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Environmental Sanitation, Poverty, and Stunting in Indonesia

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Abstract. *The high population growth is not followed by the growth of infrastructure procurement, which causes the phenomenon of excess demand for clean water and sanitation facilities and infrastructure and also currently Environmental Sanitation in Indonesia is still high, poverty is also high so the behavior of hygiene and sanitation poor food, causing infectious diseases accompanied by disorders such as decreased appetite and vomiting. This condition can reduce the nutritional status of children under five and have negative implications for the progress of child growth (stunting). The purpose of this study is to see the relationship between environmental sanitation, poverty, and stunting in 34 provinces in Indonesia for the period 2015-2017. The data used is secondary data during 2015-2017 in 34 provinces in Indonesia. method This uses the analytical approach used is the Granger causality and VAR panel data and spatially uses classic typology. Results: spatially it shows that Indonesia is classified as low stunting and low environmental sanitation (Quadrant III), while in terms of stunting and poverty, it is classified as high stunting and high poverty (Quadrant I)*

Keywords: Environmental Sanitation, Poverty, Stunting, Hygiene, Nutrition

JEL Codes: P46, O1, O11, O15, O18

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1. Introduction

Indonesia is still facing problems with the availability of clean water, drainage and sanitation. The high population growth was not followed by the growth in infrastructure provision, causing the phenomenon of excess demand for clean water and sanitation facilities and infrastructure. As a result, Indonesia faces a high number of health cases related to sanitation (Winters, et al., 2014). Although the government has socialized the importance of sanitation development in the regions, this problem is not easily resolved. One of the obstacles to improving clean water and sanitation infrastructure in Indonesia is the seriousness of local governments in addressing this issue. This challenge is increasing in the era of decentralization, given

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that the spirit of providing clean water and proper sanitation facilities can differ between the central government and local governments (Chong, et al., 2016).

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The problem of stunting is a major challenge for developing countries at this time, in a report released by the World Health Organization (2018) showing that the above problems can reduce stunting rates by as much as 64 percent. Meanwhile, those with lower middle income can only reduce the stunting rate by 24 percent from 2000-2017.

Changes in public consumption patterns occur due to the increasing population size and the rate of urban development. With a fixed land area, this condition results in a decrease in the carrying capacity of the environment. In addition, changes or degradation in the environment is also caused by people's behavior (Susilo, 2012). Activities carried out by households, agriculture and industry certainly cause waste which, if not treated properly, will have an impact on environmental quality degradation (Suriawiria, 2003).

Stunting is referred to as short toddler, which is one of the malnutrition problems experienced by toddlers (Vonaesch et al., 2017). In 2017, 22.2 percent of around 150.8 million children under five were stunted. Even so, this figure has decreased compared to 2000 which reached 32.6 percent. In 2017 more than half of Asian toddlers were stunted, while a third of children under five in Africa. As many as 83.6 million toddlers in Asia were stunted. The proportion of stunting cases is mostly found in South Asia, amounting to 58.7 percent and the lowest in Central Asia at 0.9 percent (World Health Organization, 2018).

Related literature in this study such as Adeyeye, Adebayo-Oyetoro, & Tiamiyu (2017) in their study found that low agricultural productivity lost post-harvest yields, leads to a lack of essential nutritious foods. Low levels of education can be a major factor in malnutrition and changes in the climate cycle that occur can have an impact on food production, causing various diseases, one of which is diarrhea and malnutrition. Another study conducted by Larrea & Kawach (2005) proves that economic inequality is a determining factor for the health level of the population, this study also shows that there is a relationship between economic inequality and child malnutrition. In addition, a study conducted by Kuada (2014) shows that increasing health expenditures in developing nSLara-nSLara can increase productivity values as well as increase social benefits. These benefits have an impact on improving children's health services. Studies also prove that there is a link between health spending and improving children's health and nutrition.

Based on the report on the Achievement of the Millennium development goals in Indonesia in 2010, it shows that access to proper sanitation in urban areas is still at 69.51% of the target to be achieved in 2015 of 76.82%, while the achievement of access to proper sanitation in rural areas is 33.96% of the target 55.55% (Bappenas, 2010) Other studies show that 17 percent of slum dwellers in urban areas do their defecation without using a latrine (WSP). Diarrhea pain is a pain because the environment in Indonesia in 2000-2010 tends to fluctuate, and East Java Province is the second area with the highest frequency of diarrhea outbreaks (Diarrhea Bulletin of the Indonesian Ministry of Health).

The government as a policymaker is certainly one of the parties responsible for the problem of improper sanitation, including in urban areas. According to Parker as quoted by Abdul Wahab & Solichin (2008), the policy is a specific goal or series of actions produced by the government at a certain time in relation to the subject or as a response to a critical situation. According to Thomas Dye in Subarsono (2009) Public policy is whatever the Government chooses to do or not to do. A study conducted by Jr. Richard (2004) shows that environmental sanitation will reduce poverty, the problem of poverty depends on how

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environmental sanitation is. When environmental sanitation is measured in terms of income (consumption) it shows that there is a relationship between environmental sanitation and poverty.

Further studies conducted by Mcgovern et al. (2017) research results show that environmental sanitation causes a reduction in stunting, although it has a relatively small relationship. In contrast to Frimpong, Okoye, & Pongou (2016) stated that the prevalence of stunting increases along with increasing environmental sanitation. In addition, Frimpong et al. (2016) stated that environmental sanitation in developing Country will have an impact on increasing stunting and poverty in developing Country.

The purpose of this study is to see how the relationship between environmental sanitation, poverty and stunting in Indonesia.

2. Methods

Data used in this study is secondary data obtained from the Central Bureau of Statistics. To see as a whole the data was taken from 34 provinces in Indonesia during the 2015-2017 period which was then used as panel data. The analytical approach used in this study is a quantitative and descriptive approach. The descriptive approach used is classical typology analysis and quantitative approach using the Granger panel causality model.

The Klassen typology approach is used to see the condition of environmental sanitation, poverty, and stunting by mapping the areas that require priority in handling stunting. The mapping uses the average percentage of poverty, the average environmental sanitation and the average stunting index from 2015-2017. Areas classified as a high percentage of poverty and stunting, and areas with high environmental sanitation and high stunting are the government's top priorities. The following is the typology class used.

Table 1. Typology Classification between Stunting and Poverty

Stunting (STUN)	Percent of Poverty (POV)	
	$POV_i > POV$	$POV_i < POV$
$STUN_i > STUN$	Priority II	Priority I
$STUN_i < STUN$	Priority III	Priority IV

Where: STUNi is the amount of stunting in the province to i; STUN is the average number of stunting in all provinces; POVi is the percentage of poor people in the province to i; and POV is the average percentage of poor people across the province.

Table 2. Typology Classification between stunting and Environmental Sanitation

Stunting (S)	Percent Environmental Sanitation (SL)	
	$SL_i > SL$	$SL_i < SL$
$STUN_i > STUN$	Priority I	Priority II
$STUN_i < STUN$	Priority IV	Priority III

Where STUNi is the amount of stunting in province to i; STUN is the average number of stunting for all provinces; SLi is the percentage of environmental sanitation in the province to i; and SL is the average

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percentage of environmental sanitation for all provinces. In addition, in this study the approach used is the Granger causality model. Granger (1969) developed a methodology for analyzing causal relationships between time series. Let xt and yt be two stationary series. Furthermore, the model is presented as follows:

$$y_t = \alpha + \sum_{k=1}^{K} \beta_k y_{t-k} + \sum_{k=1}^{K} y_k x_{t-k} + \varepsilon_t \quad (1)$$

This model can be used to test whether x causes y. The basic idea is that if past values of x are significant predictors of the present value of y even when past values of y have been included in the model, then x exerts a causal effect on y. By using equation (1), one can easily test this causality based on the F-test with the following null hypothesis:

$$H_0: y_1 = \cdots = y_k = 0 \quad (2)$$

If H_0 is rejected, it can be concluded that there is a causality of x to y. The variables x and y are of course interchangeable to test for causality in other directions, and it is possible to observe bidirectional causality (also called feedback).

There are several steps before estimating the vector error correction model (VECM), we must ensure that the variables in the VEC model equation are stationary (do not contain unit-root), then look for the optimal lag in the model, and finally carry out cointegration testing. Johansen. The vector error correction model is a development of the VAR model for a time series that is not stationary and has one or more cointegration relationships. The dynamic behavior of VECM can be seen through the response of each dependent variable to the shock of this variable and other dependent variables. There are two approaches to be able to see the characteristics of VECM, namely through the impulse response function and variance decomposition. The VECM model has one equation for each variable (as the dependent variable). VECM is characterized by the inclusion of an error correction term (ECT) element in the model. The general form of VECM with lag length (p-1) is as follows:

$$\Delta EG_{i,t} = \alpha_1 + \beta_1 \Delta EG_{i,t-1} + \gamma_1 \Delta POV_{i,t-1} + \delta_1 \Delta STUN_{i,t-1} + ECT_{i,t-1} + \varepsilon_{1i,t} \quad (2)$$

$$\Delta POV_{i,t} = \alpha_2 + \beta_2 \Delta EG_{i,t-1} + \gamma_2 \Delta POV_{i,t-1} + \delta_2 \Delta STUN_{i,t-1} + ECT_{i,t-1} + \varepsilon_{2i,t} \quad (3)$$

$$\Delta STUN_{i,t} = \alpha_3 + \beta_3 \Delta EG_{i,t-1} + \gamma_3 \Delta POV_{i,t-1} + \delta_3 \Delta STUN_{i,t-1} + ECT_{i,t-1} + \varepsilon_{3i,t} \quad (4)$$

Where: SL is Environmental Sanitation; POV is the level of poverty; STUN is the prevalence of stunting; I am part of every region; t is time-series data; α, β, γ, δ are coefficients in the equation model; and ECT errors are obtained from model equations between SL, POV, and STUN in one lag and are also called error correction terms.

After obtaining the best VEC model, the impulse response function analysis is then carried out to interpret the VECM equation. The impulse response function describes the shock rate from one variable to

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another over a certain period of time, so that it can be seen how long the shock of a variable affects another variable until the effect disappears or returns to equilibrium. Furthermore, we analyze Variance decomposition or also known as forecast error variance decomposition is a tool in the VECM equation to measure the variance error estimate of a variable, namely how much the ability of a variable to explain other variables or the variable itself. By using the VECM approach, it can be seen the proportion of the impact of changes on a variable if it experiences shocks or changes to the variable itself in a period.

3. Results

The average poverty rate in Indonesia during 2015-2017 stands at 10.65 percent. Spatially, it shows that the provinces of Maluku, North Maluku, West Papua, and Papua have relatively high poverty rates with an average poverty rate of more than 16 percent. This is related to relatively high population growth and the lack of infrastructure related to education, health and public welfare. Meanwhile, the regions with low poverty rates are in the provinces of West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan and North Kalimantan with an average of 6 percent.

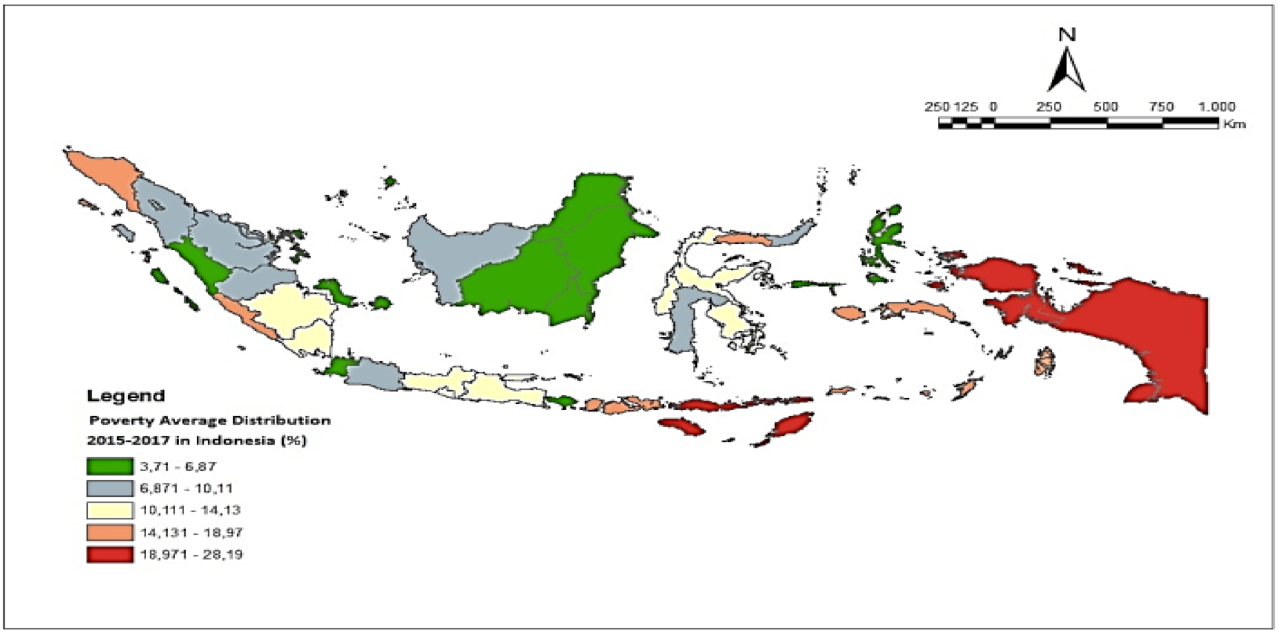

Figure 1. Distribution of average poverty rates in Indonesia (%), 2015-2017
Source: Author calculations using ArcGIS 10.3, 2020

In addition, the average poverty rate in Indonesia during 2015-2017 is 10.65 percent. Spatially, it shows that the provinces of Maluku, North Maluku, West Papua, and Papua have relatively high poverty rates with an average poverty rate of more than 16 percent. This is related to the relatively high inequality of population growth, as well as the lack of infrastructure related to education, health and community welfare. Meanwhile, the regions with low poverty rates are in the provinces of West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan and North Kalimantan with an average of 6 percent.

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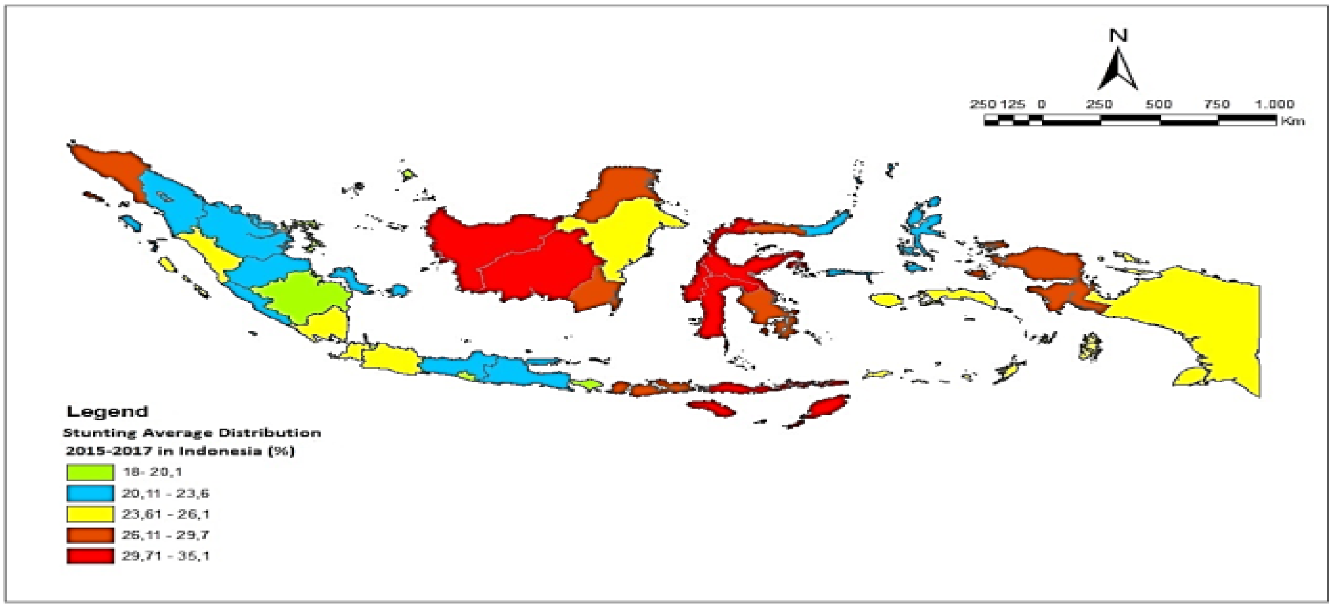

Figure 2 Distribution of average stunting rates in Indonesia (%), 2015-2017
Source: Author calculations using ArcGIS 10.3, 202-

Figure 4 shows that the depth and coverage of malnutrition in 2015-2017 is a widespread stunting rate in Indonesia which ranged from 18 percent to more than 35 percent. When viewed by island, the low stunting rate, which reached between 18-20.10 percent, was found in the provinces of Riau Islands, South Sumatra, Jakarta, Yogyakarta and Bali. Areas with a relatively high stunting rate of between 29.71 - 35.10 percent are in the provinces of East Nusa Tenggara, West Nusa Tenggara, West Kalimantan, Central Kalimantan, Central Sulawesi, Southeast Sulawesi, South Sulawesi, West Sulawesi and Gorontalo. This is related to the low nutritional intake in the first 1,000 days of life, from the fetus to the baby at two years of age. In addition, this condition is also caused by the relatively lack of sanitation facilities, access to clean water, and inadequate environmental hygiene. Poor hygiene conditions make the body have to work extra to fight sources of disease that inhabit the absorption of nutrients. A study conducted by Adewara et al. (2011) show that the quality of clean drinking water has a positive relationship with a decrease in the incidence of diarrhea and mortality in children.

Furthermore, based on the results of the typology mapping of the area between stunting and environmental sanitation which is divided into four quadrants, it can be seen that the first quadrant is inhabited by the provinces of South Sulawesi, NTB, Southeast Sulawesi, North Kalimantan. This shows that Environmental Sanitation can promote faster stunting. Therefore, the central and local governments must perfect programs and policies that promote inclusive Environmental Sanitation, as well as perfect stunting prevention programs and policies. In other words, provinces that occupy the first quadrant are the top priority in stunting prevention programs and policies.

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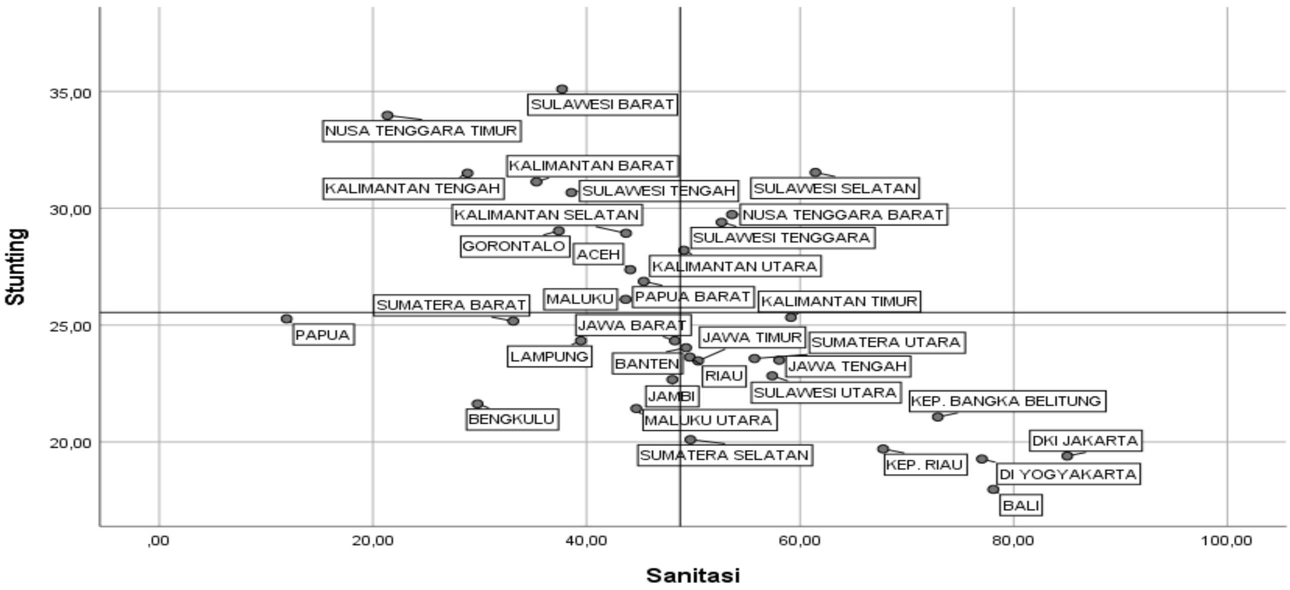

Figure 3 Typology between Environmental Sanitation and stunting, 2015-2017
Source: OALAH Data, 2020

Then, the provinces in Quadrant II are NTT, West Sumatra, West Kalimantan, Central Kalimantan, Central Sulawesi, Gorontalo, Aceh, Maluku, West Papua Province Environmental sanitation average and stunting above the national average. The area categories in Quadrant II are areas with environmental sanitation below the average, and stunting conditions above the national average. Therefore, efforts that need to be made by the central and regional governments in the future are to increase the effectiveness and efficiency of programs and policies in tackling stunting and simultaneously encourage the acceleration of Environmental Sanitation in several leading sectors such as the industrial, mining, and agricultural sectors.

In addition, the provinces in Quadrant III are Papua, West Sumatra, Lampung, West Java, Jambi, North Maluku, Bengkulu, the categories in Quadrant III are areas with environmental sanitation and stunting below the national average. Therefore, the central and local governments need to work more diligently in improving programs and policies to accelerate environmental sanitation inclusively and sustainably, as well as improving and optimizing programs and policies to encourage the reduction of stunting cases.

Meanwhile, the areas in Quadrant IV are Riau, East Java, North Sumatra, Central Java, North Sulawesi, Kep. Bangka Belitung, Riau Islands, Yogyakarta, Bali, DKI Jakarta, South Sumatra, this region shows that the average environmental sanitation condition is above the national average, but stunting cases are above the national average. This condition indicates that the relatively high environmental sanitation has not resulted in a reduction in stunting cases. Therefore, the central and local governments need to improve their programs and policies to encourage programs with *Open Defecation Free. Open Defecation Free* is a condition where people no longer defecate anywhere. Environmental Sanitation can run inclusively and sustainably, on the other hand, the government can overcome and focus on reducing stunting, increasing programs and policies that are right on target in reducing stunting cases.

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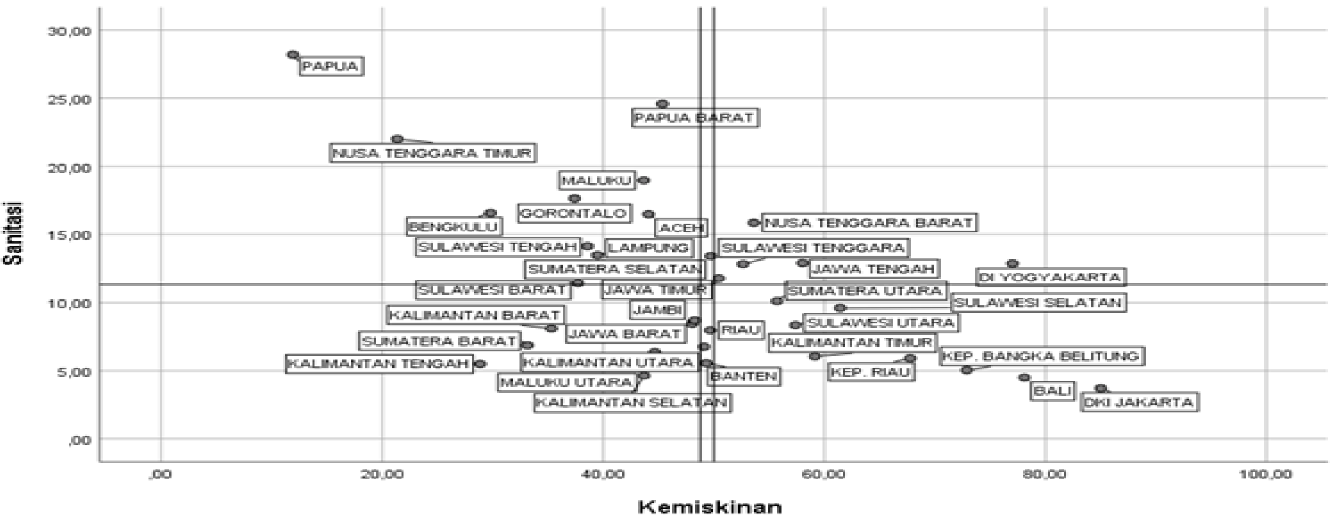
The results of this typology can be interpreted that human resources are economic potentials that have a high productivity value, so that if the prevalence of stunting continues to increase, the potential for economic loss to be felt is also relatively high nationally. Meanwhile, relatively high environmental sanitation has no impact on reducing stunting. However, this has an impact on increasing income inequality which directly results in the widening of the poverty rate in Indonesia.

Furthermore, we carried out mapping with a typology between stunting and poverty. In Figure 4, the typology shows that the regions in quadrant I are West Nusa Tenggara, Southeast Sulawesi, Central Java, Yogyakarta with the category of poverty and stunting above the national average. This means that the poverty that occurs can encourage a higher increase in stunting. Therefore, the central and local governments need to improve programs and policies related to reducing stunting and poverty optimally.



Furthermore, the areas included in quadrant II consist of Papua, West Papua, NTT, Maluku, Gorontalo, Aceh, Bengkulu, Central Sulawesi, Lampung Provinces. , South Sumatra, indicates that the category of regions with a poverty rate below the national average, but stunting above the national average. Therefore, the central and local governments need to improve programs and policies related to poverty reduction and stunting optimally.

Then the areas in quadrant III consist of West Sulawesi, East Java, West Kalimantan, Jambi, West Java, North Kalimantan, Central Kalimantan, South Kalimantan, North Maluku, Riau, Banten, these areas with average conditions of poverty and stunting. below the national average. Poverty reduction and stunting are relatively better, this is the role of the central and local governments in improving programs and policies appropriately to promote poverty reduction and stunting. Therefore, the role of the government must be more optimal and right on target, so that poverty reduction and stunting can be relatively well handled. Meanwhile, the regions in quadrant IV consist of North Sumatra, South Sulawesi, North Sulawesi, Riau, East Kalimantan, Kep. Bangka Belitung, Bali, DKI Jakarta, these regions have a category of average poverty levels that are relatively higher than the national average, but stunting is below the national

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average. This indicates that the programs and policies in reducing stunting are relatively well implemented. Nevertheless, the central and local governments need to be more optimal in improving programs and policies related to poverty reduction, such as increasing human resource capacity with education and training, health quality, and equitable development of basic infrastructure.

Stationary Data Stationary

The generally accepted unit root ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) were adopted for the Cons, GDP, IMP, CPI, and MS tests. testing of the three variables at the level is shown in Table 3:

Table 3 Stationary Test Data

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.03944	0.0012	3	294
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.21946	0.0006	3	294
ADF - Fisher Chi-square	24.6526	0.0004	3	294
PP - Fisher Chi-square	58.7823	0.0000	3	303

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Source: Processed Data, Eviews 2020

The value in brackets in Table 2 is the Prob value. The ADF and PP values are clearly less than the significant value of 5%, which indicates that the five sequences are stationary.

Lag Optimuum.

Lag length is used to determine the dynamics and efficiency of the model. This determination is very important to determine the optimal lag used in research. The lag test results show that Lag 1 is the most optimal lag because of the smallest Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information (HQ). This means that the optimal influence of the variable on other variables occurs within a 3 period time horizon. Optimum lag test results are shown in Table4.

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Table 4 Optimum Lag

VAR Lag Order Selection Criteria
Endogenous variables: D(STUNTING) D(SANITASI) D(POVERTY)
Exogenous variables: C
Date: 11/08/20 Time: 02:24
Sample: 2015 2116
Included observations: 98

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1008.969	NA	186986.5	20.65242	20.73155	20.68443
1	-994.5950	27.57383	167587.4	20.54276	20.85928	20.67078
2	-915.8863	146.1734	40426.00	19.12013	19.67405*	19.34418
3	-898.3072	31.57054*	33980.87*	18.94505*	19.73636	19.26512*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Processed Data, Eviews 2020

Johansen Cointegration

Testing to determine long-term balance and similarity of movement and stability of relationships between variables. The cointegration test in this study used the Johansen Fisher Panel Cointegration Test. An equation is said to be co-integrated on the probability value generated by the provisions if the trace statistical value is greater than the critical value so that there is cointegration between variables. Under these provisions, a cointegration relationship exists Sanitation, poverty, and stunting.

Table 5. Cointegration Johansen

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Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.425917	112.5322	29.79707	0.0000
At most 1 *	0.301794	58.69899	15.49471	0.0000
At most 2 *	0.218002	23.85254	3.841466	0.0000

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.425917	53.83325	21.13162	0.0000
At most 1 *	0.301794	34.84645	14.26460	0.0000
At most 2 *	0.218002	23.85254	3.841466	0.0000

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Processed Data, 2020Eviews

Estimates models Granger causality

Granger causality model estimation results indicate that there is a unidirectional causality flows from poverty to stunting at a significance level of 10 percent, This indicates that a heterogeneous level of poverty can cause stunting in several regions in Indonesia. Similarly, environmental sanitation and poverty have a one-way relationship where environmental sanitation does not affect poverty but poverty affects environmental sanitation. Meanwhile, environmental sanitation and stunting do not have a causal relationship. This means that environmental sanitation is not affected by stunting and vice versa.

Table 6. Estimates of the Granger causality model

Null Hypothesis:	Obs	F-Statistic	Prob.
SANITASI does not Granger Cause STUNTING	34	15.4049	0.0002
STUNTING does not Granger Cause SANITASI		7.96665	0.0058
POVERTY does not Granger Cause STUNTING	34	3.70486	0.0572
STUNTING does not Granger Cause POVERTY		0.07181	0.7893
POVERTY does not Granger Cause SANITASI	34	3.90389	0.0510
SANITASI does not Granger Cause POVERTY		0.40392	0.5266

Source: Processed data, Eviews 2020

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Table 7 Variance Decompotion

Variance Decomposition of D(STUNTING):				
Period	S.E.	D(STUNTING)	D(SANITASI)	D(POVERTY)
1	4.648405	100.0000	0.000000	0.000000
2	4.756692	96.15090	3.683433	0.165664
3	4.836253	94.07413	5.220734	0.705141
4	6.538025	92.99484	6.599156	0.406002
5	6.588590	91.69084	7.857821	0.451339
6	6.658905	90.49212	8.239090	1.268790
7	7.885323	92.14824	6.760813	1.090945
8	7.929720	91.25612	7.609126	1.134750
9	7.996871	90.69351	7.750016	1.556472
10	8.923105	91.64829	7.050125	1.301583
Variance Decomposition of D(SANITASI):				
Period	S.E.	D(STUNTING)	D(SANITASI)	D(POVERTY)
1	11.71071	1.696029	98.30397	0.000000
2	12.12657	4.477868	92.05052	3.471614
3	12.31550	5.140287	89.48604	5.373676
4	14.06921	6.367353	69.34627	24.28638
5	14.37501	7.021027	67.61956	25.35942
6	14.70751	6.862460	65.50563	27.63191
7	15.12206	6.528523	65.03371	28.43776
8	15.47965	6.910463	62.10875	30.98079
9	15.76615	6.768945	60.33877	32.89229
10	16.19545	6.635163	57.80802	35.55681
Variance Decomposition of D(POVERTY):				
Period	S.E.	D(STUNTING)	D(SANITASI)	D(POVERTY)
1	4.718703	1.522156	18.64882	79.82903
2	5.046746	1.393034	19.02175	79.58521
3	5.474824	1.228839	19.18035	79.59081
4	6.214507	1.445318	16.46716	82.08752
5	6.645688	1.457938	16.26191	82.28015
6	7.093508	1.415994	15.86335	82.72065
7	7.522240	1.399376	15.97587	82.62476
8	7.916332	1.399342	15.76626	82.83440
9	8.290047	1.361503	15.59377	83.04473
10	8.660430	1.378532	15.38884	83.23263
Cholesky Ordering: D(STUNTING) D(SANITASI) D(POVERTY)				

Source: Processed Data, Eviews 2020

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Table 7 in the 2-quarter horizon of prediction of stunting, around 96.15 percent and the remaining 0.16. Poverty 3.68 percent comes from environmental sanitation. Furthermore, in the 10-quarter stunting prediction horizon, 91.64 percent of the prediction variants originate from the stunting itself, and the remaining 1.30 percent comes from poverty and 7.05 from Environmental Sanitation. The 1-quarter poverty prediction predicts that poverty is around 79.82 percent of the variance originating from the poverty variable itself. the remaining 1.52 percent came from stunting and 18.64 percent from Environmental Sanitation. Furthermore, in the 10-quarter poverty prediction horizon, 82.23 percent of the prediction variants originate from poverty itself, and the remaining 1.37 percent comes from stunting and from 15.38 percent of Environmental Sanitation.
Environmental Sanitation Prediction for the second quarter predicts that Environmental Sanitation is about 92.05 percent of the variance sourced from the Environmental Sanitation variable itself. the remaining 4.47 percent came from stunting and 3.47 percent from poverty. Furthermore, in the 10-quarter prediction horizon, 57.80 percent of the prediction variants come from Environmental Sanitation itself, and the remaining 6.35 percent comes from stunting and 35.55 from poverty.

4 Conclusion

The results of the research using Classical Typology between Stunting and Environmental Sanitation show that the provinces that are located in the first question (High Stunting-High Environmental Sanitation) are: Province. This shows that Environmental Sanitation da. Quadrant II (High Stunting - Low Environmental Sanitation) is the Province of NTT, West Sumatra, West Kalimantan, Central Kalimantan, Central Sulawesi, Gorontalo, Aceh, Maluku, West Papua. Quadrant III (Low Stunting-Low Environmental Sanitation) consists of the provinces of Papua, West Sumatra, Lampung, West Java, Jambi, North Maluku, Bengkulu. Quadrant IV (Low Stunting, High Environmental Sanitation), namely Riau, East Java, North Sumatra, Central Java, North Sulawesi, Kep. Bangka Belitung, Riau Islands, Yogyakarta, Bali, DKI Jakarta, South Sumatra Meanwhile, areas using Stunting and Poverty are described as follows: areas that are included in Quadrant I (High Stunting-High Poverty), West Nusa Tenggara Province, Southeast Sulawesi, Central Java , Yogyakarta. Quadrant II (High Stunting Low Poverty), namely the Provinces of Papua, West Papua, NTT, Maluku, Gorontalo, Aceh, Bengkulu, Central Sulawesi, Lampung, South Sumatra Quadrant III (Low Stunting-High Poverty) consisting of West Sulawesi, East Java, Kalimantan Provinces. West, Jambi, West Java, North Kalimantan, Central Kalimantan, South Kalimantan, North Maluku, Riau, Banten. Provinces belonging to Quadrant IV (Low Stunting-Low Poverty) are North Sumatra, South Sulawesi, Uatara Sulawesi, Riau, East Kalimantan, Kep. Bangka Belitung, Bali, DKI Jakarta.

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