Poverty Index (MPI). This MPI method has been adjusted by the MDGs targets set by the United Nations (UN). In 2015, UN member states agreed on a new goal called the SDGs (Sustainable Development Goals) as a substitute for the MDGs which are targeted to be achieved by 2030. One of the aspects contained in the SDGs is reducing multidimensional poverty. One of the advantages of multidimensional measurement is that it can explain poverty categories better than ordinary poverty measurements. In addition, this method will provide more comprehensive and accurate results, which are useful for stakeholders to design a policy that is in accordance with the causes or roots of poverty.

There are also several factors that cause poverty, namely, (1) Employment and income, (2) Education, (3) Health, and (4) Expenditure, people with low spending are usually people who are in the poor group (Thurow, 1967). Based on research conducted by Corcoran & Hill (1980), it was found that the number of poverty will decrease if we can reduce the unemployment rate highest poverty rate in Indonesia for the 2016-2018 average. The unemployment rate will have a positive effect on the multidimensional poverty rate. When the unemployment rate increases, it means that there are many people who are not productive so they do not get income. With the loss of income, a person will find it difficult to make ends meet.

Another factor that can affect poverty is food and non-food per capita expenditure per month per year. Based on research conducted by Gan (2013), in 2008 the poverty rate increased in China. This is due to the declining expenditure or consumption of the Chinese people themselves. This is similar to the research conducted by Hurd & Rohwedder

(2017), where the results are obtained if there has been an increase in poverty in Cambridge when people cannot buy basic necessities or necessities of life. Based on data quoted from BPS, on the island of Sumatra in 2018 the Province of the Bangka Belitung Islands became the province with the largest per capita expenditure with IDR 1,574,392 a month, while South Sumatra Province became the province with the lowest per capita expenditure with IDR 970,078 a month. Expenditure per capita has a negative effect on the level of poverty. A person's expenses are a reflection of that person's welfare or income. When someone earns additional income, then that person will increase his expenses. This means that the higher a person's expenditure, the more prosperous that person is.

Another factor is the percentage of households that have access to proper sanitation. One of the goals of the Sustainable Development Goals (SDGs) is the availability of clean water and proper sanitation for every human being. In the targets implemented in the SDGs, there is a link between access to clean water and proper sanitation to poverty and proper sanitation is one of the indicators or factors that can affect a person's quality of life, which in the end each individual will achieve a better life. Meanwhile, according to Rizki & Saleh (2007), improving the quality and availability of drinking water and sanitation can improve welfare population which means reducing poverty. Based on data reported by BPS, in 2018 the Riau Islands Province became the province with the best distribution of access to proper sanitation on Sumatra Island with 85.07%, while Bengkulu Province was the worst with 44.31%, as well as being the province with the second worst distribution of access to proper sanitation in Indonesia after Papua Province with 33.75%. Health is the most valuable asset in life. When a person has proper sanitation, his health will improve because he is protected from diseases or harmful bacteria due to poor sanitation. When a person is healthy, then that person will be able to carry out their daily activities. With a productive person, he will be able to increase his income so that he can avoid poverty.

Based on the explanation above, the purpose of this study is to examine the effect of the unemployment rate, expenditure level, and level of proper sanitation on multidimensional poverty, which is suspected to have spatial relationships between provinces on the island of Sumatra.

II. Review of Literature

2.1 Multidimentional Poverty

Sabine Alkire and James Foster introduced a method or approach to measuring poverty in a multidimensional manner. Alkire and Foster define the poor from the deprivation of a person or the poor. Information based on this deprivation allows poverty to be broken down (eg based on ethnicity, geographic location, gender, or other social groups) to find out what the real causes of poverty are (Alkire, 2015). The advantage of the multidimensional approach is the flexibility to determine the indicators that you want to use. The indicator to be used can refer to conditions or problems experienced by a region or country. The measurement of the multidimensional poverty level in Indonesia uses 3 dimensions, namely health, education, and living standards. The calculation uses 11 indicators that have been designed and developed in such a way by Perkumpulan Prakarsa. These indicators are based on or refer to the SDGs and the 2015-2019 RPJMN.

1) *Sanitation*

The definition of poor with deprivation or sanitation indicators is when the household does not have private sanitation, and also uses latrines other than the goose neck model.

2) *Clean Water*
The poor definition of clean water indicators is a household that does not have a source of clean water other than protected wells, metered pipes, retail pipes, protected springs and the distance from the water source to the septic tank is more than 10 meters.

2) *Midwives Availbility*
The poor definition of midwife indicators is the process of giving birth or giving birth that is not assisted by trained health workers or midwives.

3) *Toddlers Nutritional Intake*
Threshold indicators of nutritional intake for toddlers are toddlers who do not meet 70-220 grams of carbohydrate intake, 15-35 grams of protein, 35-62 grams of fat and 637.5-1600 kcal of energy, which are adjusted to the 0-5 year age group.

4) *Sustainable Education*
The definition of education continuity indicators is households that have school-age children who did not complete their education until senior high school.

5) *Literation Level*
The definition of poor with literacy indicators is a household that has family members of productive age who are not literate or cannot write and read.

6) *Pre-school Services Access*
The definition of indicators of access to pre-school education services is households with pre-school age children who do not have access to pre-school education services.

7) *Lighting Source*
The definition of poor with light source indicators is when a person's household does not have a proper source of lighting or lighting, in this case not electricity.

8) *Energy Fuel for Cooking*
The definition of a fuel/energy indicator for cooking is a household that uses fuel other than electricity and gas for cooking.

9) *Roof, Floor, and Wall*
The poor definition of roof, floor, and wall indicators is a household with the widest roof apart from concrete, tile, shingles, and asbestos. household with the widest floor other than marble, tile, terrazzo, wood, cement, granite.

10) *House Ownership*
The poor definition of house ownership indicator is when a person's household does not have its own house to live. In this case, still contracting or boarding.

2.2 Individual Expenses

Based on the theory put forward by Keynes, when a person's income increases, that person will automatically increase his consumption or expenditure (Mankiw, 2010). This means that if there is an increase in income, there will be a tendency to increase the amount of consumption which means an increase in expenditure.

Engel's law states that the higher a person's non-food expenditure, the higher the welfare of that person. On the other hand, if non-food expenditures are getting smaller, then this shows that a person's level of welfare is decreasing. In addition, based on research conducted by Massaid (2019), the number of poor people will experience changes based on their per capita expenditure.

2.3 Unemployment

Poverty level is influenced by many factors. One of the influencing factors is the unemployment rate. Unemployment is an individual or a person in the labor force who is looking for work at a certain wage level, but cannot get the desired job.

The effects of high unemployment are dire. Unemployment can reduce a person's level of welfare, which is caused by reduced or absent income Sukirno (2011). The lower the income of an individual, the greater the opportunity for an individual to be trapped in poverty.

In his book, Sukirno (2011) suggests that there are several types of unemployment based on circumstances. Among others:

a) Frictional unemployment, is caused because someone is looking for a new job, which is better suited to what he or she wants

b) Structural unemployment, occurs due to economic growth. The causes of structural unemployment include technological developments, progress of the times, and economic decline.

c) Natural unemployment, occurs due to limited vacancies or job availability. Full Employment is a situation when almost 95 percent of the workforce is working. So that the remaining 5 percent of the workforce is called natural unemployment.

d) Conjuncture unemployment, occurs because of a reduction in aggregate demand. Due to the decline in demand, the company was unable to cover production costs. This causes companies to reduce their workforce, resulting in unemployment.

In addition, there is also unemployment which is distinguished based on its characteristics, namely:

a. Open unemployment, is unemployment that occurs because of the increasing growth of the workforce and there are still few jobs, so that many workers do not get jobs.

b. Hidden unemployment, is unemployment where an economic activity (production activity) is carried out by workers whose numbers exceed the amount that should be or exceed existing standards. This unemployment usually occurs in institutions or organizations where a job that can actually be done by one person, but is positioned alone to another person, so that it becomes ineffective.

c. Seasonal unemployment, occurs because of changes in the seasons that exist every year. Seasonal unemployment is common in the agricultural sector. Farmers will be temporarily unemployed while waiting for the harvest period after the planting period.

d. Unemployed underemployed, is caused by a person working under normal working hours. According to BPS (2018), the normal working hours in Indonesia are 35 hours/week, so workers who work less than 35 hours/week are classified as underemployed.

III. Research Method

3.1 Spatial Analytics

This research also using spatial analytics. Spatial analysis is a process involving a number of calculations and evaluation of mathematical logic that is influenced by the location of the object being analyzed. Spatial regression is a method or analytical tool that looks at the relationship or correlation between a variable to another variable by including spatial elements in several locations that are places of observation or objects of observation. In spatial analysis, there are 2 spatial effects, namely spatial dependence and spatial heterogeneity (Anselin, 1998). To see the spatial autocorrelation there are several stages that can be done, the following are the stages:

a) Determination of Spatial Weight W (Location)

Wrepresents spatial weighing based on two approaches, namely the intersection of regional boundaries and distances. Spatial weights are in the form of a matrix. Spatial weighting matrix is a matrix that expresses the relationship of the observation area measuring n x n and is symbolized by W. In this study the matrix was formed based on the number of districts between provinces in Java and Sulawesi. In this matrix, we will use spatial weights based on the neighboring region approach because the region borders on neighboring criteria based on queen contiguity.

b) Moran Index

Moran index as a tool that can be used to analyze spatial relationships. The Moran index itself consists of two standard and non-standard calculation methods (Wong & Lee, 2005).

$$I = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{S_0 \sum_{i=1}^{n}(x_i - \bar{x})}$$

Where :

I : Moran Index

n : Numbers of place

x_i : Value in i Location

x_j : Value in j Location

$\bar{x}$: Average of total of variables or value

w_{ij}: Unstandardized element between i and j location

c) Local Indicator of Spatial Autocorrelation (LISA)

LISA Is the analysis used which aims to determine regional linkages in particular, Anselin (1998), states that there are 2 requirements in the LISA analysis:

- Each observation shows that there are significant clusters or spatial groups in the observation area.
- The total LISA for all observation areas, is proportional to the global size

LISA aims to determine local groupings that are spatial outliers.

d) Moran Scatterplot

Moran Scatterplot as a tool used to see the relationship between standardized observation values with the average value of neighbors that have been standardized. When combined with a regression line, this can be used to determine the degree of fit and identify outliers. The Moran Scatterplot can be used to identify spatial balance or influence.

Kuadran IV Consists of areas with high multidimensional poverty surrounded by areas with low multidimensional poverty (High-Low)	Kuadran I Consists of areas with high multidimensional poverty surrounded by areas with high multidimensional poverty (High-High).
Kuadran III Consists of areas with low multidimensional poverty surrounded by areas with low multidimensional poverty (Low-Low)	Kuadran IV Consists of areas with low multidimensional poverty surrounded by areas with high multidimensional poverty (Low-High)

3.2 Panel/Pooled Data Regression

Panel data regression is an analysis that combines time series and cross section data models. Panel data regression itself is often referred to as a pooled time series (Widarjono, 2017). Data processing using this estimation technique is carried out using the Fixed Effect Model (FEM) and Random Effect Model (REM). Then the best model can be determined to explain the relationship between the dependent variable and the independent variable using the Chow test and also the Hausman test.

3.3 Choosing The Best Model

There are several methods used to choose the best model, the methods used are Log Likelihood (LL), Akaike Info Criterion (AIC) and Coefficient of Determination (R2) (Widarjono, 2017). However, in principle, to determine which model is more appropriate to describe an observational data, it must be returned to the theory of the underlying problem (Anselin, 1998).

IV. Result and Discussion

4.1 Conditions and Development of Multidimensional Poverty Provinces on the Sumatera Island

Multidimensional poverty levels have differences with monetary poverty. This difference is due to the different indicators used in the measurement of each approach. However, although there are differences in the results between the multidimensional poverty level and monetary poverty, the trend shown by these two approaches is still the same, namely showing a downward trend.

Provinces	Multidimentional Poverty Deprivation 2018 (%)	
Aceh	Drinking Water	86,28
Sumatera Utara	Drinking Water	86,7
Sumatera Barat	Drinking Water	88,47
Riau	Drinking Water	94,97
Jambi	Drinking Water	94,44
Sumatera Selatan	Sanitation	88,24
Bengkulu	Drinking Water	92,92
Lampung	Drinking Water	85,42
Kep. Bangka Belitung	Drinking Water	97,25
Kep. Riau	Drinking Water	86,8

In contrast to the monetary poverty rate, the multidimensional poverty rate in the 2016-2018 period on the island of Sumatra also showed a progressive average decline. At least during these 3 years, the multidimensional poverty rate can fall by almost 5%. Meanwhile, monetary poverty did not show a significant change, which in those 3 years only showed a decrease of less than 1%.

The reduction in the multidimensional poverty rate which is more progressive than monetary poverty means that there is an improvement in the condition of the poor in terms of their ability to live compared to monetary terms. This means that the poor have experienced improvements in aspects of education, health, and living standards. Therefore, the poor experience an increase in welfare better from the aspect of basic needs compared to welfare from the monetary side.

As explained in the previous chapter, multidimensional poverty has many indicators to be calculated. This indicator is divided into 3 dimensions, namely Education, Health, and Standard of Living. From the multidimensional poverty level, it can be seen how a region is deprived. In multidimensional poverty, deprivation is a deficiency or can be interpreted as a type of poverty experienced by a person. For example, Lampung Province is deprived of drinking water. This means that the multidimensional population in Lampung Province is 'poor' in terms of drinking water indicators or health dimensions.

9 out of 10 provinces on the Sumatera Island are deprived in the standard of living dimension, especially drinking water. The Province of the Bangka Belitung Islands is the province with the highest deprivation with 97.25% of the multidimensional poor with drinking water deprivation. This indicates that in almost all provinces in Sumatra, the people consume clean water that does not come from metered taps. In addition, the community also uses drinking water from pumps, protected wells/protected springs that are less than 10 meters from the septic tank. This assumption is used because if the protected spring is less than 10 meters from the septic tank, there is a possibility that drinking water can be contaminated with elements from the septic tank, either in solid or liquid form. For example, in 2017, 33% of the people in North Sumatra Province did not have clean drinking water. This is due to the unavailability of access to good water and proper sanitation. People usually use well water, rivers, or rain that is stored and then used as drinking water.

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The province of South Sumatra is the province with the only sanitation deprivation. A person is said to be deprived in sanitation indicators if he does not have public, shared, or private defecation facilities and the type of toilet is not a goose-neck. Sanitation problems cannot be separated from the character, culture and habits of the people themselves. So, do not feel reluctant to continue to take care of the habit of defecating, bathing in the river area.

4.2 Estimation Result

The selection of the best spatial model is done by looking at the Lagrange Multiplier (LM) as the initial identification. Lagrange Multiplier (LM) is used to detect more detailed spatial effects using lag, error, or both. If the LM lag and LM error show insignificant results, it can be concluded that there is no spatial relationship. Spatial linkage test was carried out on queen contiguity weighting.

Based on the test, conclusions can be drawn from each of the Lagrange Multiplier (LM) tests as follows:
a) SARMA, Accepts Ho because p-value (0.4467) > α (0.10). So it can be concluded that there is no spatial dependence in the model, so it is necessary to form a lag and error model.
b) SAR, Accept Ho because p-value (0.2367) > (0.10). So it can be concluded that there is no spatial dependence in the model.
c) SEM, Accepting Ho because p-value (0.7257) > (0.10). So it can be concluded that there is no spatial dependence in the model.

Because the three forming models do not show a spatial relationship, then the spatial regression analysis cannot be used because it does not meet the requirements, namely one of the models accepts Ha. Based on the Lagrange Multiplier (LM) test, this study will use a model or equation with ordinary regression without including spatial elements in it to see the effect of the independent variable on the dependent variable.

To analyze how the influence of the unemployment rate, per capita expenditure, and the level of proper sanitation on the multidimensional poverty level without a spatial concept, first a test is conducted to determine the best model between Common Effect, Fixed Effect, and Random Effect using the Chow and Hausmann tests.

Test	Cross Section Stat	Prob	Conclusion
Chow test	39,819	0,0000	Ho rejected
Hausman test	17,238	0,0006	Ho rejected

Based on the two tests, it can be concluded that the best model is the fixed effect model

$$KMLTD_{it} = 18,97 + 1,28 PNGRN_{it} - 0,205 PNGLRN_{it} - 0,188 SNTS_{it} + \varepsilon_i$$

The multidimensional poverty that occurred on the island of Sumatra showed a significant decline in the 2016-2018 period. This indicates that there is an increase in the welfare of the community, especially in aspects of health, education, and living standards each year.

One of the factors that affect the level of multidimensional poverty is the Open Unemployment Rate (X1) which shows a significant positive effect on the level of multidimensional poverty. The coefficient of the open unemployment rate shows a value of 1.28. This means that if the Open Unemployment Rate increases by 1%, the Multidimensional Poverty Rate will increase by 1.28%.The value of 1.28 can be interpreted if if the Open Unemployment Rate increases by 1%, then the Multidimensional Poverty Rate will increase by 1.28%.

The open unemployment rate variable has an average that tends to decrease during the 3 years, although it is not too significant. This is the same as what happened to multidimensional poverty, where during the 3 years the average had decreased but was more significant. Unemployment can reduce a person's level of welfare, which is caused by reduced or absent income (Sukirno, 2011). When a person is unemployed, then he will lose income. With the loss of this income, then he will not be able to meet the needs of his life so trapped in poverty.

This decline in the unemployment rate can occur because the government uses revenues from fiscal policy for various developments. This development will later create new job opportunities thereby reducing the unemployment rate. One example of development carried out is infrastructure development. In 2016, the length of the national road on the island of Sumatra was only 13,119 km. Meanwhile, in 2018 the length of the national road increased to 13,707 km. From the existence of infrastructure development, it will be able to move the real sector economy so as to reduce the unemployment rate.

In addition, the Per capita Expenditure Level (X2) shows a significant negative effect on the multidimensional poverty level. The coefficient of the open unemployment rate shows a value of –0.205 which means that if Per capita Expenditure increases by 1 unit (thousand Rupiah), then the Multidimensional Poverty Rate will decrease by 0.205%. The level of expenditure is a reflection of the level of income. With an increase in a person's income, it means that a person can fulfill their needs well. With the fulfillment of the needs of life, it will improve the quality of one's life, so that it can make a person out of poverty.

The per capita expenditure variable has an average that tends to increase during the 3 years. This is in contrast to what happened to multidimensional poverty, where for the past 3 years the average has decreased.

Based on the theory put forward by Keynes, if someone gets additional income, then naturally, he will increase consumption but the amount of this additional consumption will not be as large as his additional income (Mankiw, 2010). Based on this, it can be concluded that per capita expenditure has a significant negative effect on the multidimensional poverty level of the province on the island of Sumatra.

The thing that makes this happen is because the economy on the island of Sumatra continues to show an increase every year. Even in 2018, Sumatra Island provided the second largest contribution after Java Island to Gross Domestic Product, amounting to 21.58%. As stated by Engel's Law, an increase in the economy or income will lead to an increase in the level of consumption which means an increase in spending.

The expenditure on food and non-food tends to increase from year to year. This indicates an increase in welfare or an increase in income in the community so that it increases consumption.

But what is of concern is when the average public expenditure on non-food becomes higher than food expenditure. A person will increase consumption of food in line with the increase in income that a person receives. However, within certain limits, an increase in income will not be followed by an increase in people's consumption of food. This happens because a person's food consumption needs will reach a peak or saturation point. In this condition, a person will not increase food consumption anymore, and divert additional income for non-food expenditures such as education, health, recreation, and others (Suryani & Rachman, 2008).

The level of proper sanitation (X3) is one of the variables used to represent the dimensions of multidimensional poverty. What is obtained shows a significant negative effect on the level of multidimensional poverty. The coefficient of the open unemployment rate shows a value of 0.188 which means that if the Adequate Sanitation Level increases by 1 percent, the Multidimensional Poverty Rate will decrease by 0.188 percent. This can happen because the level of sanitation is one of the indicators or forming factors of health. And health is an important factor in the economy. With a good level of sanitation, a person will be protected from diseases that can reduce health that will hamper activities and reduce productivity. With a decrease in a person's productivity, he will lose income to meet his needs. That way, a person will be trapped in poverty because they cannot fulfill their needs.

The variable level of proper sanitation has an average that tends to increase during the 3 years, although it showed a decline in 2017. This is in contrast to what happened to multidimensional poverty, where for 3 years the average had decreased. Based on the poverty theory put forward by Nurske in Bass (2009), poverty is a number of factors that influence each other in such a way that it causes a situation in which a country will become poor and will continue to experience many difficulties to achieve a higher level of development. According to Nurske, people's low income levels, which are caused by low productivity levels, cause people's ability to save is also low. With this it can be concluded that the level of proper sanitation has a significant negative effect on the multidimensional poverty level of the province on the island of Sumatra.

This indicates that the government, especially local governments, has succeeded in implementing the national policies and strategies for sanitation development contained in the RPJMN (National Medium Term Development Plan). Of course this can happen because of good coordination between the central government and local governments. The distribution of authority related to the sanitation development program is regulated in PP no. 38 of 2007, concerning the Distribution of Authority for Sanitation Development.

Multidimensional poverty in each province on the island of Sumatra has differences. But overall, all provinces on the island of Sumatra showed a significant reduction in the multidimensional poverty rate during the 2016-2018 period. This is due to several factors such as development, increased budget allocations for health and education, as well as government acceleration in social programs. The results of this study indicate that

improvements in income, education, health, and living standards will reduce the level of multidimensional poverty.

Sumatra Island, as the island with the second largest population in Indonesia after Java, recorded an average multidimensional poverty rate of 8.76% in 2018. This figure is still above the national average of 8.17% in the same year. Seeing this, the implication is that the government needs to pay special attention to handling multidimensional poverty on the island of Sumatra, so that the level of multidimensional poverty can be reduced.

On the other hand, the multidimensional poverty rate on the island of Sumatra has shown a significant decline every year during the 2016-2018 period. During this period, the multidimensional poverty rate on the island of Sumatra could decrease from 13.16% in 2016 to 8.76% in 2018. This shows that there have been efforts by the government, both central and regional, to reduce poverty, especially multidimensional poverty.

One of the things that have a real direct impact on reducing the multidimensional poverty rate is the decrease in the open unemployment rate in the same period. The open unemployment rate on the island of Sumatra in 2018 showed a figure of 5.01%. With the decline in the unemployment rate, it means that many people who were previously unemployed then find work. With a job, someone will get an income. With the income he has, he can fulfill his life needs and other needs such as health, and education. With the fulfillment of his life needs, a person can get out of the poverty line.

Based on this, the implication is that in an effort to reduce the level of multidimensional poverty, the government must prioritize development programs that can create new job opportunities so as to reduce the unemployment rate. In addition, the government must also expand the acceleration of social programs that are right on target.

The value of 0.188 can be interpreted if the Level of Adequate Sanitation increases by 1%, then the Multidimensional Poverty Rate will decrease by 0.188%.

V. Conclusion

The condition of multidimensional poverty on the island of Sumatra is different from monetary poverty. Multidimensional poverty showed a progressive decline during 2016-2018 which led to significant government policies.

a. There is a spatial relationship of multidimensional poverty on the island of Sumatra. This shows that poverty has dependencies, which means that the level of poverty in an area will affect the level of poverty in areas that are located close to each other or are neighbors.

b. Based on the test, the unemployment variable has a significant positive effect on multidimensional poverty with a coefficient of 1.2801. So it can be concluded that if the unemployment rate increases, it will affect the increase in the multidimensional poverty rate. While the per capita expenditure variable and the level of proper sanitation have a significant negative effect on the poverty level with coefficients of -0.0254 and -0.1881. So it can be concluded that the level of multidimensional poverty will decrease along with the increase in per capita expenditure and the level of proper sanitation.

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