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TNP2K Series Editorial

Second Edition, June 2021

As a government think-tank, TNP2K secretariat is responsible for producing analysis and policy recommendations on poverty in Indonesia. In disseminating the studies that it has carried out, TNP2K has published various knowledge products, including the TNP2K Series.

> ***"The TNP2K Series is a knowledge product that compiles a collection of working papers and policy briefs and reviews that have been published by TNP2K with themes around poverty reduction."***

This knowledge product is equipped with an International Standard Serial Number or ISSN so it can be used as a scientific reference. It is expected that the TNP2K Series can assist policymakers, TNP2K member ministries/agencies, local and national parliaments, government agencies, non-government organizations, and other stakeholders in poverty alleviation.

Volume 2 of the TNP2K Series presents six working papers. The first working paper presents an analysis of progress in rural development in Indonesia. With the spatial econometric methodology, this study aims to demonstrate that the achievements of rural development are not solely due to the Village Fund program, but were rather the result of various policies from the national, subnational, to village government levels.

The second paper discusses measuring the poverty line in Indonesia. This working paper proposes an update to the poverty line calculation, by comparing the methods of food and calorie poverty line calculation, non-food poverty line calculation method, and the real poverty method. The working paper also presents a simulation of the poverty line calculation as a reference for any future proposals for improving poverty line measurement.

The third working paper discusses Village Development Indicators in Indonesia. This study aims to describe the achievements of the Village Development Indicators in 2014 and 2018 after the government allocated IDR 250 trillion for the Village Fund since 2015. Two indicators are used to measure rural development in Indonesia, namely the Geographical Difficulty Index (IKG) and the Village Development Index (IPD). These two tools have similar deficiencies, namely that both have indicators that cannot be followed up by paralegals and existing policies in the village.

The fourth working paper discusses poverty indicators in Indonesia, which projects poverty on all poverty indicators, measures the impact of price increases on per capita expenditure, thus able to measure the impact on the poverty line by looking at changes in per capita expenditure. This study also formulates a method that can be replicated by policymakers using inflation figures, economic growth, and population estimates for a certain period.

The fifth working paper analyzes regional inequality before and after regional autonomy. This study aims to answer whether fundamental changes in the country's political order have been able to reduce inequality between regions. This working paper presents the disparity between regions by comparing conditions in 1995-2001 (before regional autonomy) and 2002-2017 (after regional autonomy).

The final paper highlights identification of poverty clustering in Indonesia. This study aims to identify the various patterns of poverty in Indonesia in relation to local geographic and demographic characteristics. This study uses the Global Moran Index to investigate the spatial autocorrelation of poverty levels at the sub-district level, and the Local Moran Index to detect patterns of poverty clustering in Indonesia. In addition, this study estimates the relationship between poverty and spatial factors using spatial lag regression because poverty has a spatial correlation between one area and another.

Thank you.
Editorial Team

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VILLAGE DEVELOPMENT: SPATIAL EFFECT VS THE PERFORMANCE OF THE VILLAGE GOVERNMENT?

Sonny Harry B Harmadi, Udin Suchaini, Ardi Adji

ABSTRACT

Village funding in the amount of Rp 257.2 trillion in the past five years (2015-2019) uses a scheme that shares funding equitably. This is evident from the proportion of village funds (90 percent) that was divided equally (2015-2017) (Ministry of Finance, November 2017). This study aims to prove that the achievements of village development are not only due to the impact of the Village Fund Program, but are also based on government policies from the central government to the village. Seeing village development only from the perspective of the Village Fund is a relative undertaking. It is necessary to analyze the performance of village development to determine whether village development is inclusive at the village level (own effect) or there are other impacts outside the village (neighborhood effect) that have an effect on village development performance. The methodology used in this study is spatial econometrics. Testing was conducted on all villages in Indonesia (75,436 villages) sourced from Podes 2018 data. The findings show that village development by the local village government did not have a significant impact on the progress of village development. Development in neighbouring rural areas has a significant impact on the progress of village development. Village development undertaken on the basis of government policy at a level above the village administration has a significant impact on the progress of village development.

Key words: *Village Development, Spatial Effect, Village Fund budget*

ABSTRACT

Village funding in the amount of Rp 257.2 trillion in the past five years (2015-2019) uses a scheme that shares funding equitably. This is evident from the proportion of village funds (90 percent) that was divided equally (2015-2017) (Ministry of Finance, November 2017). This study aims to prove that the achievements of village development are not only due to the impact of the Village Fund Program, but are also based on government policies from the central government to the village. Seeing village development only from the perspective of the Village Fund is a relative undertaking. It is necessary to analyze the performance of village development to determine whether village development is inclusive at the village level (own effect) or there are other impacts outside the village (neighborhood effect) that have an effect on village development performance. The methodology used in this study is spatial econometrics. Testing was conducted on all villages in Indonesia (75,436 villages) sourced from Podes 2018 data. The findings show that village development by the local village government did not have a significant impact on the progress of village development. Development in neighbouring rural areas has a significant impact on the progress of village development. Village development undertaken on the basis of government policy at a level above the village administration has a significant impact on the progress of village development.

Key words: *Village Development, Spatial Effect, Village Fund budget*

Background

Village development is not solely a consequence of disbursements from the Village Fund. Villages are the target of all policies at the central, provincial, regency, to the village government itself. The provision of village funds which has reached more than Rp 257 trillion uses a basic allocation which is distributed equally. Village Fund disbursements in 2019 were allocated in the ratio AD:AA:AF[3] (72:3:25), therefore, viewing development only from Village Fund alone becomes a relative undertaking.

Since the acceleration of village development in Indonesia in 2015, numerous villages have experienced development growth. One of the indicators of such growth is increased economic activity in the villages–for example, some villages have succeeded in earning more from Village Own-source Revenues (Pendapatan Asli Desa: PADes) than from the Village Fund. Villagers, families, or households who became economic operators or agents play an important role in economic growth as well as a beneficiary of this growth. The communities as economic agents play an important role as the economic driver of a region (Birdsall et al. 2001). This movement has an impact on the household economy (Foster and Rosenzweig 2002), however, such economic movement needs to be supported by regional infrastructure.

The village development paradigm has now changed and infrastructure can be developed starting from the lowest administrative region. The empowerment of residents in labor-intensive programs is strengthened through village government institutions (Antlöv et al. 2016). The budget increase for village development through the Village Fund offers new hope for village development as well as a stimulus for the village economy.

As a stimulus, the Village Fund is expected to be able to accelerate growth in the village economy. Actualizing this stimulus is in the form of development of infrastructure to support economic access, people's empowerment in the form of labor-intensive work programs for fiscal stimulation, and other activities which support economic acceleration. The successful acceleration of village economic progress is also inseparable from the active role of the village government itself in empowering its people. The village head is the key figure in moving the village economy. The village government has a separate authority that does not involve the regency government to build their village by developing and formulating village regulations (Antlöv 2003).

The development of economic infrastructure at the local level supports economic circulation in a village and its surrounding area. The existence of markets, store groups, shops/groceries is an illustration of local economic circulation at the village level. Infrastructure may improve performance with the infrastructure-economy interaction model in predicting the distribution of economic opportunities at the village level in a region (Wismadi et al. 2012). Research on infrastructure at the local village level has been conducted in India by observing the economic growth at the village level as well as its connectivity. The result is that economic infrastructure has significant potential to lift economic growth at the village level and even affects the GDP (Chakraborty and Guha 2009). The existence of economic infrastructure facilities, such as markets, plays a significant role in the economic life of rural areas.

[3] AD: Alokasi Dasar (Basic Allocation); AA: *Alokasi Afirmasi* (Affirmation allocation); AF: *Alokasi Formula* (Formula allocation).

The introduction of lump-sum village grants in 2014 has given a little incentive to the fiscal and funding effort to improve productivity by regional governments (Dick 2019). Through the Village Fund, the government generally divides village expenditures into four categories, namely the government administration, village development, community empowerment, and social development (Regulation of the Minister of Finance 2017). Such expenditures are set out in detail in the Village Budget (Anggaran Pendapatan dan Belanja Desa: APBDes). The village government through the role of village head in the lowest administrative region serves as the representation of the people's aspirations (Deggs and Miller 2013).

In addition to the four allocations for government administration; community development; development; and community empowerment; the Village Fund can also be used for capital participation in village-owned enterprises (Badan Usaha Milik Desa: BUMDes) (Regulation of the Minister of Finance 2017). Budget management at the village level shares the role of accelerating the process of rural economic growth (Alam et al. 2018) The allocation of a precise budget and investment by the village government not only serves as the current engine room of the village economy, but rather, it can also have a spillover effect on the surrounding villages.

The development of a village may have an impact on surrounding villages. An example of this is the rural market in the United States in the period of 1870 to 1900 which accelerated urban growth through the substitution of urban production for non-agricultural goods and services (Ermisch and Weiss 1968). The market contains all kinds of products that are produced in the village and outside the village. Meanwhile in Indonesia, the government has been facilitating the growth of, and access to, market facilities at the village level since 2015. Such village development is, however, highly dependent on the community's role through village consultation and the ability of village officials to allocate the budget in the village.

Until 2018, the human resources capacity of the managers of village development was still limited. The publication of Village Potential (Podes) 2018 identified 1,017 village heads who had never attended school, 907 village heads who had not finished elementary school, 1,656 village heads with an education level of elementary school or the equivalent, and 7,545 village heads with an education level of junior high school or the equivalent. In addition, there were still 327 village secretaries who had never attended school, 461 village secretaries who had not finished elementary school, 1,302 village secretaries with an education level of elementary school or equivalent, and 3,615 village secretaries with an education level of junior high school or the equivalent. As the motor of the village economy, the human resources quality of village officials still needs to be improved so they are better able to perform their duties.

The economic movement at the village level driven by the village government is realized in the form of BUMDes. In order to realize BUMDes, the village government must have the ability to identify the resources and opportunities available at the village level. Utilization of the Village Fund can, therefore, be used for capital participation (BUMDes) (Regulation of the Minister of Finance 2017). BUMDes plays an important role in village autonomy by earning PADes. In addition, community empowerment and investment can be developed in the business units of BUMDes. The existence of BUMDes affects people's businesses in villages by encouraging the people to start a new business according to the potential existing in the villages (Caya and Rahayu 2019). In addition to BUMDes, the management of the village budget also affects village development and can be utilized by the surrounding villages.

From the residents' point of view, this spillover is felt through circular migration. A household has at least one circular migrant, and based upon the gender and age of the household head. The household income from short-term circular migration supports numerous medium and high-income households (Hetler 1989). The benefits resulting from village development can be felt by residents of the surrounding villages. In addition to the residents who live in the village, the people from outside the village are also interested in improving the village economy which is still developing.

The spillover effect of village development is not only utilized by the people living in the village, but also by the residents of the surrounding villages. The village is not the object of unilateral development, so its development is inseparable from development of the surrounding areas. In 1968, research on village-city development was closely related to the population size as well as entrepreneurial decisions, both of which are the key to the growth process locally (Hart et al. 1968).

On the other hand, theoretically the effects of village budget autonomy on village development cannot yet be proven. This is because village development has given an assurance that if villages are able to manage their budget properly, it will have a direct impact in improving the welfare of people in the villages. This condition opened up a study discourse, namely as to whether village development is caused by inclusive development at the village level or by other matters outside the village that affect the performance of village development.

This research resulted in a number of important contributions for literature and policies.

- Firstly, this study looks at the location of village development concentration in the form of spatial clustering because the performance of village development cannot be separated from the surrounding villages. Empirical evidence is, therefore, needed to show that the progress of village development is also significantly affected by the spillover effect of the development of the surrounding villages;

- Secondly, in order to obtain such empirical evidence, this research studies the impact of development of rural areas;

- Thirdly, this research simultaneously studies the performance of village government as a reflection of the driving motor of village development through the allocation of APBDes, human resources at the village level, and investments in the business units of BUMDes; and

- Fourthly, this research studies the leadership capacity of the village heads along with their officials in implementing village development.

This study is divided into several sections namely: the theoretical framework; description of the main data series used; a description of village development to date; the research results; and the conclusions.

Theoretical Framework

This study discusses the important role of the village government in village development. The first matter discussed is the village government's ability to allocate the budget in accordance with the applicable provisions. The second issue is the education level of the village head, village secretary, and village officials. Third, investment in the business field in BUMDes. These three domains are growing from within the village.

The allocation of village fund budget is already regulated in Regulation of the Minister of Finance (Peraturan Menteri Keuangan, 2017). The distribution is regulated in the village expenditures for the organization of government, village development, and community empowerment. In addition, the leadership in the village, starting from the village head to its officials is a legal mandate (Law No. 6/2014). The main concern raised is regarding the village's capacity to manage the increased volume of funds (Antlöv et al. 2016). If the village government does not have capacity to develop the village effectively, it will diminish the quality of village development itself.

Investments at the village level are also driven by the village government itself. Under Law No. 6/2014 on Villages, village governments can develop BUMDes). The establishment of BUMDes itself is a prerequisite for the disbursements from the Village Fund, however, this may lead to ineffective growth of BUMDes as it only serves as a requirement for budget disbursement. On the other hand, linkages with the same parameters for neighbouring villages are also evaluated, in order to show the spillover effect from each region. The variables predicted in this research are the results of village development that are reflected in the scores of the Village Development Index (Indeks Pembangunan Desa: IPD) (Table 1).

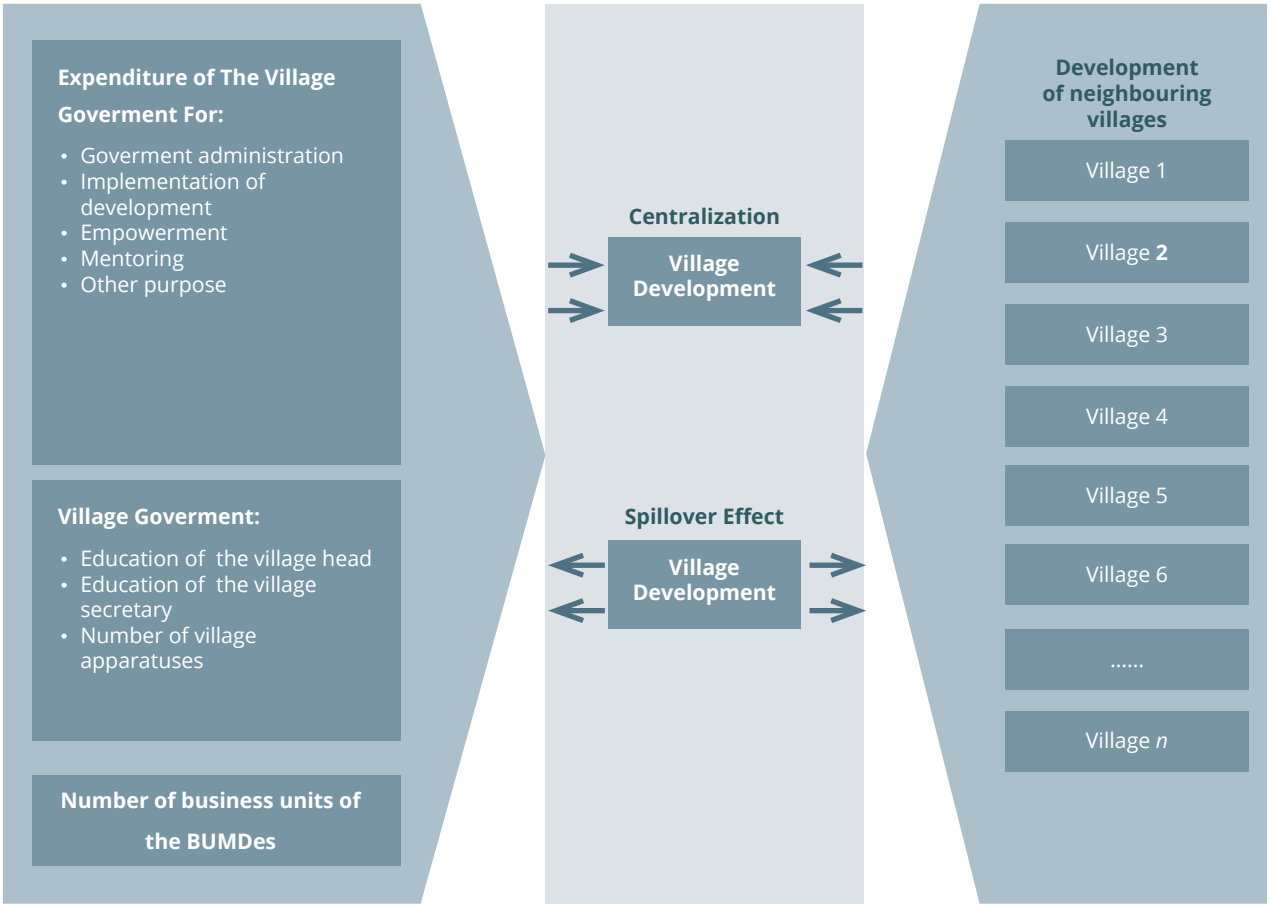
Table 1: Variables of the Research

Notation	Variable	Regulation/Publication/Research Source
Y	Village Development Index (Indeks Pembangunan Desa/IPD).	2018 Village Development Index from Statistics Indonesia (Badan Pusat Statistik: BPS) 2018.
X1	Village expenditures for government administration.	Village expenditures from the report on use of village funds (Regulation of the Minister of Finance 2017). Benefits of Allocation of Village Fund on Rural Development (Alam et al. 2018).
X2	Village expenditures for implementation of development.	
X3	Village expenditures for empowerment.	
X4	Village expenditures for mentoring.	
X5	Village expenditures for other purposes.	
X6	Highest education level of the Village Head.	Leadership in the village, village head and its officials constitute the mandate of Law No. 6/2014. The main concern raised is regarding the village's capacity to manage the increased fund (Antlöv 2016).
X7	Highest education level of the Village Secretary.	
X8	Number of village officials.	
X9	Number of business units of BUMDes.	Effect of BUMDes on the Community's Welfare in Aik Batu Buding Village, Belitung Regency, Bangka Belitung Province (Caya and Rahayu 2019).

Source: processed by TNP2K, 2019

The general overview of inter-variable relationship in this research is quoted from a previous research on the agglomeration of small and micro industries that have experienced group concentration, as well as to observe the spatial effect from the surrounding regions (Suchaini and Lupiyoadi 2013).

Figure 1: Frame of Thought of the Research



Source: Wismadi et al. (2012) and Suchaini and Lupiyoadi. (2013).

Source of Data

In this study, the source of data used is the data on Village Potential (Potensi Desa/Podes) of 2018 (Table 2). Podes data contain all regional data on the lowest level of government in Indonesia, namely villages/subdistricts. The data are obtained from data collection activities in all villages, subdistricts, and transmigration settlement units (Unit Permukiman Transmigrasi –UPT) / transmigration settlement system (Sistem Permukiman Transmigrasi - SPT. The Podes data constitute the only regional data collected by BPS as a framework of census, namely the basic data on preparation for population census, agricultural census, and economic census. For village administrative regions in particular, the Podes data contain sufficiently comprehensive information.

Table 2: Source of Research Data

Variable Type	Variable	Unit of measurement for the model	Data Source	Data Conversion
Eksogen	Village expenditures for government administration	Million rupiah per village	PODES code 1402a	Percentage with Natural Logarithm
	Village expenditures for implementation of development	Million rupiah per village	PODES code 1402b	Percentage with Natural Logarithm
	Village expenditures for empowerment	Million rupiah per village	PODES code 1402c	Percentage with Natural Logarithm
	Village expenditures for mentoring	Million rupiah per village	PODES code 1402d	Percentage with Natural Logarithm
	Village expenditures for other purposes	Million rupiah per village	PODES code 1402e	Percentage with Natural Logarithm
	Highest education of the Village Head	Million rupiah per village	PODES code 1701a	Original data with the scale of 1 – 9
	Highest education of the Village Secretary	Level of Education	PODES code 1701b	Original data with the scale of 1 – 9
	Number of village apparatuses	Level of Education	PODES code 1702	Original data with the scale of 1 – 100
	Number of business units of BUMDes	Million rupiah per village	PODES code 1404a	Original data with the scale of 1 – 9
Endogenous	Village Development Index (IPD)	Index with the scale of 0-100	Village Development Index	Original data with the scale of 0-100

Source: processed by TNP2K, 2019

One of the major issues when evaluating development at the village level is inter-regional inequality that results in data abnormalities and outliers of development outcomes. Prior to processing the data, there is a need to cleanse the data in order to remove outliers from the existing data. Nevertheless, the Podes data can be used as the source of census data on all of the lowest administrative regions at the village level. The information that we use from this data source are population, number of families, number of economic facilities (markets, stores, minimarkets, and grocery stores), business units in BUMDes, as well as the village government's expenditures for development, empowerment, mentoring, and government administration.

Village Development

The measurement of village development by using the IPD was performed twice, namely during planning and evaluation. In the planning stage, the villages listed in the Minister of Home Affairs Regulation No. 39/2015 were measured in 2015. The village data used was sourced from Podes 2014 data. The results of IPD 2015 are set out in the book titled "Village Development Index 2014: Challenges in the Fulfillment of Village Minimum Service Standards" ("Indeks Pembangunan Desa 2014: Tantangan Pemenuhan Standar Pelayanan Minimum Desa") published in the same year, and constitutes the results of a collaboration between the National Development and Planning Board (Badan Perencanaan dan Pembangunan Nasional: Bappenas) and BPS.

In the evaluation stage, the IPD was calculated again in 2018 using the list and data on villages produced from the 2018 Podes Data Collection. The results of this calculation are presented in a book titled "Village Development Index 2018" (Indeks Pembangunan Desa 2018) prepared by BPS. This book discusses the results of village development through IPD in every village, province, and large island region. The IPD summarizes the outcomes of diverse village development according to the locality needs of each village.

In this study, the results of village development are used as endogenous variables, the effect of village government performance. The approach used the IPD that describes the availability and accessibility of various basic services for village communities. Village development in 2018 provides a description of the villages with the status of underdeveloped, developing, and independent. The results of this IPD categorization are 14,461 underdeveloped villages (19.17 percent), 55,369 developing villages (73.40 percent), and 5,606 independent villages (7.43 percent).

The dimensions of village development increased in 2018, compared to 2014. The five dimensions are the Basic Services Dimension, Infrastructure Condition Dimension, Transportation Dimension, Public Services Dimension, and Village Government Administration Dimension. The dimension with the highest increase was Village Government Administration, namely by 9.81 points. Furthermore, the dimension with the lowest increase was Basic Services, namely by 0.92 points. The number of developing villages fell by 6,518 compared to 2014. At the same time, the number of independent villages increased by 2,665 (BPS 2018).

The improvement in village development as described in the IPD is quite varied. One of the indicators that saw a significant improvement in the Basic Services Dimension is Availability of and Access to High School or the equivalent with an increase in the number of villages. Furthermore, in the Infrastructure Condition Dimension, the indicator with the highest increase is Cooking Fuel, indicated by the increased number of villages with LPG stations/agent/sellers.

Method of Analysis

In this study, the data review was performed in three stages. First, preparation of variables and cleansing the outlier data. Second, specifications test on the model prepared through several equations which are divided into typologies of village development regions. The test simultaneously assesses the variables of village government performance, including the allocation of a village government budget, village officials human resources, as well as investments in the business units of BUMDes at the village level. Third, testing the effect of rural area development which are bordered by neighbouring village regions.

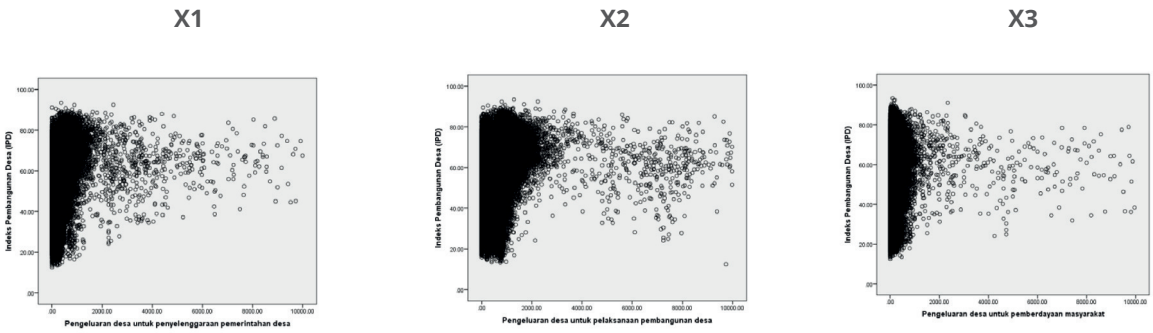
In this study, the test is performed by testing the effect of exogenous variables on the endogenous. The types of exogenous variables used are the economic activities in the village, business operators and consumers at the village level, and village investments in business. The first variable type can be observed from the number of store groups, markets, minimarkets, as well as grocery stores, while the second variable type is observed from the total population and number of families in the village. The third exogenous variable type is observed from the existence of BUMDes and village government expenditures for development, empowerment, mentoring, and village government administration. On the other hand, the endogenous variables used are the village development achievements reflected in the IPD.

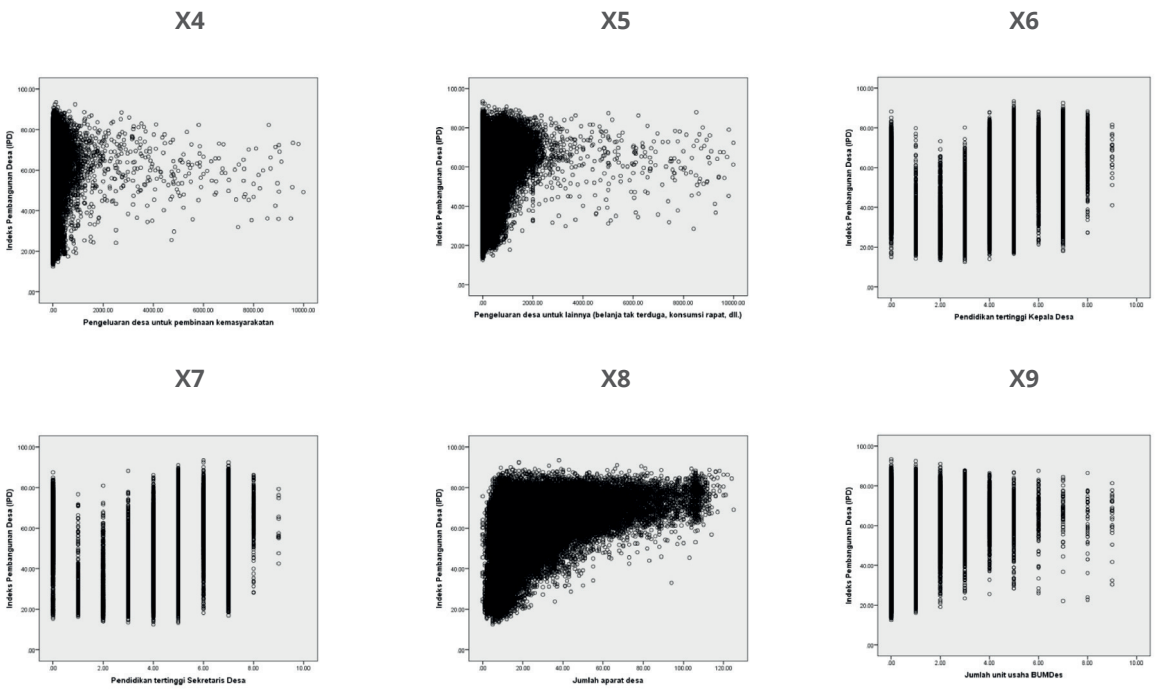
The units of analysis in this study are villages. The village is the lowest administrative region in Indonesia and is the subject of development at the village level. The villages evaluated are all villages in Indonesia– a total of 75,436 villages.

Data Cleansing

In this section, the researchers present the data spread used to undertake the analysis. The objective is to observe the data outliers that may disrupt the calculation. These data are made by using the scatter plot technique with the results presented in Figure 2.

Figure 2: Scatter Plot of the Original Data





Source: Podes 2018.

Note: X constitutes exogenous variable and Y constitutes endogenous variable.

Translation of texts in Figure 2:

Indeks Pembangunan Desa (IPD)	**Village Development Index (IPD)**
Pengeluaran desa untuk penyelenggaraan pemerintahan desa	Village expenditures for village government administration
Pengeluaran desa untuk pelaksanaan pembangunan desa	Village expenditures for implementation of village development
Pengeluaran desa untuk pemberdayaan masyarakat	Village expenditures for community empowerment
Pengeluaran desa untuk pembinaan kemasyarakatan	Village expenditures for social mentoring
Pengeluaran desa untuk lainnya (belanja tak terduga, konsumsi rapat, dll.)	Village expenditures for other purposes (unexpected spending, consumption for meetings, etc.)
Pendidikan tertinggi Kepala Desa	Highest education level of the Village Head
Pendidikan tertinggi Sekretaris Desa	Highest education level of the Village Secretary
Jumlah aparat desa	Number of village officials
Jumlah unit usaha BUMDes	Number of BUMDes business units
Endogenous	Village Development Index (IPD)

Source: processed by TNP2K, 2019

From the scatter plot, it can be observed that nearly all variables experience data outliers. Data outliers occurred at the highest value, therefore, the data with outliers are entered by removing the outlier or replacing the outlier figure with the highest value.

Spatial Autocorrelation

In this test, grouping or clustering is conducted on the village development regions. The test is performed on the inter-regional interdependence relationship which is stated in the framework of spatial autocorrelation weighting matrix. Each structural composition that connects the N sample unit can be represented as matrix N × N (Dow and Eff 2008). In this study, the weighting matrix is used in regions that are directly adjacent geographically. The data used are the 2018 IPD data. The results are used to observe which regions experience significant concentration of village development.

The Pearson's Correlation by units follows the equation:

$$\mathbf{r(x,y) = \frac{[\Sigma_i(x_i - x_m)(y_i - y_m)]/N}{[\sqrt{\Sigma_i(x_i - x_m)^2/N}][\sqrt{\Sigma_i(y_i - y_m)^2/N}]}}$$

The spatial autocorrelation in this study uses the Pearson correlation derivative that involves the neighbouring regions, therefore, the following equation is obtained:

$$\frac{[\Sigma_{ij} w_{ij}(y_i - y_m)(y_j - y_m)]/S}{[\Sigma_i(y_i - y_m)^2/N]} = \frac{N}{S}\frac{[\Sigma_{ij} w_{ij}(y_i - y_m)(y_j - y_m)]}{\Sigma_i(y_i - y_m)^2}$$

(Dow and Eff 2008)

Predictor Effect

Own Effect

This test is conducted to identify the extent to which the policies and economy in the village impact on the results of village development. The test is performed directly on the exogenous variables existing in the village against the effects of village development measured by the government. The test to determine the effect in this section is in the equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon$$

Where:
Y = IPD
X1 = Village expenditures for government administration
X2 = Village expenditures for implementation of development
X3 = Village expenditures for empowerment

X4 = Village expenditures for mentoring
X5 = Village expenditures for other purposes\
X6 = Highest education level of the Village Head
X7 = Highest education level of the Village Secretary
X8 = Number of village officials
X9 = Number of business units of BUMDes

Neighbourhood Effect

In this test, the test of the effect several X variable on Y which occurs within the village is undertaken by involving the neighbouring villages. Direct test is performed on the exogenous variables existing in the village on the effects of village development measured by the government (Suchaini and Lupiyoadi 2013). Meanwhile, in order to observe the interregional relationship, the test uses the autocovariate model. This model is used for observing the spatial autocorrelation by estimating how many response variables in one location reflect the response values in the surrounding locations. The autocovariate is aimed at capturing the spatial autocorrelation that originates from the endogenous process, such as the relationship between individuals (Dormann et al. 2007). The autocovariate is added to change the linear predictor from the usual form model:

$Y = \beta X + \varepsilon$ ... equation 1

Into:

$Y = \beta X + \rho A + \varepsilon$ ... equation 2

in which:
β = vector of the intercept and coefficient that describe the X variable
ρ = coefficient of autocovariate A

Meanwhile, the autocovariate from the observation environment (neighbourhood) is described by:

$A_i = \sum_{jeki} w_{ij} \, y \, j_i$ ... equation 3

The predictor variable is simultaneously described through its relationship with the Spatial Auto Regressive (SAR) model. The first SAR model assumes that the autoregressive process only occurs on the response variables or the predicted variables (Y), therefore, including the term (ρW) for spatial autocorrelation in the response variable Y, but also the standard term for predictor and error (βX+ε) as used in the Ordinary Least Squares (OLS) regression. The spatial autocorrelation in the response may occur, and usually leads to a directed spatial effect.

Therefore, an equation is obtained from equation 2 as follows:

$$Y = \beta X + \rho A + \varepsilon$$

$$Y = \beta X + \rho WY + \varepsilon$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_7 X_7 + \varepsilon \quad \text{... equation 4}$$

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_7 X_7 + \rho WY + \varepsilon \quad \text{... equation 5}$$

STUDY RESULTS

Descriptive Analysis

In this study, data cleansing is performed in order that the effects of the analysis are not affected by the data outlier. The data cleansing is aimed more at removing the data outlier and making the scales uniform but not changing the data distribution pattern. The scale used is the scale of 0-10. This adjustment is made to facilitate interpretation and formulation of policies related to the predictor variables.

Table 3: Description of Data

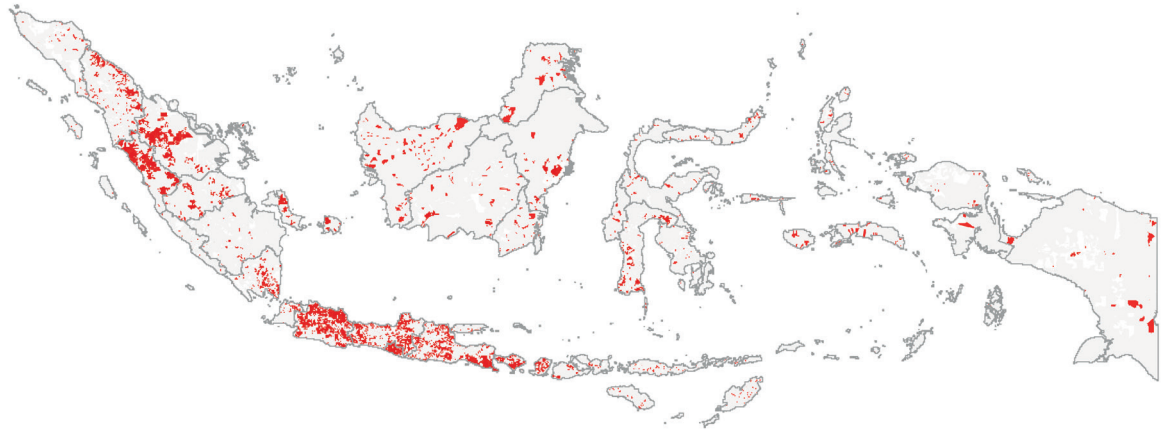
Variable	Min	Mean	Max	Standard Deviation	Deviasi Standar
Y	Village Development Index (IPD)	12.54	59.36	93.37	13.04
X1	Village expenditures for village government administration	0.00	5.54	9.21	1.29
X2	Village expenditures for implementation of village development	0.00	6.19	9.21	1.36
X3	Village expenditures for community empowerment	0.00	4.13	9.21	1.45
X4	Village expenditures for social mentoring	0.00	3.32	9.21	1.72
X5	Village expenditures for other purposes (unexpected spending, consumption for meetings, etc.)	0.00	3.28	9.21	2.88
X6	Highest education level of the Village Head	0.00	4.96	9.00	1.53
X7	Highest education level of the Village Secretary	0.00	5.17	9.00	1.61
X8	Number of village officials	0.00	22.09	125.00	17.87
X9	Number of business units of BUMDes	0.00	0.79	9.00	0.95

Source: processed by TNP2K, 2019

Spatial Clustering

In this section, we undertake a test with spatial autocorrelation to determine the locations where village development is concentrated. This concentration of village development has a pattern, namely some regions have high concentration. The results show that the regions of Sumatra, Java, Bali, and the western part of NTB have significant concentration of development–marked in Figure 3 with a dark color–where there are groupings of IPD which are quite high.

Figure 3: Concentration of Village Development (2018)

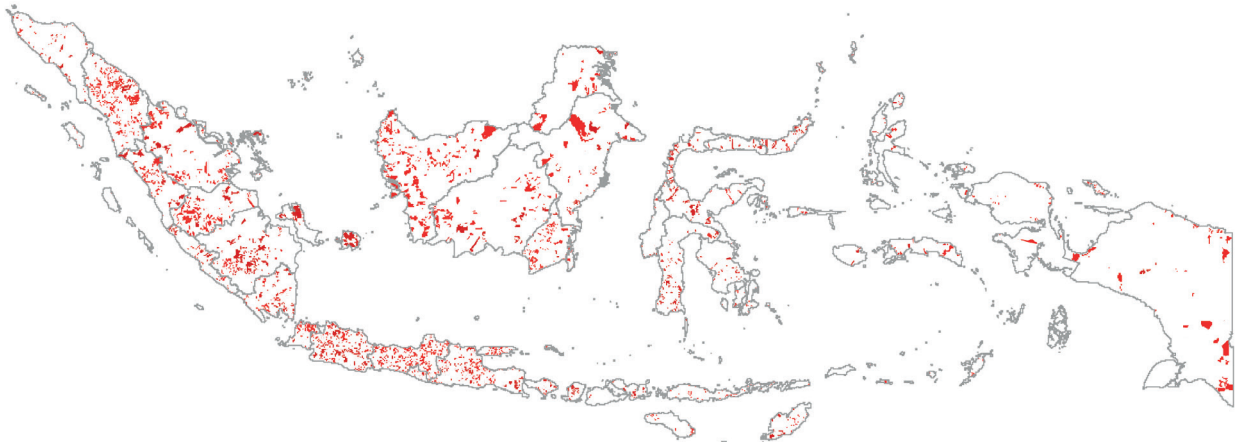


Concentration of village development, rate of significance reached 5 percent.
Source: Processed from Podes 2018.

Massive village development is still occurring in the western part of Indonesia. The significant grouping is shown by the regions with (dark) red color. These regions constitute the village clusters with a high IPD score with neighbouring villages that also have high IPD scores. Statistically, such regions have a high significance rate so concentration of village development in NTT, Kalimantan, Sulawesi, Maluku, and Papua did not occur evenly. Outliers of village development occur in certain regions and are not evenly distributed.

Numerous BUMDes have begun to grow, and their concentration is related to village development. Despite the fact that the growth of BUMDes is still focused in western Indonesia, BUMDes in the regions of Kalimantan, Sulawesi, Maluku, and Papua have started developing. The significant growth of BUMDes is shown by the regions with (dark) red color, namely village clusters which have BUMDes related to the IPD (Figure 4). Statistically, the growth of BUMDes indicates significant value with a score of 0.05 percent. The success of village development and BUMDes is also attributable to the leadership in the village.

Figure 4: Concentration of Village Development According to Existence of BUMDes (2018)

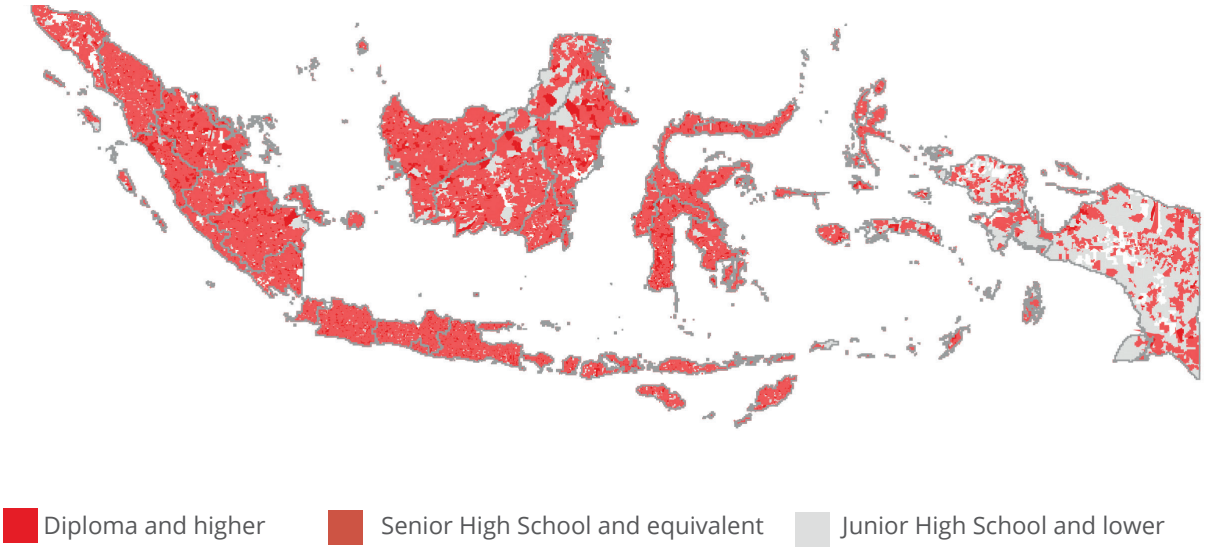


Source: Processed from Podes 2018.

Note: Villages coloured in red denote the concentration of BUMDes that is correlated to village development has reached a significance rate of 5 percent.

Most village heads in Indonesia have a senior high school education (Figure 5). The spread of villages based on the education level of the village heads is almost evenly distributed in Indonesia, except in Papua and West Papua. This is consistent with the enforcement of Law No. 6/2014 on Villages which requires that the minimum education standard of a village head is senior high school. The villages that have conducted village head elections have also applied this rule. In carrying out the village development duty, a village head is assisted by a village secretary.

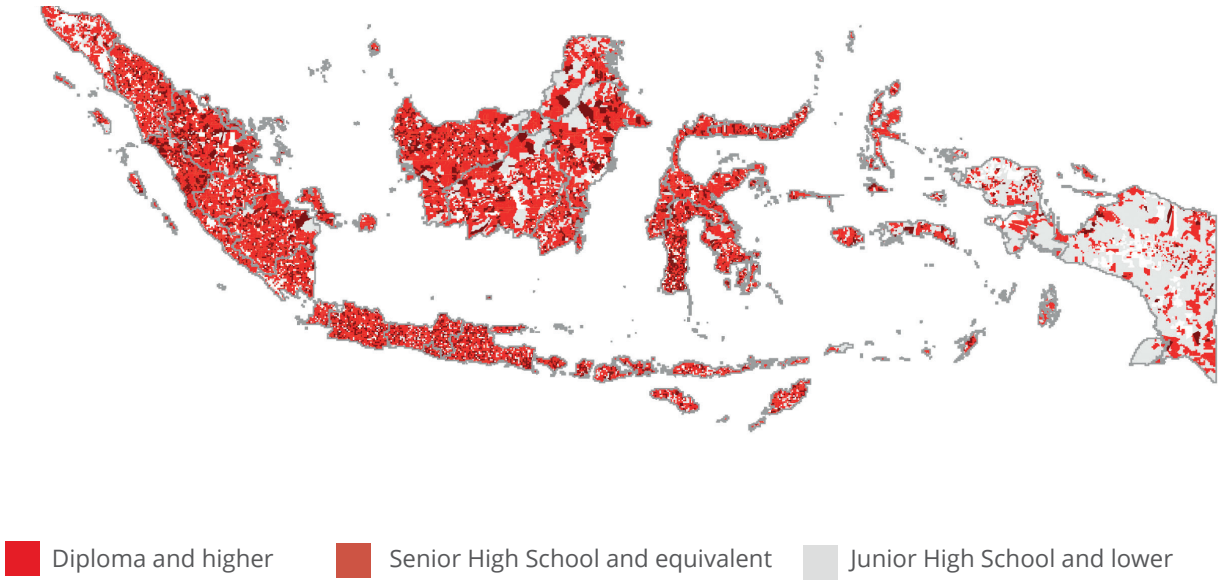
Figure 5: Concentration of Villages by Education Level of Village Head (2018)



Source: Processed from Podes 2018.

Most village secretaries in Indonesia have a senior high school education (Figure 6). The spread of villages based on the education level of the village secretary is almost evenly distributed in Indonesia, except in Papua and West Papua. The village secretary plays an important role in assisting the village head in village development, starting from administrative affairs to disbursements from the Village Fund.

Figure 6: Concentration of Villages by Education Level of Village Secretary (2018)



Source: Processed from Podes 2018.

OLS Diagnostics

The OLS in this section is to identify the pattern of village development behaviour from the data. The village development behaviour in different village typology illustrates the condition in the field. Analysis of the OLS is used to ensure that the data used are already aligned with the reality occurring in village development progress.

This section assesses the following data behaviour using several equations which are tested simultaneously, and then comparing the results with one another. Each equation is used to observe the consistency of the effect of exogenous variables on endogenous variables. Each equation is also differentiated according to the village typology, namely the rural-urban, coastal-noncoastal, and forest area-outside forest area status.

The regression modeling resulted in consistent models. Of the six models implemented according to the village typology, only one has a different pattern, namely villages with an urban typology. Meanwhile, the models with other typologies–rural, coastal, and forest area–have similar patterns. Villages with an urban typology have basic service infrastructure that is relatively complete in comparison with rural villages.

Table 4: Coefficient of OLS According to Village Typology (Badan Pusat Statistik (BPS), 2018)

Model	Parameter	β0	β1	β2	β3	β4	β5	β6	β7	β8	β9
Urban	R^2:0,165 P-Val: 0,000 SE:6,642 N: 9.774	56.618 (+)*	0.795 (+)*	0.054 (+)	0.018 (+)**	0.201 (+)	0.000 (+)	0.633 (+)*	0.443 (+)*	0.084 (+)*	0.351 (+)*
Rural	R^2:0,345 P-val: 0,000 SE:10,279 N: 65.662	24.192 (+)*	1.239 (+)*	0.581 (+)*	-0.305 (-)*	0.428 (+)*	0.284 (+)*	1.936 (+)*	1.259 (+)*	0.220 (+)*	2.049 (+)*
Coastal	R2:0,240 P-Val: 0,000 SE:10,22479 N: 11.385	33.17 (+)*	0.781 (+)*	0.151 (+)	-0.204 (-)*	0.216 (+)*	0.342 (+)*	1.009 (+)*	1.517 (+)*	0.217 (+)*	2.014 (+)*
Non-Coastal	R2:0,385 P-Val: 0,000 SE:10,378 N: 64.051	22.904 (+)*	1.526 (+)*	0.613 (+)*	-0.265 (-)*	0.480 (+)*	0.247 (+)*	2.175 (+)*	1.143 (+)*	0.217 (+)*	1.870 (+)*
Around Forest Area	R2:0,447 P-Val: 0,000 SE:11,261 N: 20.682	15.265 (+)*	1.067 (+)*	0.592 (+)*	-0.171 (-)*	0.568 (+)*	0.367 (+)*	2.118 (+)*	1.613 (+)*	0.299 (+)*	2.71 (+)*
Outside Forest Area	R2:0,276 P-Val: 0,000 SE:9,117 N: 54.754	36.059 (+)*	1.105 (+)*	0.285 (+)*	-0.138 (-)*	0.332 (+)*	0.171 (+)*	1.461 (+)*	0.815 (+)*	0.185 (+)*	1.238 (+)*

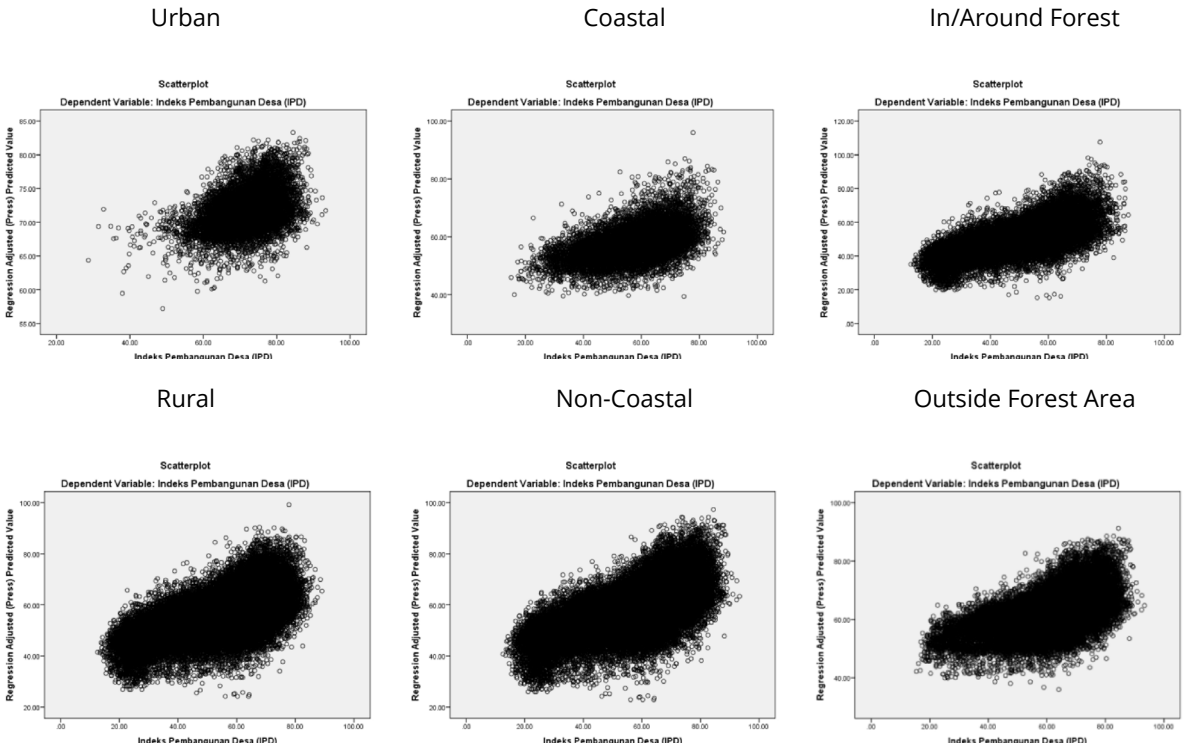
Source: Processed from Podes 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

R^2: R-Squared; SE: Standard Error of Estimation; β_0 = Intercept coefficient; β_1:Village expenditures for government administration; β_2: Village expenditures for implementation of development; β_3: Village expenditures for community empowerment; β_4: Village expenditures for social mentoring; β_5: Village expenditures for other purposes (unexpected spending, consumption for meetings); β_6: Highest education level of the Village Head; β_7: Highest education level of the Village Secretary; β_8: Number of village officials; and β_9: Number of business units of BUMDes.

The results of the OLS diagnosis indicate that only one variable–community empowerment–has a negative impact on village development. At the same time, the other seven variables have a positive effect on village development. This model has a consistent result as confirmed by the scatter plot between the Y value and the predicted result of Y value (Figure 7). Only one equation does not describe a particular pattern, namely the first model equation. This model equation exists in villages with an urban status.

Figure 7: Scatter Plot Y with Y Prediction According to Village Typology



Source: Processed from Podes 2018.

Note: X constitutes the endogenous variable, Y constitutes the Predictor.

Villages With Urban Status

Villages with urban characteristics have the most divergent pattern to villages in general. This behaviour is reflected in the existence of subdistricts with city characteristics but whose status has changed to village. Villages with an urban status have differences in the shape of village development, government empowerment, and village expenditures in other forms that are insignificant. In this kind of village, the government spends funds for social mentoring and government administration that usually delivers quite significant results. In addition, village heads make a greater contribution compared to village secretaries, and there are more village officials. Villages in this urban category also have BUMDes that make a significant contribution to village development.

In addition to the differences described above, villages with an urban status also have relatively good basic service infrastructure. Village policies can, therefore, be optimized by mentoring the community to improve their quality of life. One of the methods to optimize the services of village government is by observing the highest education level of the candidates for village head and village secretary during the election for the sake of effectiveness of services and development of the village community.

Villages With Rural Status

The government's expenditures for development in villages with a rural status make a positive and significant contribution after government administration. Community empowerment, however, makes a negative contribution to village development. This is because the empowerment of village communities is undertaken in a labor-intensive way but is attached to infrastructure development. The effect is that the community empowerment activities form a part of village development, whereas infrastructure development is still needed. On the other hand, village expenditures for mentoring and other purposes have a positive and significant effect on village development.

In addition to village expenditures, the education level of village officials is related to village development. The education background of village heads in particular will have a more significant effect on village development in comparison with the education level of village secretaries. This condition is indicated by β_6 (1,936) which is higher than β_7 (1,259). In addition, the increasing number of village officials also makes a positive and significant contribution to village development but not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes provides a positive and significant contribution. BUMDes make the greatest contribution to the performance of village government in comparison to the expenditure and village officials variables.

Coastal Villages

In general, the performance of coastal village governments has a different pattern to that of rural villages. Village government expenditures for other purposes has the greatest contribution if compared to development, empowerment, and mentoring. In fact, the expenditures for village development did not reach a significance rate of 5 percent alpha. Furthermore, the village expenditure for community empowerment is also negative.

In addition to the above, the education level of village secretaries has a more significant effect in comparison with that of village heads**.** This condition is indicated by β_7 (1.517) that is higher than β_6 (1.009). The increasing number of village officials makes a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes has a positive and significant contribution. BUMDes make the greatest contribution to village government performance in comparison with the expenditure and village officials variables.

Non-Coastal Villages

The performance of village government in noncoastal regions is indicated by the expenditure pattern for government administration which makes the highest contribution compared with village expenditures for other purposes. For villages in this category, the government's expenditure for village development has a positive and significant contribution to village development, however, the expenditures for community empowerment have a negative and significant contribution.

In addition, the education level of village heads has a more significant contribution if compared to village secretaries. Village heads play an important role in village development. This condition is indicated by β_6 (2.175) that is higher than β_7 (1.143). The increasing number of village officials also makes a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes has a positive and significant contribution. BUMDes make the greatest contribution to village government performance compared with the expenditure and village officials' human resources variables.

Villages Around Forest Areas

The performance of village government in villages around forest areas has the same pattern, between village development and social mentoring. Government administration is the highest contributor compared with village expenditures for other purposes. Expenditure for community empowerment, however, makes a negative and significant contribution.

Beyond the matters described above, village heads play an important role in village development. The education level of village heads makes a more significant contribution if compared to that of village secretaries. This condition is indicated by β_6 (2.118) that is higher than β_7 (1.613). The increasing number of village officials also has a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes makes a positive and significant contribution. BUMDes make the greatest contribution to village government performance compared with the expenditure and village officials' human resources variables.

Villages Outside Forest Areas

The performance of village governments outside forest areas that have a social mentoring pattern make a better contribution to village development. Government administration makes the highest contribution compared with village expenditures for other purposes, however, expenditures for community empowerment make a negative and significant contribution.

In addition, village heads play an important role in village development and their education level makes a more significant contribution than that of village secretaries. This condition is indicated by β_6 (1.461) that is higher than β_7 (0.815). The increasing number of village officials also makes a positive and significant contribution to village development, although it is not as high as the education level of village heads and village secretaries.

From the economic investment aspect, the existence of business units of BUMDes makes a positive and significant contribution. BUMDes make the lowest contribution to village government performance in comparison with the education level of village heads.

Predictor Effect

This study produces four equations that are tested simultaneously, and then compared to each other. One other equation is used to measure errors of the regional development effect.

Table 5: Coefficient of the Results of OLS Regression, Spatial Lag, and Spatial Error

Model	Parameter	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	W_Y	λ
OLS	R^2:0,364 P-Val: 0,000 SE: 10,399 N: 75.436	24,710 (+)*	1,413 (+)*	0,548 (+)*	-0,269 (-)*	0,420 (+)*	0,264 (+)*	1,962 (+)*	1,190 (+)	0,222 (+)*	1,903 (+)*		
LAG	R^2:0,617 LI: 0,000 SE: 7,369 N: 71.494	9,405 (+)*	0,423 (+)*	0,175 (+)*	0,045 (+)**	0,215 (+)*	0,076 (+)*	0,809 (+)*	0,643 (+)*	0,099 (+)*	0,770 (+)*	0,599 (+)*	
Error	R^2: 0,659 LI: 0,000 SE: 6,957 N: 71.494	47,084 (+)*	0,279 (+)*	0,036 (+)	0,049 (+)**	0,195 (+)*	0,053 (+)*	0,594 (+)*	0,594 (+)*	0,145 (+)*	0,537 (+)*		0,750 (+)*

Source: Processed from Podes 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

R^2: R-Squared; SE: Standard Error of Estimation; β_0 = Intercept coefficient; β1:Village expenditures for government administration; β2: Village expenditures for implementation of development; β3: Village expenditures for community empowerment; β4: Village expenditures for social mentoring; β5: Village expenditures for other purposes (unexpected spending, consumption for meetings); β6: Highest education level of the village head; β7: Highest education level of the village secretary; β8: Number of village officials; and β_9: Number of business units of BUMDes.

In general, regional development delivers a far better impact. The results of parameter calculations between OLS and Spatial Lag has a difference of 25.3 percent. Generally the development of rural areas produces better parameters on village development.

In addition, the number of BUMDes business units makes a positive and significant contribution to the performance of village development. On the other hand, village expenditures for community empowerment have a negative effect on village development.

Village expenditures for government administration

Government administration makes a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for government administration will increase the outcomes of village development by 0.01413 points–assuming that the other variables remain the same.

Village expenditures for implementation of development

Initiating village development makes a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures to initiate development will increase the outcomes of village development by 0.00548 points–assuming that the other variables remain the same.

Village expenditures for community empowerment

The empowerment of village communities makes a negative and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for community empowerment will reduce the outcomes of village development by 0.00269 points–assuming that the other variables remain the same.

Village expenditures for social mentoring

Village expenditures for social mentoring have a positive and significant contribution to village development**.** In village regions, a 1 percent increase in village government expenditures for mentoring will increase the outcomes of village development by 0.00420 points–assuming that the other variables remain the same.

Village expenditures for other purposes (such as unexpected spending and consumption for meetings)

Village expenditures for other village financing make a positive and significant contribution to village development. In village regions, a 1 percent increase in village government expenditures for other costs will increase the outcomes of village development by 0.00264 points–assuming that the other variables remain the same.

Highest education level of the village head

The education level of village heads makes a positive and significant contribution to village development. Each one level increase in the education level of a village head will increase the outcomes of village development by 1.962 points–assuming that the other variables remain the same.

Highest education level of the village secretary

The education level of village secretaries makes a positive and significant contribution to village development. Each one level increase in the education level of a village secretary will increase the outcomes of village development by 1.190 points–assuming that the other variables remain the same.

Number of village officials

The number of village officials has a positive and significant contribution to village development. The addition of one village official will increase the outcomes of village development by 0.222 points–assuming that the other variables remain the same.

Number of BUMDes business units

The number of BUMDes business units makes a positive and significant contribution to village development**.** The addition of one BUMDes business unit will increase the outcomes of village development by 1.903 points–assuming that the other variables remain the same.

Simultaneous development of villages

Village development can be described by the allocation of budget in the village, condition of village officials and BUMDes business units. These variables collectively describe 36.4 percent of village development.

Spatial development of villages

Spatial or regional development of villages by engaging the neighbouring villages has an interrelated connection. The development of neighbouring villages has a significant effect on village development. If the neighbouring village increases its development by one village development point, the observed village will increase by 0.599 points and village development simultaneously sees an impact of 61.7 percent. Village development is described by the development of neighbouring villages, village expenditures, education of the village head and secretary, as well as the BUMDes business units in the village.

In addition, village development also has an effect on the development of neighbouring villages. This spillover effect has a positive and significant value of 0.750, namely if the village development increases by one, the neighbouring villages will have an effect of 0.750483–assuming that the other variables remain the same. In other words, village development is not merely an effect of the village development itself, but rather, it also spills over from the development of neighbouring villages.

CONCLUSIONS

This study particularly observed the achievements of village development from the economic aspect and the performance of village government. In general, the outcomes indicate that the success of village development is not merely the effect of the village development itself but the development of neighbouring villages also has a positive and significant effect on village development.

Village development can be described by the performance of village government through the allocation of budget in the village, condition of village officials, and BUMDes business units. These variables overall contributed 36.4 percent to village development, however, at the same time, the spatial (regional) village development has an effect of 61.7 percent on the achievement of village development.

The development of neighbouring villages has a significant effect on village development, namely by 0.599. This means that if the neighbouring villages increase by one village development point, the observed village will have an increase by 0.599. This achievement describes an effect of 61.7 percent on village development. On the other hand, village development also has an effect on the development of neighbouring villages. This spillover effect has a positive and significant value of 0.750 so that, if the village development increases by one point, the neighbouring villages will have a spillover effect by 0.750483–assuming that the other variables remain the same. This achievement describes an effect of 65.9 percent on village development.

The village development predictor of achievement can be described by the performance of village development. This performance is indicated from: (i) village expenditures by expenditure category; (ii) village officials' human resources described by the education level of the village head and the village secretary, as well as the number of village officials; and (iii) development of BUMDes business units. These three things have a positive and significant effect on village development achievement.

The results of this study can serve as the benchmark for the formulation of policies:

First, the policies needed for the development of villages with an urban typology are different from the development policies for villages in general. This is because villages with an urban status tend to have complete infrastructure and the communities have quite a good level of education. The direction of policies of the village government are directed more towards community mentoring to earn better income.

Second, the development policies of coastal villages are more inclined to optimize the role of the village secretary rather than the village head. As a community figure, the village head in a coastal village is more prioritized, while the village secretary is more focused on resolving technical issues. Each activity in a coastal village, therefore, tends to be delegated to the village secretary to follow up.

Third, village government expenditures for development of coastal village is not significant and community empowerment has a negative score. Instead, the village's expenditures for government, mentoring, and other village expenditures are significant. The optimum village policies of mentoring for coastal village communities are more prioritized.

Fourth, the development of villages around forest areas optimize government expenditures for government administration, development, and mentoring.

Fifth, in general the empowerment of village communities has a negative score because the labor-intensive context undertaken by the village government is currently attached to the development of village infrastructure. This creates a need for community empowerment efforts rather than infrastructure development.

Sixth, the development of BUMDes will be more effective if it is done jointly.

Seventh, establish cooperation among villages in the development of rural areas so that the progress of village development is accelerated.

Limitations of the Research

At the time this research was conducted, there were several limitations to the research:

(1) the village neighbourhood is the surrounding village regions which borders the village directly;
(2) According to the regulations, village government expenditures are limited to four budget items in 2017, namely: (a) government administration; (b) development; (c) empowerment; and (d) community mentoring, while other expenditures are combined under the heading of expenditures for other purposes;
(3) The capacity of village officials was limited by the education level of the village head and the village secretary;
(4) The description of investments at the village level was limited by the existence of BUMDes business units; and
(5) the source of data used was the data collection of *Podes* 2018.

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Table A1: OLS Diagnostics According to Village Typology

Model	Parameter	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9
Urban	R^2:0,165 P-Val: 0,000 SE:6,642 N: 9.774	56.618 (0,000)	0.795 (0,000)	0.054 (0,413)	0.018 (0,741)	0.201 (0,000)	0.000 (0,984)	0.633 (0,000)	0.443 (0,000)	0.084 (0,000)	0.351 (0,000)
Rural	R^2:0,345 P-val: 0,000 SE:10,279 N: 65.662	24.192 (0,000	1.239 (0,000)	0.581 (0,000)	-0.305 (0,000)	0.428 (0,000)	0.284 (0,000)	1.936 (0,000)	1.259 (0,000)	0.220 (0,000)	2.049 (0,000)
Coastal	R^2:0,240 P-Val: 0,000 SE:10,22479 N: 11.385	33.17 (0,000)	0.781 (0,000)	0.151 (0,060)	-0.204 (0,003)	0.216 (0,000)	0.342 (0,000)	1.009 (0,000)	1.517 (0,000)	0.217 (0,000)	2.014 (0,000)
Non-Coastal	R^2:0,385 P-Val: 0,000 SE:10,378 N: 64.051	22.904 (0,000)	1.526 (0,000)	0.613 (0,000)	-0.265 (0,000)	0.480 (0,000)	0.247 (0,000)	2.175 (0,000)	1.143 (0,000)	0.217 (0,000)	1.870 (0,000)
Around Forest Area	R^2:0,447 P-Val: 0,000 SE:11,261 N: 20.682	15.265 (0,000)	1.067 (0,000)	0.592 (0,000)	-0.171 (0,001)	0.568 (0,000)	0.367 (0,000)	2.118 (0,000)	1.613 (0,000)	0.299 (0,000)	2.71 (0,000)
Outside Forest Area	R^2:0,276 P-Val: 0,000 SE:9,117 N: 54.754	36.059 (0,000)	1.105 (0,000)	0.285 (0,000)	-0.138 (0,000)	0.332 (0,000)	0.171 (0,000)	1.461 (0,000)	0.815 (0,000)	0.185 (0,000)	1.238 (0,000)

Source: Processed from *Podes* 2018.

Table A2: Coefficient of Regression Results

Model	Parameter	β_0	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9	W_Y	λ
OLS	R2:0,364 P-Val: 0,000 SE: 10,399 N: 75.436	24,710 (0,000)	1,413 (0,000)	0,548 (0,000)	-0,269 (0,000)	0,420 (0,000)	0,264 (0,000)	1,962 (0,000)	1,190 (0,000)	0,222 (0,000)	1,903 (0,000)		
LAG	R2:0,617 LI: 0,000 SE: 7,369 N: 71.494	9,405 (0,000)	0,423 (0,000)	0,175 (0,000)	0,045 (0,035)	0,215 (0,000)	0,076 (0,000)	0,809 (0,000)	0,643 (0,000)	0,099 (0,000)	0,770 (0,000)	0,599 (0,000)	
Error	R2: 0,659 LI: 0,000 SE: 6,957 N: 71.494	47,084 (0,000)	0,279 (0,000)	0,036 (0,204)	0,049 (0,038)	0,195 (0,000)	0,053 (0,000)	0,594 (0,000)	0,594 (0,000)	0,145 (0,000)	0,537 (0,000)		0,750 (0,000)

Source: Processed from *Podes* 2018.

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TOWARDS SPATIAL POVERTY TARGETING: IDENTIFICATION OF POVERTY CLUSTERING IN INDONESIA

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ABSTRACT

The Government of Indonesia is facing a new challenge in tackling poverty since the pace of the fall in the poverty rate has been slowing over the five years to 2020. To date, poverty alleviation programs implemented by the Government of Indonesia have been limited to large administrative areas such as the district (*kabupaten*) level. For this study, we combined the Poverty Livelihood Map of Indonesia 2015 (Poverty Maps) that measures Small Area Estimation to estimate poverty at the subdistrict (*kecamatan*) level using National Socioeconomic Survey Data (Susenas), with Census of Village Potential (Podes) datasets and Census Base Maps. This study aims to explore spatial patterns of poverty in Indonesia in relation to local geographic and demographic characteristics. We employed Global Moran's I to investigate the spatial autocorrelation of the poverty at *kecamatan* level, and Local Moran's I to detect the clustering pattern of poverty in wider geographical area in Indonesia. Furthermore, we estimated the association of poverty with spatial factors using spatial lag regression because poverty is spatially correlated across areas. The data show that hot spots of poverty are concentrated in many adjacent subdistrics and can be located across neighboring district. We found strong clusters of poverty of subdistricts in Indonesia. The spatial lag regression showed that factors such as agriculture, natural landscape (area located in uplands, woodland, sea, and river), physical infrastructures (road access and irrigation availability), access to basic facilities (health, education, and economy) are significantly correlated with poverty clustering.

Keywords: Poverty, Clustering, Spatial Analysis, Spatial Lag Regression, Local & Global Moran's I

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The Government of Indonesia is facing a new challenge in tackling poverty since the pace of the fall in the poverty rate has been slowing over the five years to 2020. To date, poverty alleviation programs implemented by the Government of Indonesia have been limited to large administrative areas such as the district (*kabupaten*) level. For this study, we combined the Poverty Livelihood Map of Indonesia 2015 (Poverty Maps) that measures Small Area Estimation to estimate poverty at the subdistrict (*kecamatan*) level using National Socioeconomic Survey Data (Susenas), with Census of Village Potential (Podes) datasets and Census Base Maps. This study aims to explore spatial patterns of poverty in Indonesia in relation to local geographic and demographic characteristics. We employed Global Moran's I to investigate the spatial autocorrelation of the poverty at *kecamatan* level, and Local Moran's I to detect the clustering pattern of poverty in wider geographical area in Indonesia. Furthermore, we estimated the association of poverty with spatial factors using spatial lag regression because poverty is spatially correlated across areas. The data show that hot spots of poverty are concentrated in many adjacent subdistrics and can be located across neighboring district. We found strong clusters of poverty of subdistricts in Indonesia. The spatial lag regression showed that factors such as agriculture, natural landscape (area located in uplands, woodland, sea, and river), physical infrastructures (road access and irrigation availability), access to basic facilities (health, education, and economy) are significantly correlated with poverty clustering.

Keywords: Poverty, Clustering, Spatial Analysis, Spatial Lag Regression, Local & Global Moran's I

1. INTRODUCTION

The Government of Indonesia has implemented three poverty reduction programs in the areas of food, health services, and education. The first cluster consists of health insurance (*Jamkesmas*),[1] conditional cash transfers (PKH),[2] rice subsidies for the poor (Raskin),[3] and scholarships for the poor (BSM).[4] The second cluster is a community-driven development program to alleviate poverty by having the communities design their own development agenda (PNPM).[5] The third cluster consists of a business microcredit program (KUR)[6] which is based on the empowerment of small and micro enterprises to provide access to, and strengthen, the economic environment for small- and micro-scale entrepreneurs. These programs have resulted in a fall in the national poverty rate to 10.12 per cent in 2017.

Although the national poverty rate has declined over time, the pace of the reduction in some places is much slower than others. For example, the 2017 poverty rates in eastern parts of Indonesia such as West Papua, Papua, and East Nusa Tenggara provinces are 23.12 per cent, 27.76 per cent, and 21.38 per cent respectively. These numbers are still relatively high compared to the national poverty rate and suggests that existing programs are not enough to accelerate poverty reduction in some areas and another approach is needed to solve the problem.

Bigman et al. (2000) argued that poverty tends to be concentrated in villages and certain parts of towns in most developing countries. We have made a similar assumption towards poverty in Indonesia. There has been a growing interest among scholars to study geographic targeting of small administrative areas and its use for poverty reduction efficiency and effectiveness. A study by Elbers et al. (2007) found that there are potentially large gains to be made by disaggregating to the local level in target programs. Baker and Grosh (1994) argued that geographic targeting is a useful mechanism for transferring benefits to the poor because of its simplicity and that regions can be assigned priority on the basis of existing aggregate data. Bigman et al. (2000) added that geographic targeting can reduce leakage so that a larger share of the poor population can be reached on a given budget or a larger share of this budget can reach the poor because it identifies the geographic areas where the poor are concentrated.

Hyman et al. (2005) argued that areas with high living standards are usually surrounded by neighbouring areas that have spill-over effects. Prosperous communities and households generate wellbeing in their neighbours through diffusion of innovations, social capital, trade, economies of scale, and other factors related to proximity and spatial interaction (Hyman et al. 2005). On the contrary, poor areas are often surrounded by neighbouring areas that are also poor. Poverty-stricken communities and their neighbouring areas often lack opportunities for trade and interaction (Hyman et al. 2005)

[1] *Jamkesmas: Jaminan Kesehatan Masyarakat* (Social Health Insurance).

[2] PKH: *Program Keluarga Harapan* (Family Hope Program).

[3] Raskin: *Beras Miskin* (Rice for the Poor) Program.

[4] BSM: *Bantuan Sekolah Miskin* (Cash transfer program for poor students).

[5] PNPM: *Program Nasional Permberdayaan Masyarakat* (National Program for Community Empowerment).

[6] KUR: *Kredit Usaha Rakyat* (Micro Credit Program).

We aim to examine whether poverty in Indonesia is spatially clustered by utilising the poverty estimates at *kecamatan* level from Poverty Livelihood Map of Indonesia 2015 (Poverty Maps). Furthermore, we determine how far spatial clustering correlates poverty incidences and investigate the association of geographic characteristics and its spatial clustering across *kecamatan* in Indonesia. This study suggests that, by finding poverty clusters and their contributing factors, more effective programs can be implemented to boost the poverty reduction effort.

2. DATA AND METHOD OF ANALYSIS

2.1. Data

This study utilised Podes 2014. Podes is a village-level census carried out by Statistics Indonesia (BPS).[7] Podes is a village-level dataset that covers all 74,410 villages in Indonesia. We merged the Podes dataset with poverty at the *kecamatan* level from the Poverty Livelihood Map of Indonesia 2015 (Poverty Maps). Poverty Maps applied small area statistics combining the 2010 Population Census, Susenas 2015, and Podes 2014 to estimate subnational poverty rates–particularly at *kecamatan* and village level (SMERU, 2014).

2.2. Poverty Clustering at *kecamatan* Level

Spatial clustering shows the similarity or dissimilarity of poverty in neighbouring units and spatial autocorrelation measures the strength of the spatial clustering (Cliff and Ord 1973; Getis and Ord 1992; Anselin 1995). Spatial autocorrelation is applied when the dependent variable or errors of every observation are correlated with observations or error terms of other observations. Spatial autocorrelation measures the closeness of an observation with other surrounding observations. Global Moran's I is generally applied to measure such a problem. Global Moran's Index measures the existence of spatial distribution of a variable globally. Moran's I scores are ranged from -1 to 1. A value of -1 means the data is scattered randomly while a value of 1 shows that the data is perfectly distributed spatially. We estimated the *kecamatan*-level poverty clustering using the Poverty Maps dataset. The Poverty Maps estimation combines information from Susenas with information from the population census (*Sensus Penduduk*) and Podes. A small area estimation technique is applied to estimate the *kecamatan* level poverty rates. Subdistrict poverty rates in this study are the ratio of the number of households whose expenditure per capita falls below the poverty line at *kecamatan* level.

Structurally, the poverty level of an area is related to the poverty level of the neighbouring area. In other words, we know that the structure of poverty has a spatial relationship feature. Spatial lag regression can, therefore, be utilised to model the spatial interactions of subdistrict poverty. The auto global spatial autocorrelation is calculated using Moran's I index using the following formula (Pfeiffer et al. 2008):

$$I = \frac{1}{s^2} \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij} (Z_i - Z)(Z_j - Z)}{\sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij}}$$

[7] BPS: *Badan Pusat Statistik* (Statistics Indonesia).

where

$$S^2 = \frac{1}{n}\sum_{i=1}^{n}(Z_i - \bar{Z})^2$$

n indicates the number of observations, Zi is the poverty rate for observations in location i, Zj, is the poverty rate of location j, ZBAR is the average of poverty level, and WIJ is the weight of connectivity between location i and j. The value of the Moran's I index ranges from -1 to 1. The Moran's I of 1 shows a perfect autocorrelation and -1 shows a prefect random spread (Pfeiffer et al. 2008).

The Moran's I index only provides information on whether there is or is no spatial autocorrelation of poverty between locations. To supplement this, we also need information about where the poor locations are clustered. After conducting the Global Moran's I test, the next step would, therefore, be investigating the clustering pattern by employing a local Moran's I test. The local Moran's I test is calculated by using the Local Indicator of Spatial Association (LISA) formula (Anselin 1995):

$$I_i = \frac{\sum_{j=1}^{n} W_{ij}\left(Z_i - \bar{Z}\right)(Z_j - \bar{Z})}{\sum_{i=1}^{n}(Z_i - \bar{Z})^2}$$

The LISA will provide information about the similarity of the poverty between location i and location j as well as the significance level. As with Global Moran's I, if the statistical test is not significant it means that there is no clustering pattern in the region. In other words, the poverty is randomly distributed. On the contrary, if the LISA statistical test is significant, there will be four possibilities:

1. A high-high (HH) association: this is a hot spot cluster where the LISA index in location I is higher than the overall location.
2. A low-low (LL) association: this is a cold spot cluster where the LISA index is lower than the overall location.
3. High-low outlier: in this cluster, the LISA index in location i is higher than the neighbouring location.

4. Low-high outliers: in this cluster, the LISA index in location i is lower than the neighbouring location.

In the LISA analysis, the focus is on the HH and LL association.

2.3. Spatial Lag Regression

The spatial lag regression is utilised to examine the relationship between poverty and other spatial characteristics. A spatial regression instead of linear regression is needed for two reasons: firstly, where the poverty is spatially distributed within the country. In this case, a proper consideration about spatial dependence between observations should be considered (Pisati 2001). Secondly, from the LISA analysis we found there are some regional poverty clusters, however, from the Moran's I and LISA test we cannot explain what factors are responsible for the clustering of poverty in the country. Spatial regression will, therefore, be useful for identifying factors explaining the spatial distribution of poverty. Spatial regression is able to estimate the relationship of the poverty rate as the outcome variable and some geographic and socioeconomic predictors by considering the spatial dependence among observations (Pisati 2001). This study develops spatial regression using the spatial error model. A spatial weight matrix is developed to consider the connectivity between districts. The Podes dataset is utilised to obtain subdistrict characteristics such as geography, infrastructure, population and environment, natural disasters, and education and health facilities.

The spatial lag regression is defined as:

$$y = \rho W y + x\beta + e$$

The spatial lag model reduced form equation is:

$$(I - \rho W)y = x\beta + e$$

The spatial weight matrix is defined as W with elements wij indicating whether observations i and j are spatially close.

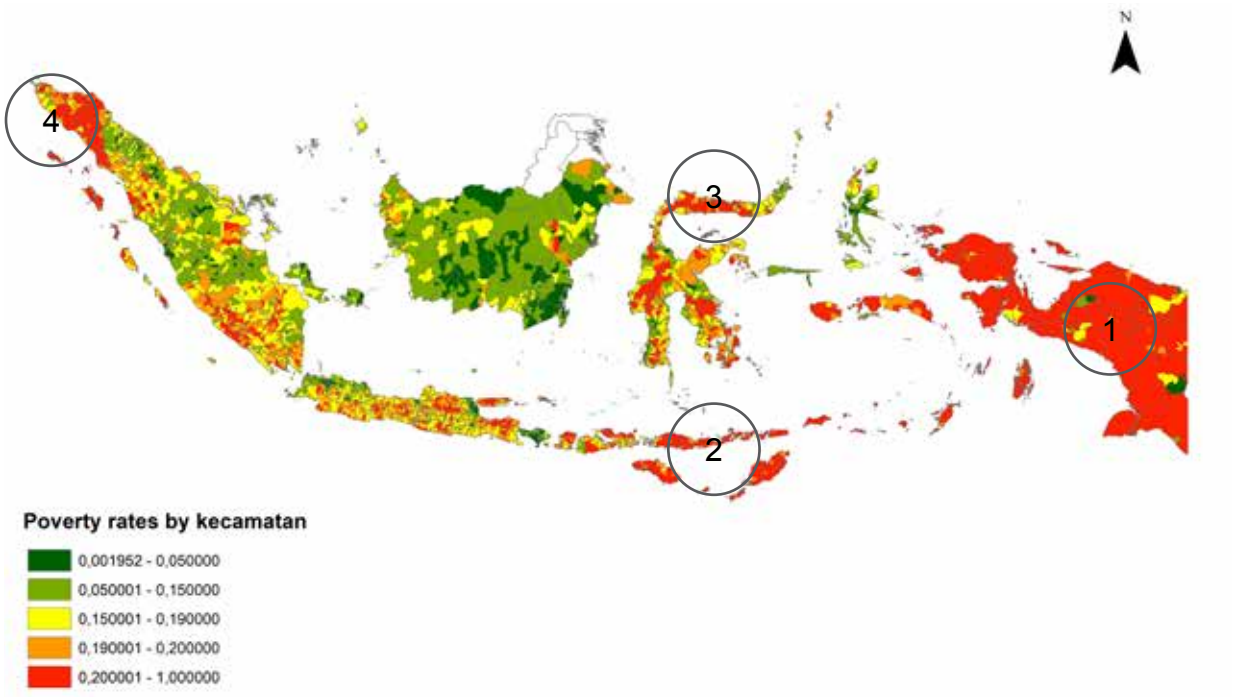
The independent variables explain the variation in the dependent variable that is not explained by the neighbours' values. The spatial dependence parameter ρ is also estimated.

3. RESULTS AND DISCUSSION

3.1. Poverty Clustering at kecamatan Level

Using a choropleth map, we can visually find a spatially distributed structure of poverty in certain regions in Indonesia by dividing the poverty rates into five categories: (i) below five per cent; (ii) five to ten per cent; (iii) ten to fifteen per cent; (iv) fifteen to twenty per cent; and (v) over twenty per cent. Figure 3.1 shows the distribution of poverty at *kecamatan* level. Cluster of poverty can be identified visually in (1) the east; (2) south; (3) top west; and (4) some small clusters spread around Java and Sumatra islands. This simple choropleth shows signs that the distribution of poverty is not spread randomly but tends to be concentrated in certain areas.

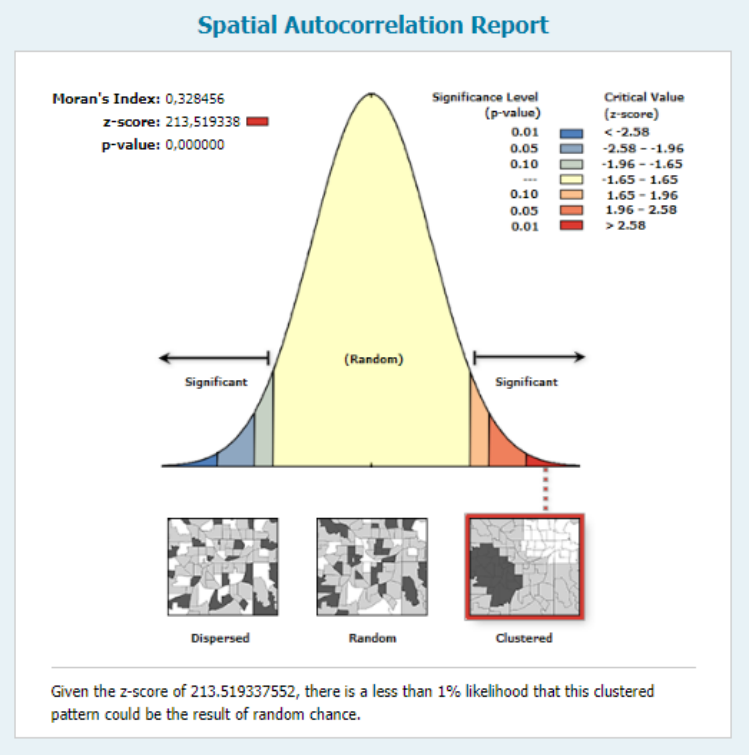
Figure 3.1: Spatial Distribution of Poverty at Kecamatan Level in Indonesia, 2015



Source: Calculated from Poverty and Livelihood Data (SMERU, 2015)

To statistically test whether the subdistrict poverty level in Indonesia is clustered, scattered or random, we used a spatial autocorrelation test of poverty using ArcMap. The test resulted in a statistically significant score of global Moran's I, which is 0.329 with the p-value of 0.0000 (Figure 3.2). Statistically significant global Moran's I verified the hypothesis of spatially distributed poor or non-poor areas across regions in Indonesia. It means a poor area is often surrounded by poor neighbours and vice versa.

Figure 3.2: Measure of Global Spatial Autocorrelation at Kecamatan Level in Indonesia, 2015



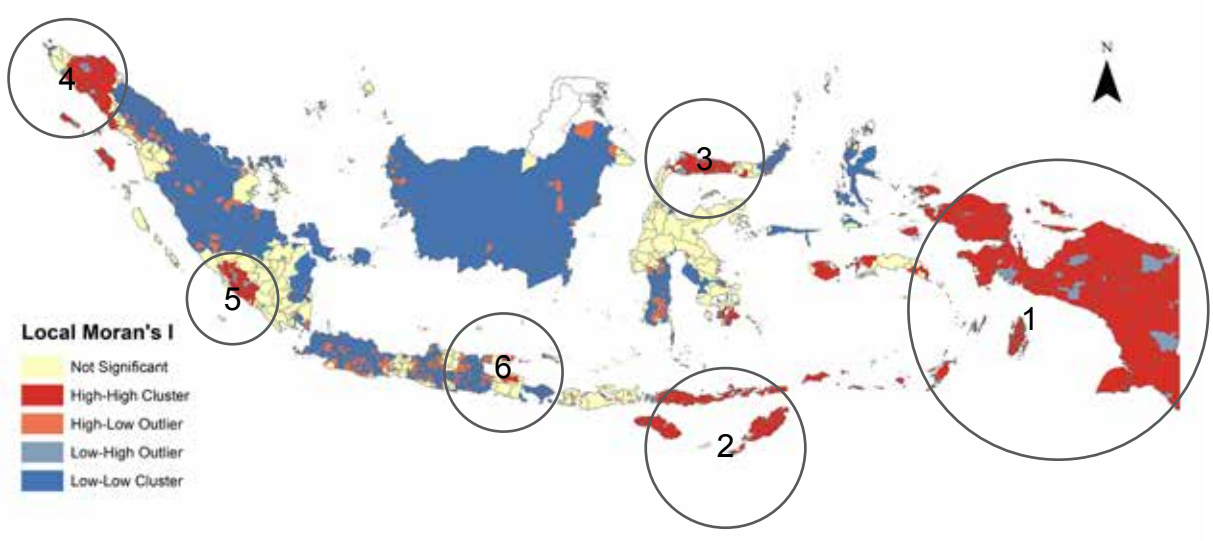
Source: Calculated from Poverty and Livelihood Data (Smeru, 2015)

Furthermore, we decompose the global spatial correlation to lower geographic coverage using LISA and plot the results in Figure 3.3. This figure suggests there are four clustering patterns of poverty: high-high, high-low, low-high, and low-low. A high-high cluster shows high subdistrict poverty with high poverty neighbours. The second group, low-high shows low subdistrict poverty with high poverty neighbours. High-low clusters show high poverty with low poverty neighbours, while low-low clusters show low poverty surrounded by low poverty neighbours.

Most of the low-low clusters are found in North Sumatra, Riau, Jambi, and South Sumatra provinces. Other low-low clusters are found in most parts of Java including Banten, West Java, DKI Jakarta, Central Java, and Yogyakarta provinces. We also found small clusters that are located across Probolinggo, Situbondo, and Bondowoso districts in East Java.

We suggest that priority attention should be given to high-high clusters of poverty, indicated by numbers 1 to 6 in Figure 3.3. These are located in Papua (1), East Nusa Tenggara Province (2), Gorontalo Province (3), Aceh Province (4), Bengkulu Province (5), and East Java Province (6). Not surprisingly, three massive clusters of poverty are found in the eastern part of the country: Papua (1), Nusa Tenggara (2), and Aceh region (4).

Figure 3.3: The Spread of Strong Poverty Clusters in Indonesia, 2015



Source: Calculated from Poverty and Livelihood Data (Smeru, 2015)

The poverty level of an area is correlated with that of the neighbouring area. In other words, the structure of poverty has a spatial relationship feature. We ran a spatial lag regression to estimate the correlation between clusters of poverty at the subdistrict level and other spatial variables.

We use the subdistrict poverty rate (p0) as a dependent variable and spatial variables as covariates. These include topography, access to river, irrigation, sea and woodland, distance to doctor, midwife and *puskesmas*, distance to primary school, distance to market, road access and electricity, share of villages with agriculture as main occupation and natural disaster.

The result is presented in Table 3.1 below.

Table 3.1: Spatial Lag Regression: Result

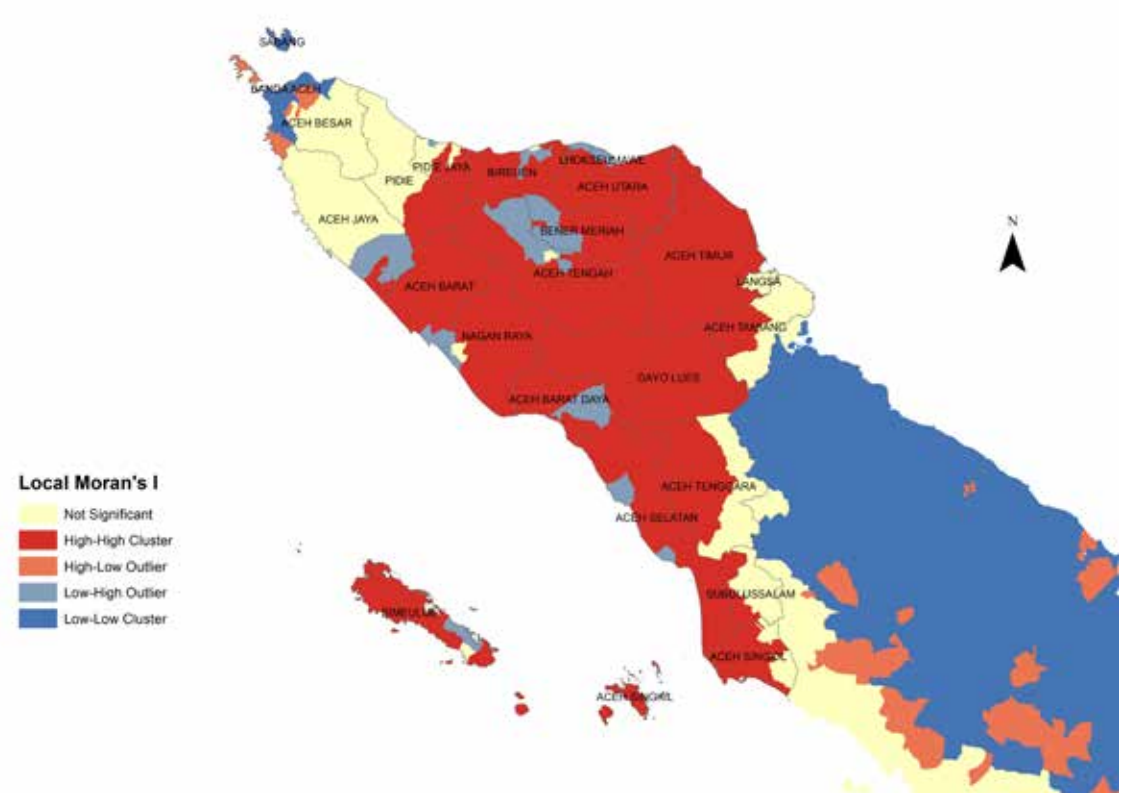
Spatial autoregressive model	Number of obs = 6,817		
(Maximum likelihood estimates)	Wald chi2(14) = 1,885.64		
	Prob > chi2 = 0.0000		
Dependent Variable = p0	Coef.	Std. Err.	P>|z|
Share of villages with river network	-0.008	0.003	0.012
Share of villages having irrigation network	-0.007	0.003	0.013
Share of villages whose main occupation is agriculture	0.069	0.004	0.000
Share villages with road network that is accessible all year	-0.010	0.004	0.021
Share of villages with access to PLN* electricity	-0.050	0.005	0.000
Share of villages located in mountainous area	0.007	0.003	0.027
Share of villages adjacent to sea	0.010	0.004	0.004
Share of villages located in or around woodland	0.014	0.003	0.000
Average distance of village to permanent market	0.000	0.000	0.000
Average distance of village to community health facility	0.000	0.000	0.613
Average distance of village to private doctor's practice	0.001	0.000	0.000
Average distance of village to midwife	0.000	0.000	0.064
Average distance of village from primary school	0.000	0.000	0.024
Average number of villages experiencing natural disaster in the last three years	-0.006	0.002	0.016
Intercept	0.120	0.009	0.000
Rho	0.138	0.002	0.000
sigma2	0.003	0.000	0.000

Source: author's analysis (2019)

The above table shows that, with the exception of distance to public health facilities, almost all local geographic characteristics have a significant relationship with subdistrict poverty. This result is consistent with previous research such as Murayama and Thapa (2011), Davis (1986), and Hyman et al. (2005). These findings highlight the role of local geographic conditions and infrastructure to characterise the presence of poverty clusters or poverty pockets in some regions of Indonesia.

To better understand the determinants of spatial clusters of poverty at the district level, we conducted several separated analyses for major high-high cluster areas, namely the Aceh cluster and Papua cluster to represent the west and the east region of the country.

Figure 3.4:Distribution of Poverty Clusters in Aceh Province, 2015



Source: Calculated from Poverty and Livelihood Data (Smeru, 2015)

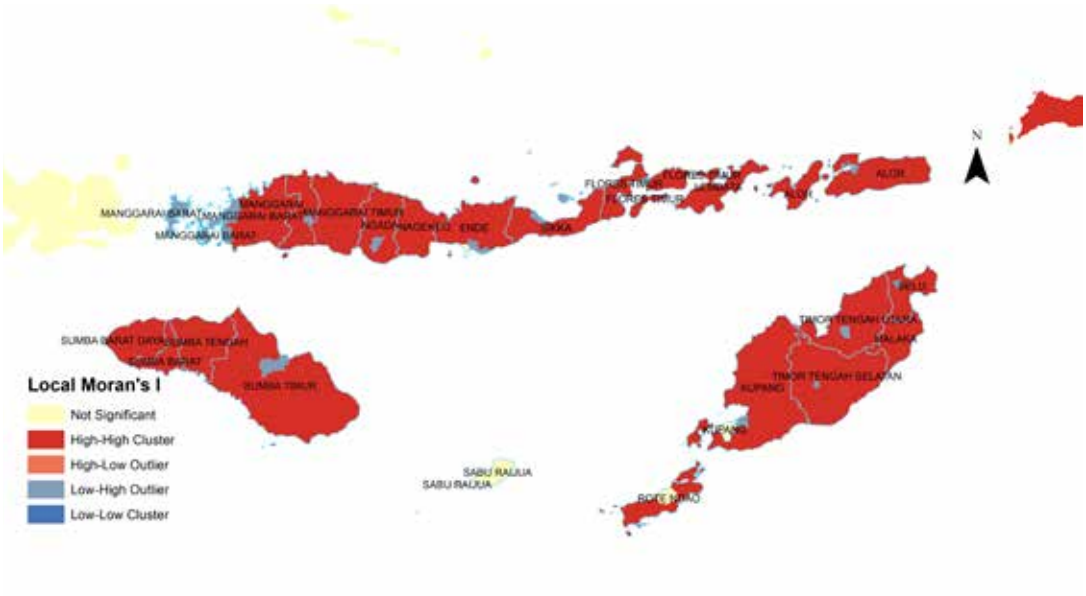
A big high-high cluster is located across Pidie, Pidie Jaya, West Aceh, Central Aceh, Bener Meriah, Bireden, Lhokseumawe, North Aceh, East Aceh, Aceh Tamiang, Gayo Lues, Southwest Aceh, Nagan Raya, Southeast Aceh, Sulubussalam, Aceh Singkil, and Simeulue districts (Figure 3.4). A low-low cluster is found in Banda Aceh and Sabang districts which is not surprising since Banda Aceh and Sabang are tourist destinations.

To examine factors which determine the high-high cluster in Aceh Province, we ran an ordinary least square (OLS) regression in 155 subdistricts. Significant correlations are found between agriculture, access to health facility, and access to a doctor with poverty rates (Table 3.1).

Local Moran's I showed that almost all districts in East Nusa Tenggara province are among in a high-high cluster (Figure 3.5). Unlike the high-high cluster in Aceh province, the OLS regression result of the high-high cluster in East Nusa Tenggara showed that there is significant correlation between poverty with irrigation access, topography, market access, health facility and doctor access, and access to primary education (Annex 1).

The road system in East Nusa Tenggara is among the worst in Indonesia (Resosudarmo and Jotzo 2009). The main highway from Kupang to Atambua on the border of Timor-Leste is well maintained, however, interior roads are frequently unsealed, irregularly serviced, and often impassable during the annual 3-4 month rainy season. Indeed, most locations off the Kupang-Atambua highway and a few other main routes can only be accessed by four-wheel drive or motorcycle, even in dry weather (Resosudarmo and Jotzo 2009).

Figure 3.5: East Nusa Tenggara Local Moran's I Result



Source: author's analysis (2019)

To examine what factors determine the high-high poverty cluster in a region, policy makers should conduct a separate regression analysis on each cluster. A qualitative analysis is also necessary to confirm the findings.

4. CONCLUSION

This study found that *kecamatan*–level poverty in Indonesia is clustered and that there are strong clusters of poverty at this administrative level. Each cluster has a different geographic endowment, therefore, local-level spatial analysis is needed to determine specific geographic characteristics that are linked to poverty. Spatial factors such as agriculture, natural landscape (upland, woodland, sea, and river), physical infrastructure (road access and irrigation availability), access to facilities (health, education, and economy) are significantly correlated with poverty clustering. By finding poverty clusters and their contributory factors, more effective programs can be implemented to boost the effort to reduce poverty.

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ANNEX

Annex 1: OLS Regression Result for HH Cluster in Aceh Province

	Number of obs	=	155
	F(18, 136)	=	2.95
	Prob > F	=	0.0002
	R-squared	=	0.2811
	Adj R-squared	=	0.186
Dependent variable =p0	Coef	Std. Err.	P>t
Share of villages with river network	-0.0131416	0.0188734	0.487
Share of villages having irrigation network	0.0192845	0.0138052	0.165
Share of villages whose main occupation is agriculture	0.2323021	0.1075864	0.033
Share villages with road network that is accessible all year	-0.0332242	0.0243716	0.175
(Share of villages with access to PLN* electricity	-0.0262783	0.0340587	0.442
Share of villages located in mountainous area	0.0075562	0.0207866	0.717
Average distance of village to permanent market	0.000322	0.0003651	0.379
Average distance of village to community health facility	-0.0029591	0.0020456	0.15
Average distance of village to private doctor's practice	0.0008836	0.0002498	0.001
Average distance of village to midwife	-0.000138	0.0001975	0.486
Average distance of village from primary school	0.0026599	0.012074	0.826
Average number of villages experiencing natural disaster in the last three years	-0.0108685	0.0137466	0.431
Number of primary school	-0.0006091	0.0011627	0.601
Total of *puskesmas*	0.0008138	0.0015695	0.605
Number of *poliklinik*	-0.0037137	0.0052951	0.484
Number of doctors and midwives	-0.0002903	0.0009392	0.758
Number of *polindes & poskesdes*	-0.0012336	0.0007369	0.096
Number of *posyandu*	0.0001308	0.0005379	0.808
Intercept	0.0871016	0.118817	0.465

Annex 2: OLS Estimation Result for East Nusa Tenggara Province

	Number of obs	=	268
	F(18, 136)	=	8.76
	Prob > F	=	0
	R-squared	=	0.3878
	Adj R-squared	=	0.3436
Dependent variable =p0	Coef	Std. Err.	P>t
Share of villages with river network	-0.0012034	0.0104823	0.909
Share of villages having irrigation network	-0.0307098	0.0122041	0.012
Share of villages whose main occupation is agriculture	0.2686013	0.0792408	0.001
Share villages with road network that is accessible all year	-0.0401405	0.0128902	0.002
Share of villages with access to PLN* electricity	-0.0061248	0.0121067	0.613
Share of villages located in mountainous area	-0.0097865	0.0088476	0.27
Average distance of village to permanent market	-0.0003885	0.0001955	0.048
Average distance of village to community health facility	-0.0013762	0.0004784	0.004
Average distance of village to private doctor's practice	0.0005695	0.0001326	0
Average distance of village to midwife	-0.0001242	0.0001056	0.241
(Average distance of village from primary school	-0.0151331	0.0166493	0.364
Average number of villages experiencing natural disaster in the last three years	-0.0031126	0.008438	0.713
Number of primary schools	0.0015836	0.0006088	0.01
Total of *puskesmas*	-0.0035938	0.00144	0.013
Number of *poliklinik*	-0.0066779	0.0052369	0.203
Number of doctors and midwives	0.0006517	0.0025878	0.801
Number of *polindes & poskesdes*	-0.0036201	0.0009393	0
Number of *posyandu*	-0.0001038	0.0003612	0.774
Intercept	0.074197	0.0805451	0.358

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REGIONAL INEQUALITY IN INDONESIA: PRE AND POST REGIONAL AUTONOMY ANALYSIS

Sonny Harry B Harmadi, Ardi Adji

ABSTRACT

The era of reform in Indonesia was initially triggered by the monetary crisis that Indonesia experienced in June 1997, marked by the sharp decline in the value of the Rupiah, Indonesia's national currency. In the year 1999, Law No. 22/1999 on Regional Autonomy and then Law No. 25/1999 on Fiscal Balance between the central and regional governments. Both of these laws would later serve as an "umbrella" for the implementation of fiscal decentralisation in Indonesia. The implementation of regional autonomy in Indonesia was followed by the delegation of a large proportion of the central government's affairs to the regional governments. There are 26 mandatory affairs originally handled by the central government that were delegated to, and are now implemented by, regional governments. The regional autonomy system was enacted formally in 2001. The establishment or delegation of authority to the lower levels of government is one way to improve efficiency and effectiveness in the relationship between the government and the people. The question arises, obviously, will Indonesia, with the fundamental change in the country's political setting, be able to reduce inter-regional inequality? This paper attempts to compare the conditions of inter-regional disparity, that is comparing the conditions before (1995-2001) and after (2002-2017) the implementation of regional autonomy. Based on the results of calculating disparity among the regions related to per capita government expenditures, similar conditions to that of per capita income disparity were found. Nevertheless, one of the positive outcomes of implementing regional autonomy is the decline in educational disparity among regions.

Keywords: Regional Inequality, Regional Autonomy, Regional, Inequality

INTRODUCTION

Indonesia is an archipelagic nation consisting of some 17,504 islands with a total area of 1,904,569 km2. Indonesia is the 15th most expansive country in the world. It is estimated that only 6,000 of the islands in Indonesia are occupied. Administratively, the Republic of Indonesia is divided into 34 provinces, 514 regencies/ municipalities (98 municipalities and 416 regencies or districts), 7,094 subdistricts, and 83,447 villages. East Java is the province with the largest number of regencies/municipalities, namely 38 while Yogyakarta and West Sulawesi have the least number of regencies/municipalities at 5 each.

The 2010 census indicates that the population of Indonesia has reached 237.6 million, with more than 57 percent of the people living on the island of Java and approximately 21 percent living on the island of Sumatra. Indonesia is the fourth most populous country in the world. Within a period of 80 years (1930 to 2010), the population of Indonesia had risen fourfold. Between the years 2000 to 2010, the average population growth in Indonesia was around 1.49 percent which was higher than the target set by the government of only 1.26 percent per year. It is estimated that there are more than 1,100 ethnic groups in Indonesia.

Regarding the economy, Indonesia's economic growth has been quite stable over the period 2000-08. According to Nugraha and Lewis (2013), Indonesia has experienced significant economic growth in recent years (on average, 5 percent in 2000–08), but many people are still living in poverty. Income inequality, as measured by the official Gini coefficient, has also increased. This paper evaluates household income and income inequality in Indonesia, assessing both market and non-market income to reach a more accurate measure of how actual income affects living standards. We find that if household income considers non-market income, income distribution is significantly more balanced, the coefficient of income inequality falls from 0.41 to 0.21 and the income share of the population's poorest deciles increases more than fivefold. The results suggest that market income alone is a misleading measure of income distribution in Indonesia.

This economic growth in 2007 was the highest since the economic crisis that Indonesia experienced in 1997. In 2008, Indonesia's economic growth faltered a bit, slipping to 6.1 percent. Unfortunately, in 2009, Indonesia's economic performance declined even further and the economic growth rate was only 4.5 percent. This was due to the decline in exports and in the prices of certain major commodities as a result of the global economic crisis. The economic growth rate in 2009 was able to remain positive mainly because of an increase in domestic consumption. The evidence suggests that the general elections of regional heads in that year triggered a high degree of domestic spending to mobilize the national economy. In 2010, the country's economic growth began to rise again, reaching 6.1 percent. The lower 40 percent of Indonesia's population by income experienced lower growth than the national average, with rural areas experiencing worse conditions compared than urban areas.

There are three sectors that are the most dominant in Indonesia's economy, having a 'double digit' contribution to the economy. In 2009, around 26.16 percent of Indonesia's economy was supported by industrial and manufacturing activities, followed by the trade, hotel, and restaurant sectors at 16.90 percent and the agricultural sector at 13.61 percent. In 2010, from approximately 171.02 million people in the working age group (above 15 years old), as many as 116 million were part of the labour force. The majority are males, in a proportion reaching two-thirds of the total labour force. As many as 107.41 million people in the labour force are actively working and about 8.59 million are in open unemployment. This means around 7.41 percent of the labour force are unemployed.

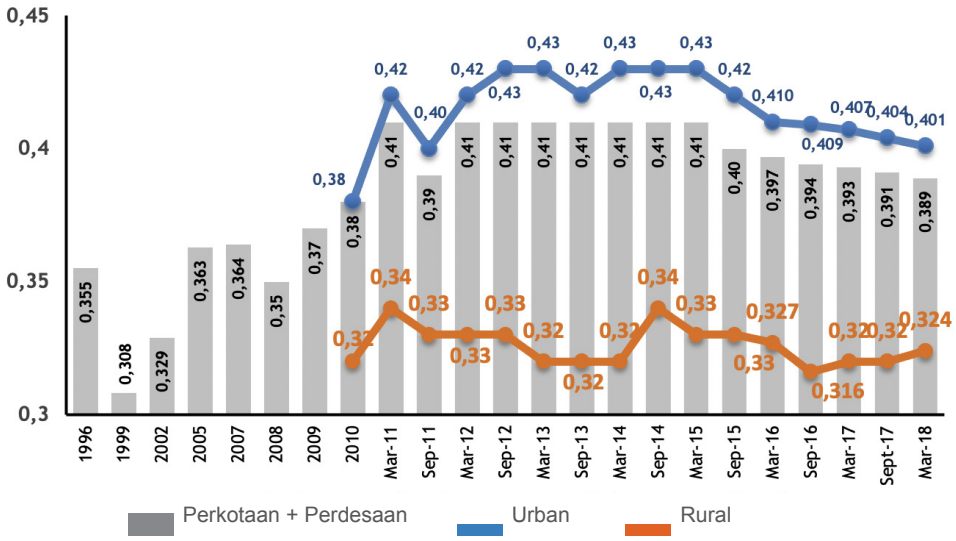
Regionally, during the period of 2002-07, only eight of 33 provinces in Indonesia had economic growth that was above the national average. The provinces of Riau, Jambi, South Sumatra, East Kalimantan, West Sulawesi, Central Sulawesi, Southeast Sulawesi, and West Papua during that specific period experienced a growth that surpassed the national growth rate. This means that the contribution of these eight provinces to the national economy had increased significantly over this period. The implementation of regional autonomy since 2001 has encouraged several regions outside of Java to grow more rapidly. In this case, we must also bear in mind the increased fiscal capacity of each of the regions in financing their own development. Fiscal decentralisation reduces the regional income gap and enables local governments to efficiently provide the public services they need. Finally, decentralisation motivates local politicians to effectively allocate local public goods and services. This is because regional heads are elected through direct elections in Indonesia and they want to be re-elected by serving voters better (Siburian 2019).

Indonesia continues to make serious efforts to improve the quality of life of its people. The human development index for Indonesia in 2010 was still 108 out of 169 countries of the world. Ianatul 2006, uses data from the 1976 Household Expenditure Survey (Susenas) to examine spatial patterns of poverty and inequality in Indonesia. A number of inequality measures are computed for each province (Gini Ratio, Atkinson Index, Theil Index, L-Index) and provincial rankings according to each index are compared. Provinces are also ranked according to a number of poverty indexes, using a poverty line adjusted for differences in price levels between provinces. The correlation between selected measures of poverty and inequality is also investigated and some implications for regional development policy discussed.

Bas 2016 estimated inequality in Indonesia between 1932 and 2008. Inequality increased at the start of this period but declined sharply from the 1960s onwards. The increase was due to a shift from domestic to export agriculture over the period up to the Great Depression. During the 1930s, as the price of export crops declined, the income of rich farmers suffered a blow. This was, however, counterbalanced by an increasing gap between expenditures in the urban and rural sectors, causing an overall rise in inequality. As for the second half of the century, we find that the employment shift towards manufacturing and services—combined with an increase in labour productivity in agriculture—accounts for a fall in inequality. Nevertheless, this period of falling inequality was halted in the 1990s. These inequality trends affected poverty as well, but prior to the 1940s the negative impact of the rise in inequality was offset by an increase in per capita GDP. Between 1950 and 1980 a decline in inequality, combined with increased per capita GDP, rapidly lifted a large proportion of the population above the poverty line.

Since the implementation of regional autonomy in 2002, inequality between regions has continued to increase, from 0.33 in 2002 to become 0.39 in 2017. Since 2011 until 2019 the Gini ratio has ranged from 0.39-0.41 (Figure 1). Miranti et. al. (2014) shows that the effectiveness of growth in alleviating poverty across provinces was greater during decentralisation—that is, between 2002 and 2010—than at any other point since 1984. The growth elasticity of poverty since 2002 is estimated to have been –2.46, which means that a 10 percent increase in average consumption per capita would have reduced the poverty rate by almost 25 percent. We also find, however, that rising income inequality negated one-quarter to one-third of the 5.7 percentage point reduction in the headcount poverty rate. This increasing inequality has contributed to a lower level of pro-poor growth than that maintained in Indonesia before decentralisation.

Figure 1: National Gini Ratio: Urban and Rural (1996-2018)



Source: Statistics Indonesia (few editions). BPS.

Implementation of Regional Autonomy and Fiscal Decentralisation

Indonesia began the era of reform after the downfall of the Soeharto regime on 21 May 1998. The reform movement was initially triggered by the monetary crisis that Indonesia experienced in June 1997, marked by the sharp decline in the value of the rupiah, Indonesia's national currency. The crisis developed further to become an economic crisis and the people demanded a change in the powers running the government. They also demanded reform in the governmental system and the desire to enforce a decentralisation system in Indonesia grew more intense at this time.

In the year 1999, Law No. 22/1999 on Regional Autonomy was passed, and then Law No 25/1999 on Fiscal Balancing between the central and regional governments. Both of these laws would later serve as an "umbrella" for the implementation of fiscal decentralisation in Indonesia. Law No. 22/1999 basically regulates the running of a regional government that prioritises the principles of decentralisation where the regency/ municipality acts as a "motor" while the provincial government acts as coordinator. In further developments, Law No. 32/2004 replaced Law No. 22/1999 as of September 2004. Similarly, Law No. 25/1999 was replaced by Law No. 33/2004 as of September 2004. A second revision was made to both laws as a follow-up measure by the government to harmonise these two "umbrella" laws for regional autonomy with the various other related laws and regulations.

The implementation of regional autonomy in Indonesia was followed by the delegation of a large proportion of the central government's affairs to the regional governments. There are 26 mandatory affairs originally handled by the central government that were delegated to, and are now implemented by, the regional governments. Regional autonomy is linked to the delegation of authority from the central government to the regions. This naturally has implications on the financial relationship between central and regional levels, and consequently the implementation of regional autonomy becomes the application of fiscal decentralisation. The impact of the distribution in the current macroeconomic climate tends to be most difficult for the poor to feel. Indonesia is famous for its record of poverty reduction, but between September 2014 and March 2015

the share of the population in poverty increased despite economic growth approaching 5.0 percent. Slowing growth, rising food prices, falling real wages for farmers, and delaying payment of compensation for fuel prices all had an impact. According to Yusuf and Summer (2015), such impacts could have been reduced in the medium term by reallocating Jokowi's budget to infrastructure, if realised, and expanding social spending. The main objective of decentralisation is to develop the functions of the government to provide better services for the people. Since the people have lived with administrative limitations in the regions, they want to have direct interaction with their local government, a closeness that exceeds that of the central government. The building up, or delegation, of authority to the lower levels of government is one way to improve efficiency and effectiveness in the relationship between the government and the people. In theory, the regional governments will be able to cut the costs of transactions and increase transparency and accountability and this should encourage more and better dominance of the regional requests. Regional development is expected to become more efficient and effective.

The general objective of regional autonomy is to: (a) promote equitable development; (b) raise the prosperity of the people; and (c) improve democratisation through local participation. Whereas in implementing fiscal decentralisation, there was a change in the pattern of financial relations between the central government and the regions. The financial relationship between governments is based on the principle of fair and responsible distribution, paying special attention to inter-regional equality, and financial adequacy or financing should be in accordance with the authority of the decentralised region. In addition to its local own revenues, the regional government also obtains its development funds from transfers made by the central government to the regional governments. The transfer system can be divided into three types of schemes: (i) revenue sharing (tax and natural resources); general transfers (*Dana Alokasi Umum*: DAU); and specific transfers (*Dana Alokasi Khusus*: DAK). This transfer system has seven main targets, namely:

1. To overcome the vertical fiscal disparity between levels of government (DBH,[1] DAU);
2. To equalise the fiscal capacities of the regional governments to provide public services (DAU);
3. To encourage regional expenditures that are the priority of national development (DAK);
4. To achieve the minimum standard in infrastructure (DAK);
5. Compensation for the benefits/costs of spillover effects in the priority regions (DAK);
6. To stimulate regional commitment (DAK); and
7. To stimulate mobilisation of the regional income (DBH, DAU, DAK);

Purpose of this Paper

As demonstrated in many studies on inter-regional inequalities (for example Akita and Alisjahbana 2002), sharp disparity exists between the eastern regions of Indonesia and Java/Bali region. It is widely known that the eastern part of Indonesia was the smallest beneficiary of development during the New Order regime.

The question arises, obviously, will Indonesia, with the fundamental change in the country's political setting, be able to reduce inter-regional inequality? This question cannot be answered immediately. First, decentralisation in Indonesia is still searching for its optimal form. Indonesian decentralisation is a mega project in any term. Within its ten years of implementation, both the central and regional governments had no adequate experience and knowledge about the subject. Prior to the revision, decentralisation implemented at regional level had caused the span of management by the central government to become extremely large. This, then, presented the central government with great challenges to direct the country's progress. The

[1] DBH: Dana Bagi Hasil: Revenue-sharing Funds.

nature of Indonesia itself had helped to amplify the challenge. This country is highly heterogeneous in almost every aspect. So immense is the level of diversity that if decentralisation is something referred to in a variety of preferences, then what occurred during the first three and a half years of implementation can be thought of as performing a full symphony orchestra with only a single musician.

Decentralisation aims at delivering services to a variety of local requirements so that eventually inter-regional disparity can be minimised. Nevertheless, in practice, this has also produced a wide range of programs and treatments to deliver public services. With the various different policies applied by the local governments, the rate of development differs from region to region. Nonetheless, the transfers from the central government to the regional governments will at least lessen the inter-regional fiscal capacity gap, and thus the development capacity should be more equitable.

This paper attempts to compare the conditions of inter-regional disparity, that is comparing the conditions before and after the implementation of regional autonomy. This constitutes an effort to measure the success in implementing regional autonomy and fiscal decentralisation. As already explained, one of the goals of regional autonomy is to promote equitable development in Indonesia. This paper attempts to measure the inter-regional disparity against three variables, namely income per capita, per capita regional fiscal capacity, and years of schooling. Income per capita is used to measure disparity in welfare among the regions. Per capita regional fiscal capacity is used to measure disparity in terms of the capacity to finance public services, while years of schooling is used to compare the performance in providing public services before and after the implementation of regional autonomy in Indonesia.

DATA AND METHODS

1. Data and Sources

The data used for the analysis of inequality between regions included the periods before and after the implementation of the regional autonomy or decentralisation law. The regional autonomy law was given effect in 2001. The data used in the analysis are as follows:

(1) Per capita GRDP at constant price at the level of Regency/Municipality in 1995, 2000, 2005, 2010 and 2015. The availability of GRDP data had lagged, so the latest data available for analysis was GRDP in 2005. It was difficult to collect regency-level data from about 298 regencies in 1998, a number that had grown to become about 440 regencies in 2008. Data on GRDP and population was collected from various BPS publications.

(2) Regional Fiscal or Government Revenue at Province and Regency/Municipality in 1995, 2000, 2005, 2010 and 2015. The source of fiscal revenue to finance the public services in a province was sourced from the provincial and regency/municipality government budget. The sum of two sources of budget in a province was used to calculate the inequality indices between provinces. To calculate disparity between regencies/municipalities in a province, we used the regency budget, and neglected the provincial budget. The fiscal data were collected from Directorate General for Financial Balancing, Ministry of Finance, Republic of Indonesia.

(3) Years of schooling by province and regency/municipality in 1995, 2000, 2005 and 2008. The data was disseminated from the Sakernas (National Survey on Labour Force) database in 1995, 2000, 2005, 2008, 2010-2017 that was conducted by BPS.

2. Methods to Measure Inequality

2.1 Theil Index

Regencies or municipalities are grouped into provinces that are mutually exclusive and collectively exhaustive. Theil indices (TI), as a measure of inequality, are defined as:

$$T = \sum_i \sum_j \left(\frac{Y_{ij}}{Y} \right) \log \left(\frac{Y_{ij}/Y}{n_{ij}/n} \right) \qquad (1)$$

where

Y_{ij} = total regional revenue or GRDP in regency j in province I;

Y = the total regional revenue of all regions nationally ($\sum\sum Y_{ij}$);

n_{ij} = the total number of regencies or municipalities in regency j at province I; and

n = total number of regencies or municipalities in Indonesia.

According to Anand (1983), the Theil indices given in equation (1) can be decomposed into within-group and between-group components as follows:

$$T = \sum_i \left(\frac{Y_i}{Y} \right) T_i \sum_i \left(\frac{Y_i}{Y} \right) \log \left(\frac{Y_i/Y}{n_i/n} \right) = T_w + T_B \quad (2)$$

Where

$$T_i = \sum_j \left(\frac{Y_{ij}}{Y_i} \right) \log \left(\frac{Y_{ij}/Y_i}{n_{ij}/n_i} \right)$$

The smaller the TI or the closer to 0, the smaller the regional inequality, or the higher TI the higher the level of regional inequality.

2.2 Williamson Index

The Williamson Index (WI) can be applied as a measure of regional inequality, following the formula:

$$WI = \sqrt{\frac{\sum_i \left(Y_i - \bar{Y} \right)^2 n_i / n}{\bar{Y}}} \qquad (3)$$

where

Y_i = GRDP, revenue per capita, or years of schooling in region I;

Y = GRDP or revenue per capita or years of schooling at national level;

n_i = number of population in region I; and

n = number of population overall regions or at national level.

From the point of view of statistics, WI is merely a coefficient of variations, that is the standard deviation divided by mean. The smaller the WI or the closer to 0, the smaller the level of regional inequality. In other words, the higher the WI, the higher the level of regional inequality.

Table 1: Population and GRDP per capita at Constant Prices 2000 (by Province)

No.	Province	GRDP adhk 2000 (Billion IDR)					Population (th person)					GRDP per capita (million IDR)				
		1995	2000	2005	2010	2015	1995	2000	2005	2010	2015	1995	2000	2005	2010*	2015
1	Aceh	43,969	35,883	36,288	33,103	38,013	3,848	3,929	4,032	4,523	5,002	11.43	9.13	9	22.5	22.5
2	North Sumatera	62,639	69,154	87,898	118,719	142,537	11,115	11,642	12,451	13,029	13,938	5.64	5.94	7.06	25.4	31.6
3	West Sumatera	20,521	22,890	29,159	38,862	46,640	4,323	4,249	4,566	4,865	5,196	4.75	5.39	6.39	21.6	27.1
4	Riau	82,275	94,758	79,288	97,736	109,073	3,901	4,948	4,579	5,575	6,344	21.09	19.15	17.31	69.7	70.8
5	Jambi	8,247	9,569	12,620	17,472	21,979	2,370	2,407	2,636	3,108	3,402	3.48	3.98	4.79	29.2	36.8
6	South Sumatera	43,002	41,318	49,634	63,859	76,410	7,208	6,211	6,782	7,482	8,052	5.97	6.65	7.32	25.9	31.5
7	Bangka Belitung island		5,761	8,707	8,340	10,052		900	1,043	1,722	1,875		6.4	8.34	16.5	20.3
8	Bengkulu	4,458	4,868	6,239	38,390	46,123	1,409	1,456	1,549	7,634	8,117	3.16	3.34	4.03	19.7	24.6
9	Lampung	20,770	23,265	29,397	10,885	12,905	6,658	6,731	7,116	1,230	1,373	3.12	3.46	4.13	28.9	33.5
10	Riau Island			30,382	41,076	49,667			1,275	1,693	1,973			23.83	65.7	78.6
11	DKI Jakarta	231,568	227,924	295,271	395,622	477,285	9,113	8,361	8,860	9,640	10,178	25.41	27.26	33.32	111.5	142.9
12	West Java	219,777	195,753	242,884	322,224	386,839	39,207	35,724	38,965	43,227	46,710	5.61	5.48	6.23	21.0	25.8
13	Central Java	109,301	114,701	143,051	186,993	223,100	29,653	31,223	31,978	32,444	33,774	3.69	3.67	4.47	19.2	23.9
14	DI Yogyakarta	12,727	13,481	16,911	21,044	24,567	2,917	3,121	3,344	3,468	3,679	4.36	4.32	5.06	18.7	22.7
15	East Java	203,486	202,830	256,375	342,281	419,428	33,844	34,766	36,294	37,566	38,848	6.01	5.83	7.06	26.4	34.3
16	Banten		45,312	58,107	88,552	105,856		8,098	9,029	10,689	11,955		5.6	6.44	25.4	30.8
17	Bali	15,158	17,268	21,072	28,882	34,788	2,896	3,150	3,384	3,907	4,153	5.23	5.48	6.23	24.0	31.1
18	West Nusatenggara	8,226	12,182	15,184	20,073	20,417	3,646	4,009	4,184	4,516	4,835	2.26	3.04	3.63	15.5	18.5
19	East Nusatenggara	6,598	7,851	9,867	12,547	14,746	3,577	3,823	4,260	4,706	5,120	1.84	2.05	2.32	9.3	11.1
20	West Kalimantan	16,101	19,319	23,538	30,329	36,075	3,636	4,016	4,052	4,411	4,790	4.43	4.81	5.81	19.5	23.5
21	Central Kalimantan	9,682	10,981	14,035	18,806	23,000	1,627	1,855	1,915	2,221	2,495	5.95	5.92	7.33	25.5	31.6
22	South Kalimantan	14,516	17,215	23,473	30,675	36,196	2,893	2,984	3,282	3,643	3,990	5.02	5.77	7.15	23.4	27.8
23	East Kalimantan	67,813	82,447	93,938	110,953	121,990	2,314	2,452	2,849	3,576	3,427	29.3	33.63	32.97	116.9	128.6
24	Nort Kalimantan				-	-				0	642					76.8
25	North Sulawesi	10,733	10,565	12,689	18,377	22,872	2,649	2,001	2,129	2,278	2,412	4.05	5.28	5.96	22.7	29.2
26	Central Sulawesi	7,411	8,649	11,752	17,624	22,979	1,938	2,176	2,295	2,646	2,877	3.82	3.97	5.12	19.6	28.8
27	South Sulawesi	26,670	30,763	36,422	51,200	64,284	7,558	8,051	8,129	8,060	8,520	3.53	3.82	4.48	21.3	29.4
28	South East Sulawesi	5,085	5,775	8,027	11,654	15,041	1,587	1,820	1,963	2,244	2,500	3.2	3.17	4.09	21.6	29.2
29	Gorontalo		1,473	2,028	2,917	3,647		833	922	1,045	1,133		1.77	2.2	14.8	19.5
30	West Sulawesi				4,744	6,113				1,165	1,282				14.8	20.2
31	Maluku	5,939	2,769	3,259	4,251	5,111	2,087	1,166	1,252	1,542	1,686	2.85	2.37	2.6	12.0	14.7
32	North Maluku		1,880	2,237	3,036	3,656		815	884	1,043	1,162		2.31	2.53	14.4	17.5
33	West Papua			5,307	9,361	15,062		530	643	765	872		0	8.25	54.0	60.1
34	Papua	16,390	22,283	22,209	22,400	24,617	1,943	1,684	1,875	2,857	3,149	8.44	13.23	11.84	38.8	41.4
	Total	1,273,063	1,358,887	1,687,248	2,222,987	2,661,071	193,915	205,132	218,518	238,519	255,462	6.57	6.62	7.72	28.8	35.2

Source: Statistics Indonesia, few edition. BPS

The GRDP per capita of Indonesia's eastern region tends to be lower than in the West Indonesia region, so that the Indonesian population tends to cluster on Java and Sumatra. The increase in provincial income per capita in Indonesia from 1995-2015 reached an average of fivefold–the highest in Jambi and Lampung–while the increase in income per capita rose tenfold. The lowest was in Aceh that rose by only 1.97 times over 20 years. Base point 1995 per capita income has been high and there has been a significant decline during the crisis, conflict and tsunami disaster.

The biggest government revenue even outliers are in DKI Jakarta Province, capital city of Indonesia (Table 2). The biggest government revenue per capita are in Aceh Province, West Papua and Papua, this is due to the existence of special autonomy funds for the three regions.

Table 2: Government Revenue per capita at Current Prices 2000 (by Province)

No.	Province	Government Revenue (Million IDR)					Government Revenue per capita (million IDR)				
		1995	2000	2005	2010	2015	1995	2000	2005	2010	2015
1	Nanggro Aceh Darussalar	503	1,443	7,978	6,968	11,680	0.13	0.37	1.98	3.50	8.10
2	North Sumatera	1,182	2,272	7,949	3,886	8,481	0.11	0.2	0.64	1.52	3.36
3	West Sumatera	521	1,021	4,298	1,921	4,052	0.12	0.24	0.94	2.15	4.76
4	Riau	634	1,888	11,180	4,305	6,911	0.16	0.38	2.44	2.82	4.17
5	Riau Island			1,162	1,858	2,515			0.91	2.24	4.57
6	Jambi	356	663	2,551	1,640	3,130	0.15	0.28	0.97	1.93	4.09
7	South Sumatera	780	1,401	5,935	3,223	5,990	0.11	0.23	0.88	2.92	5.91
8	Bangka Belitung island	211	395	1,064	848	1,887		0.44	1.02	1.24	3.21
9	Bengkulu	522	858	3,740	1,001	2,181	0.37	0.59	2.41	2.89	6.11
10	Lampung			1,200	2,085	4,787			0.17	3.20	5.50
11	DKI Jakarta	2,717		13,477	23,026	44,209	0.3		1.52	2.31	6.06
12	West Java	3,100	5,564	17,967	9,742	24,010	0.08	0.16	0.46	0.86	2.03
13	Banten			5,086	3,139	7,328			0.56	1.02	2.59
14	Central Java	2,371	4,399	17,210	6,626	16,828	0.08	0.14	0.54	1.49	3.61
15	DI Yogyakarta	360	726	2,713	1,374	3,400	0.12	0.23	0.81	1.05	2.67
16	East Java	2,633	4,934	20,423	9,777	22,228	0.08	0.14	0.56	0.86	2.50
17	Bali	550	1,488	3,993	2,238	4,968	0.19	0.47	1.18	1.97	5.36
18	West Nusatenggara	335	856	2,901	1,272	3,449	0.09	0.21	0.69	1.52	3.57
19	East Nusatenggara	482	979	3,439	1,088	3,316	0.13	0.26	0.81	1.87	4.68
20	West Kalimantan	466	1,563	3,543	1,779	4,073	0.13	0.39	0.87	2.02	4.74
21	Central Kalimantan	424	778	3,030	1,555	3,253	0.26	0.42	1.58	4.00	7.32
22	South Kalimantan	473	1,098	3,881	2,280	4,747	0.16	0.37	1.18	2.65	5.27
23	East Kalimantan	714	1,110	12,045	7,041	9,465	0.31	0.45	4.23	5.56	7.43
24	Nort Kalimantan				0	1,444				0.00	10.99
25	North Sulawesi	378	669	1,779	1,159	2,528	0.14	0.33	0.84	2.91	6.37
26	Gorontalo			945	593	1,389			1.02	2.69	6.03
27	Central Sulawesi	367	704	1,314	1,178	2,902	0.19	0.32	0.57	2.42	6.17
28	South Sulawesi	852	1,717	6,983	2,564	6,106	0.11	0.21	0.86	1.77	4.47
29	South East Sulawesi	245	578	1,322	1,055	2,471	0.15	0.32	0.67	2.92	6.35
30	West Sulawesi				0	1,474				2.19	5.41
31	Maluku	328	406	1,958	953	2,133	0.16	0.35	1.56	3.52	7.68
32	North Maluku			1,163	0	1,801			1.32	4.03	9.48
33	West Papua			2,110	3,408	5,840			3.28	11.17	19.27
34	Papua	714	1,755	5,670	5,662	11,806	0.37	1.04	3.02	7.41	14.89
	Total	**22,218**	**39,263**	**180,008**	**115,244**	**242,782**	**0.11**	**0.19**	**0.82**	**1.69**	**3.24**

Source: www.djpk.kemenkeu.go.id/?p=5412, Few Editions.

National mean years of schooling in the period from 1995 to 2017 has only increased by 1.18 points to 8.1 years (Table 3). Papua has a low base and has a low rate of only 0.47 points in 20 years.

Table 3: Years of Schooling By Province

No.	Province	1995	2000	2005	2008	2010	2015	2017
1	Aceh	7.5	-	-	8.6	8.3	8.8	9.0
2	North Sumatera	8.2	8.2	8.8	8.8	8.5	9.0	9.3
3	West Sumatera	7.8	8.0	8.1	8.6	8.1	8.4	8.7
4	Riau	7.6	7.9	8.3	8.8	8.3	8.5	8.8
5	Jambi	7.0	7.3	7.8	7.9	7.3	8.0	8.2
6	South Sumatera	6.9	7.3	7.9	7.8	7.3	7.8	8.0
7	Bengkulu	7.1	7.4	8.0	8.2	7.8	8.3	8.5
8	Lampung	6.6	6.8	7.2	7.5	7.3	7.6	7.8
9	Bangka Belitung island	-	-	6.9	7.7	7.1	7.5	7.8
10	Riau Island	-	-	9.3	8.3	9.4	9.7	9.8
11	DKI Jakarta	10.3	9.9	10.2	10.3	10.4	10.7	11.0
12	West Java	7.0	7.3	7.6	7.7	7.4	7.9	8.1
13	Central Java	6.2	6.6	6.6	7.1	6.7	7.0	7.3
14	DI Yogyakarta	8.2	7.8	8.6	9.0	8.5	9.0	9.2
15	East Java	6.1	6.6	7.0	7.2	6.7	7.1	7.3
16	Banten			7.9	8.0	7.9	8.3	8.5
17	Bali	6.8	7.4	7.7	8.0	7.7	8.3	8.6
18	West Nusatenggara	5.4	6.0	5.6	6.8	5.7	6.7	6.9
19	East Nusatenggara	5.9	6.0	6.3	6.8	6.5	6.9	7.2
20	West Kalimantan	5.8	6.4	6.9	6.9	6.3	6.9	7.1
21	Central Kalimantan	7.3	7.6	8.0	8.0	7.6	8.0	8.3
22	South Kalimantan	6.8	7.0	7.6	7.8	7.3	7.8	8.0
23	East Kalimantan	8.1	8.1	8.9	8.9	8.6	9.1	9.4
24	Nort Kalimantan						8.4	8.6
25	North Sulawesi	8.2	8.1	9.0	9.0	8.7	8.9	9.1
26	Central Sulawesi	7.4	7.4	7.6	8.1	7.7	8.0	8.3
27	South Sulawesi	6.8	6.9	7.3	7.6	7.3	7.6	8.0
28	South East Sulawesi	7.2	7.5	7.5	8.1	7.6	8.2	8.5
29	Gorontalo					6.9	7.1	7.3
30	West Sulawesi					6.6	6.9	7.3
31	Maluku	7.8	-	8.5	8.8	8.6	9.2	9.4
32	North Maluku	-	-	8.2	8.3	7.9	8.4	8.6
33	West Papua	-	-	-	8.0	6.8	7.0	7.2
34	Papua	5.8	5.6	6.4	6.5	5.6	6.0	6.3
National		6.9	7.2	7.5	7.8	7.5	7.8	8.1

Source: ipm.bps.go.id, BPS.

RESULT AND ANALYSIS

1. Gross Regional Domestic Product per capita (GRDP)

In this section we shall analyse changes in the disparity index between the regions based on GRDP per capita over a period of 22 years, namely in 1995 and 2017 by using the Williamson Index and Theil Index.

1.1 Williamson Indexes (WI)

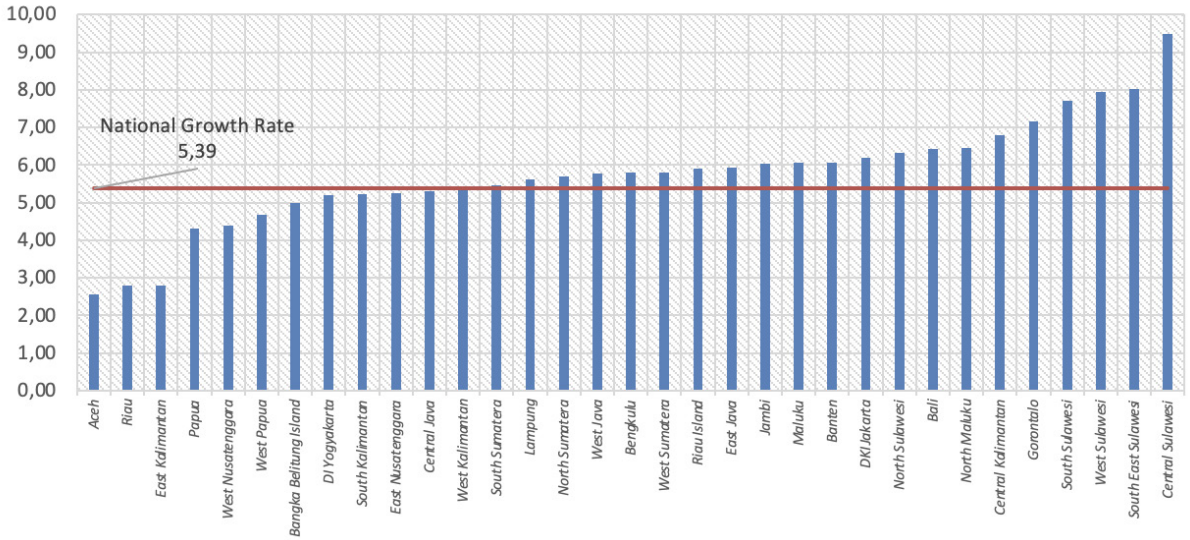
The WI illustrates the regional disparity based on GRDP per capita, namely between the provinces as well as between the regencies/municipalities as presented in Table 1 and Figure 2. The regional disparity between provinces during the period of regional autonomy was, in fact, higher than the WI before regional autonomy was implemented. This means the policies on regional autonomy that had been applied for five years (since 2001) still had not succeeded in reducing the imbalance in revenues between the regions at the provincial level.

The disparity in GDP per capita in the period 2010-17 tends to decline. Unfortunately, the decline in disparity is not due to an improvement in productivity of regions that have a low per capita GRDP in pursuit of regions that have high per capita GRDP. The decline in disparity in this period was, however, caused more by the slowing economic growth of rich regions such as Riau and East Kalimantan as producers of oil and gas.

Economic equality is supposedly an effort to increase the economy of regions with poor economic conditions while still striving for stable growth for regions with large economies. Inequality of GRDP per capita, as indicated by the WI on regional inequality, could increase slightly when the estimated speed of convergence is not significant–mainly due to Jakarta's growth. Conversely, changes in the Human Development Index figures for Indonesia show that regional convergence is taking place, even though its speed is declining. Environmental effects can be significant in both cases but have little influence on the speed of convergence (Vidyattama 2013).

DI Yogyakarta, Central Java, NTB, and NTT provinces that have a low GRDP per capita experienced average growth during the 2010-17 period below national average growth (Figure 2). In contrast, DKI Jakarta, Riau Islands, East Java, South Sumatra, and North Sumatra which have a relatively high GRDP per capita experienced economic growth during the period 2010-17 above the national economic growth average. This phenomenon, if it continues, will certainly widen the disparity between regions.

Figure 2: Growth Rate of GRDP (%) (2010-2017)



Source: Statistics Indonesia, processed by author

Note: blue columns are those provinces with a GRDP above the national average

Similarly, if we look at the WI between regencies, it is evident that the WI during the period of regional autonomy was higher than during the period before implementation of regional autonomy. This means that the disparity in income per capita between regencies/municipalities tended to rise during the period of implementing regional autonomy (2005) compared to the period before regional autonomy (1995).

It can, therefore, be concluded that the inter-regional disparity grew increasingly higher during the period of regional autonomy when compared to earlier periods. Furthermore, the disparity in income per capita between regencies/municipalities was higher than the disparity between provinces.

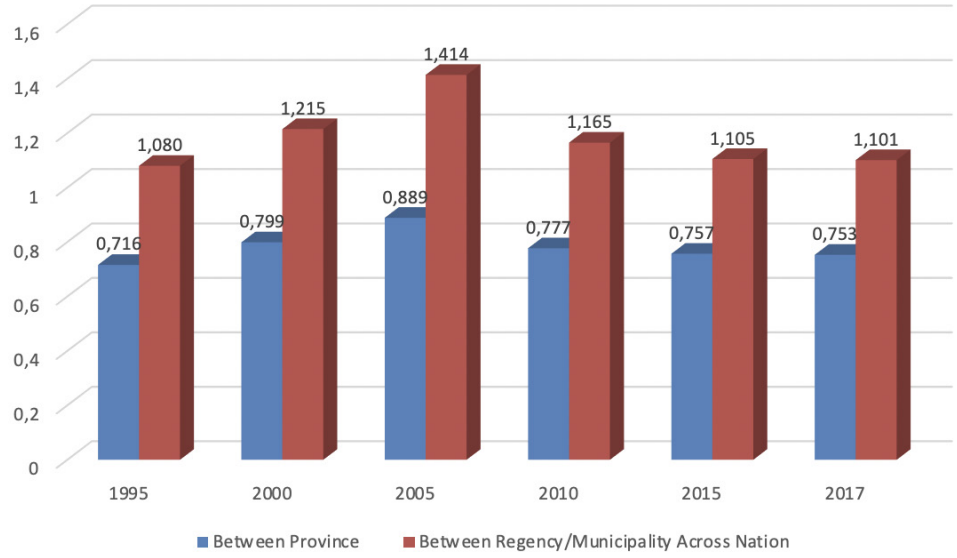
The WI between-regency phenomenon in the period 2010-17 is also the same as the WI between-province phenomenon where the decrease in disparity is caused by the slowing down of regency/city economic growth that has a high GRDP per capita due to the weakening of oil and gas sector production such as in Siak Regency, Bengkalis Regency (Riau Province), Bontang City, and Kutai Kartanegara Regency (East Kalimantan Province) (Table 4).

Table 4: Williamson Index Based on GRDP per capita

	1995	2000	2005	2010	2015	2017
Between Province	0.716	0.799	0.889	0.777	0.757	0.753
Between Regency/Municipality Across Nation	1.080	1.215	1.414	1.165	1.105	1.101

Source: processed by author

Figure 3: Williamson Index Based On GRDP per capita



Source: processed by author

It is worth noting that both before and after implementing regional autonomy, some provinces were split to create several new provinces, for example, Riau Islands was created by splitting the Riau province; Bangka-Belitung Islands was split from the South Sumatra province; Banten was formerly part of the West Java province; Gorontalo was from the North Sulawesi province; North Maluku was from the Maluku province; and West Papua was split from the Papua province. On the other hand, the 27th province, namely Timor Timur, became an independent country, based on the results of a *referendum* held in 1999.

The WI indexes that illustrate the disparity between regencies/municipalities within a province is presented in full in Appendix A1, and similar WI figures are presented in Figure 2. From Figure 3 we can see that the disparity in GRDP per capita between regencies/municipalities in some provinces does not show any significant change. This is the case in most of the provinces, such as in the provinces of North Sumatra, Jambi, Lampung, Central Java, Yogyakarta, East Java, Bali, West Kalimantan, Central Kalimantan, South Kalimantan, North Sulawesi, Central Sulawesi, and Southeast Sulawesi.

Some provinces experienced a significant decline in inequality, such as Aceh, Riau and East Kalimantan that was caused by declining oil and gas production in regencies/cities that were rich in natural resources.

On the other hand, some provinces have indicated a pattern where the disparity between regencies/ municipalities experienced an increase from the year 1995 up to 2005. This was the case in the provinces of South Sumatra, DKI Jakarta, West Java, West Nusa Tenggara, South Sulawesi, and Papua. This growing disparity among regions occurred in the provinces with rich mining resources, particularly in Riau, South Sumatra, East Kalimantan, West Nusa Tenggara, South Sulawesi, and Papua.

An explanation for the increased disparity between regencies/municipalities could be as follows: prior to regional autonomy in this group of provinces, each regency was quite large. Consequently the income per capita from mining must be distributed to a broader area and a larger population. After the splitting of

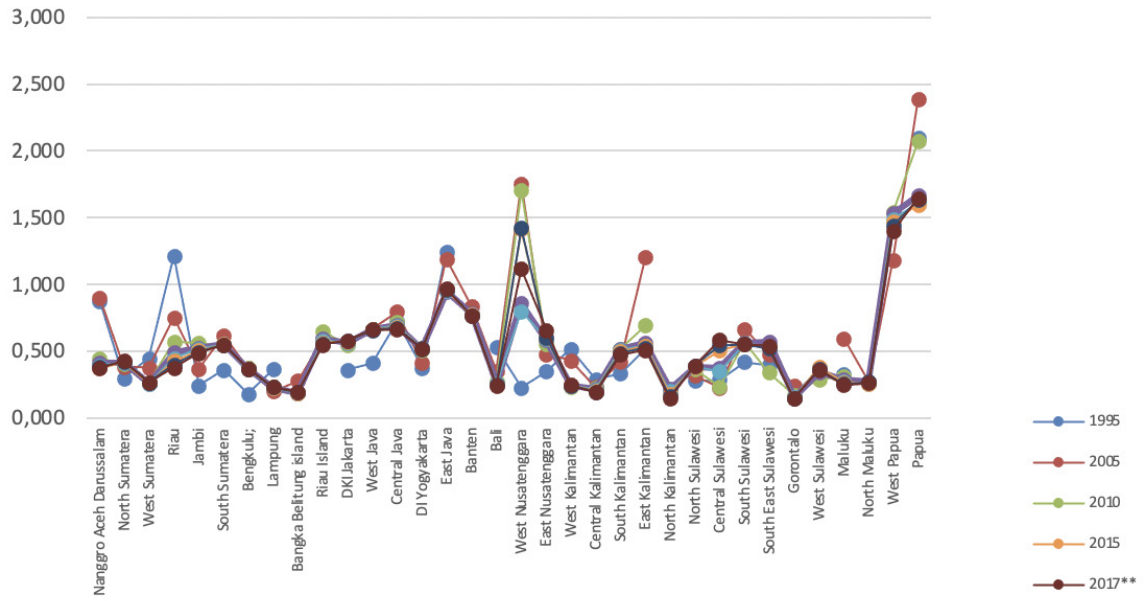
provinces, some of the new regencies had mining resources, while others did not. Any regency that was fortunate to have mining resources would receive a much higher GRDP per capita compared to the other regencies/municipalities. This process of splitting and creating a regency is a source of disparity in GRDP per capita between the regencies in this group of provinces

.

Meanwhile, the rising disparity between the province of DKI Jakarta and West Java is more the result of differences or unequal growth of industries in the regions. A regency/municipality that is the centre of manufacturing industries and a centre of growth will have a higher rate of growth in GRDP which implies a higher GRDP per capita. Whereas in the other regencies/municipalities, the growth of industries and growth of economy are generally lower, therefore, the GRDP per capita will also be much lower.

Further, based on statistical testing using data coupled with the WI of 1995 and 2005 it can be concluded that the WI of 2005 is significantly higher compared to 1995, at the actual rate of 5 percent (Figure 4). The conclusion is that the degree of disparity between regencies viewed in terms of GDRP per capita in 2005 is higher than in 1995. This means the policies on regional autonomy have not succeeded in overcoming regional inequality in terms of GRDP per capita. The fall in disparity in the 2010-17 period was mainly due to the slowing growth of regions rich in natural resources and not due to increased productivity of regions lacking natural resources.

Figure 4: Comparison of Williamson Index between Regencies/Municipalities (1995, 2005 and 2015)



Source: processed by author

As is known, inequality usually occurs because of the concentration of economic activities in the base sector in certain regions so that only a proportion of the regions enjoy the results, as well as differences in natural resources that are owned between regions.

1.2. Theil Indexes (TI)

The advantage of Theil indexes in measuring the disparity between regions is that the TI can differentiate the sources of disparity into two components, that is the disparity between regions and within regions. Between regions is defined here as between province, while within region is the disparity between regencies/municipalities in the province.

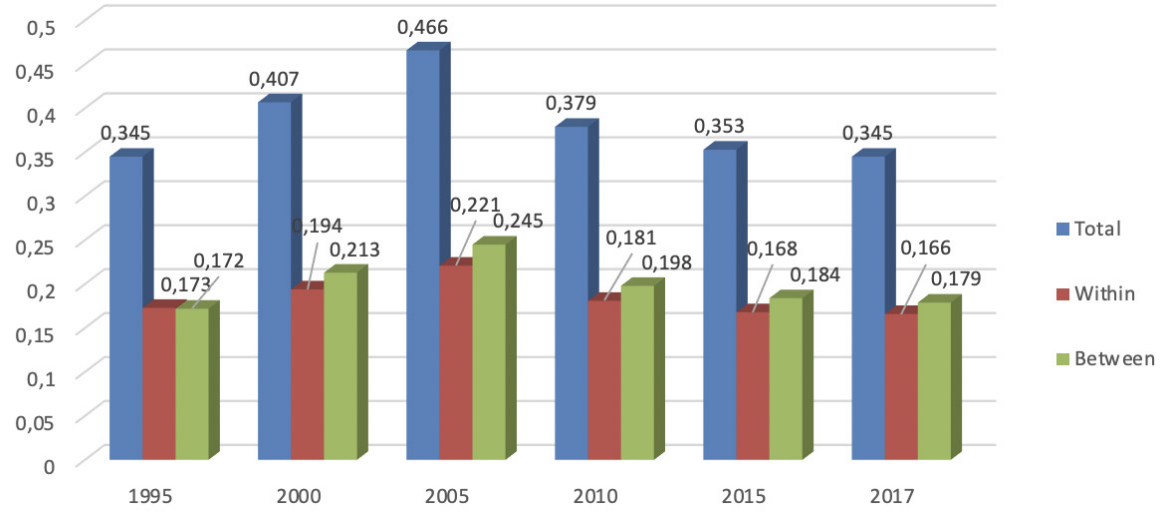
The calculation of TI based on the GRDP per capita of provinces and regencies in the year 1995 (before regional autonomy), in 2000 and in 2005, 2010, 2015, and 2017 (after regional autonomy) shows increasingly higher figures (Table 5 and Figure 5). Both the TI Between and the TI Within have slowly declined since 2005 but the increase in TI Between is higher than TI Within for the period to 20005. This indicates that the disparity between provinces has rose between 1995 and 2005 before slowly falling and such a finding matches the WI Between-Province (Figure 3). Similarly, the disparity between regencies in the province has increased however, it return even though it was insignificant and remained above 1995, and the findings are in line with the WI (Figure 3).

Table 5: Regional Disparity Index (Theil Index)

	1995	2000	2005	2010	2015	2017
Total	0.345	0.407	0.466	0.379	0.353	0.345
Within	0.173	0.194	0.221	0.181	0.168	0.166
Between	0.172	0.213	0.245	0.198	0.184	0.179

Source: processed by author

Figure 5: Theil Index Between and Within Provinces

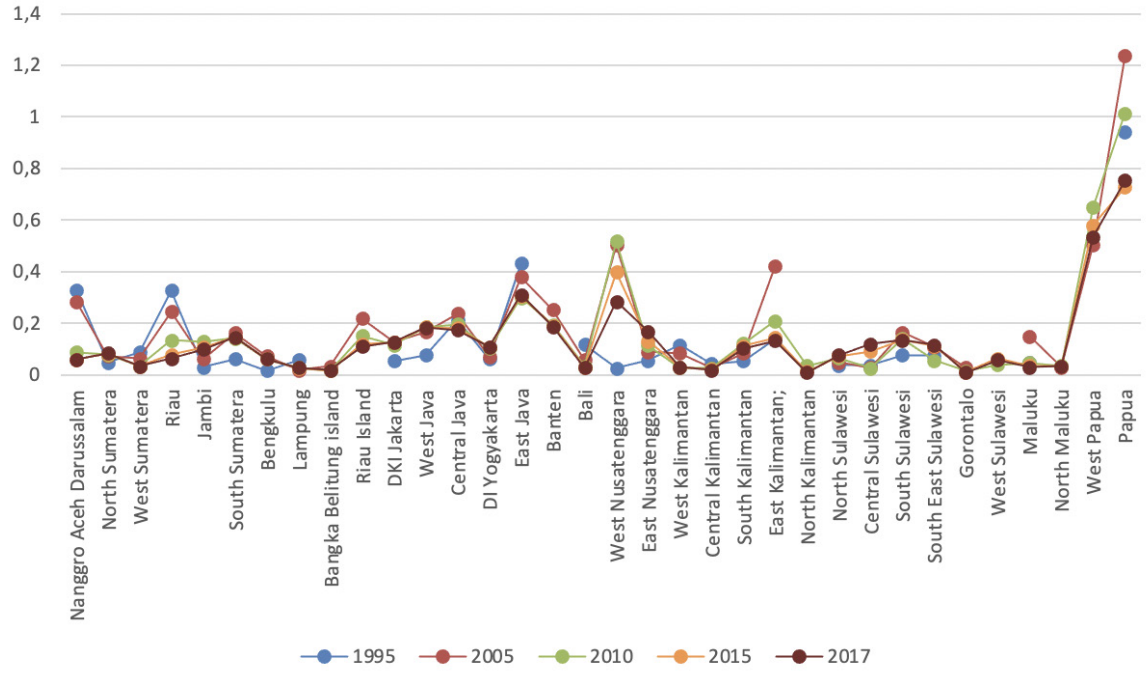


Source: processed by author

Table 6 presents the figures of Theil Indexes between regencies/municipalities in a province, where it can be seen that during the period of 1995 to 2017 the figures tended to rise. Some of the provinces that experienced a rise in TI figures are: South Sumatra, DKI Jakarta, West Java, West Nusa Tenggara, East Kalimantan, South Sulawesi, Maluku, and Papua. In fact, statistically, there was a significant increase of 5 percent in the WI between regencies/municipalities from 1995 up to 2017.

An explanation of the increased disparity in this case is the same as the explanation for increased disparity between provinces, using the WI figures.

Figure 6: Comparison of Disparity Index between Regencies/Municipalities at Province Level



Source: processed by author

2. Disparity of Fiscal Revenue per capita

Before discussing the WI as an indicator of disparity, we shall first present an explanation regarding regional fiscal revenue. The transfer of a larger amount of funds from the central government to the regions during the era of regional autonomy follows the delegation of central government functions to regional governments. The provision of such funds was, in addition to lessening the fiscal-gap of the regional government, an effort to accelerate more equitable development between the regions. These transfers between governments were in the form of DAUs, DAKs, and DBH.

2.1 Williamson Indexes

The results of calculating WI figures are provided in Table 6 and in Figure 7. These indicate that the WI between provinces based on the Total Fiscal Revenue of the regional government have become higher from 1995 up to 2015. This indicates that the application of regional autonomy has not yet been able to improve equitable development between the provinces for the provision of public services. The inequality is apparently caused by the high government revenue per capita in the provinces of Papua, East Kalimantan, and Timor Timur in 1995.

Table 6: Disparity of Fiscal Revenue (Williamson Index)

	1995	2000	2005	2010	2015	2017
Between Province due to Sum of Province & Regency Revenue*)	0.453	0.591	0.830	0.941	0.934	0.345
Between Province due to Sum of Regency's Revenue	0.602	0.529	0.790	0.971	0.957	0.166
Between Regency's Revenue Across National	0.888	0.780	0.998	0.986	0.972	0.179

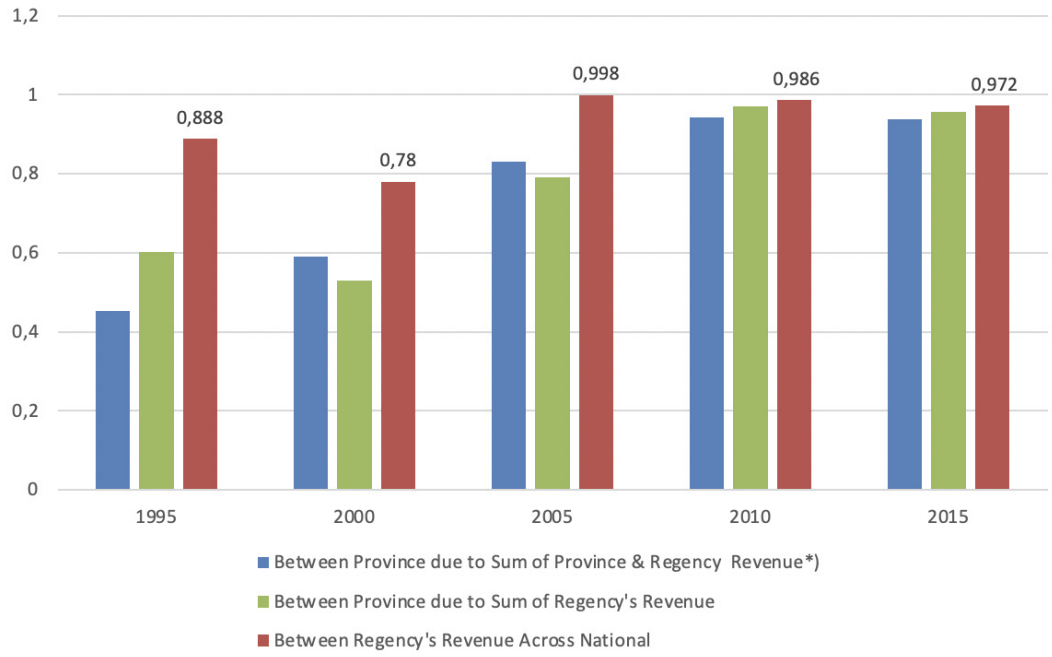
Note: *) Excludes DKI Jakarta (extreme outliers).

Source: processed by author

Meanwhile in 2005–that is, during the era of implementing regional autonomy–the disparity between provinces was due to the extremely high government revenue per capita in the provinces with rich mining resources, such as East Kalimantan, Papua, West Papua, and Riau. In addition, extreme revenue per capita occurred in provinces with a small population but large area, or where the area is geographically a cluster of islands, such as the provinces of Central Kalimantan, Maluku, North Maluku, Riau Islands, Jambi, and Bangka Belitung Islands. Among those having a very high revenue per capita is DKI Jakarta.

On the other hand, disparity also occurred due to low government revenue per capita, as was the case in provinces with a large population that are generally located on the island of Java and in several provinces outside of Java, such as North Sumatra, Lampung, and West Nusa Tenggara.

Figure 7: Disparity of Fiscal Revenue (Williamson Index)



Source: processed by author

Likewise, the disparity in government revenue or budget per capita during the era of regional autonomy (2005, 2010, and 2015) was a bit higher than in the previous era (1995), and this once again indicates that the legal basis for implementation of regional autonomy has not been able to produce more equitable regional revenue.

The inequality between regencies/municipalities within a province has shown some improvement in the period after application of regional autonomy (2005, 2010, and 2015) compared to pre-autonomy periods (Table 7 and Figure 8). The reduction in disparity between regencies within a province is not yet significant, however, and can only be recognised as significant statistically if the level of significance is 8 percent.

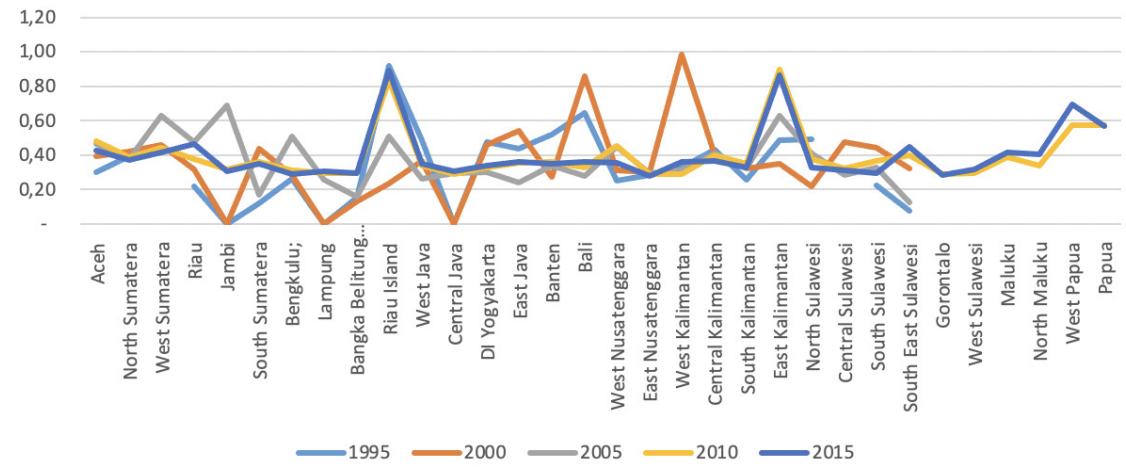
Table 7: Disparity of Fiscal Revenue per capita (Williamson Index)

	1995	2000	2005	2010	2015	2017
Between provinces due to sum of provincial & regency revenue*)	0.453	0.591	0.83	0.724	0.664	0.345
Between provinces due to sum of regency's revenue	0.602	0.529	0.79	0.574	0.566	0.166
Between regency's revenue nationally	0.888	0.78	0.998	0.899	0.802	0.179

Source: processed by author

A lessening or reduction in disparity between regencies in the province from 1995 up to 2015 did not happen equally throughout the province. Instead, in some parts of the province the disparity in fiscal revenue per capita between regencies showed a tendency to rise. At the beginning of autonomy, the increase in WI Between Regency's Revenue Across National was very high even though, after 18 years, it experienced a decline to 0.802. WI Between Province's Regency of Revenue has also increased after autonomy, but in 2015 there was a significant decline, even lower than in 1995. Total revenue increased disparity occurred in Aceh province Riau, South Sumatra, West Nusa Tenggara, East Kalimantan, and South Sulawesi. The disparity was related to the fact that some regencies in the province received revenue as a result of profit-sharing from mining activities in their area. Regencies that receive revenue from profit-sharing will receive a larger proportion than the other surrounding regencies in the province.

Figure 8: Williamson Index as Disparity Measure of APBD per capita Between Regencies/Municipalities



Source: processed by author

2.2 Theil Indexes

The calculation of Theil Indexes uses data on the Realised Regional Budget (APBD) of the regency/municipality and does not include the Realised Regional Budget (APBD) of the province. The exclusion of the province is required in order to meet the technical requirements for calculation of the index. Based on the Theil Indexes total we find that the disparity in revenue of the regional government per capita can be considered unchanged or the same as the conditions in 1995 up to 2015 (Table 8 and Figure 9).

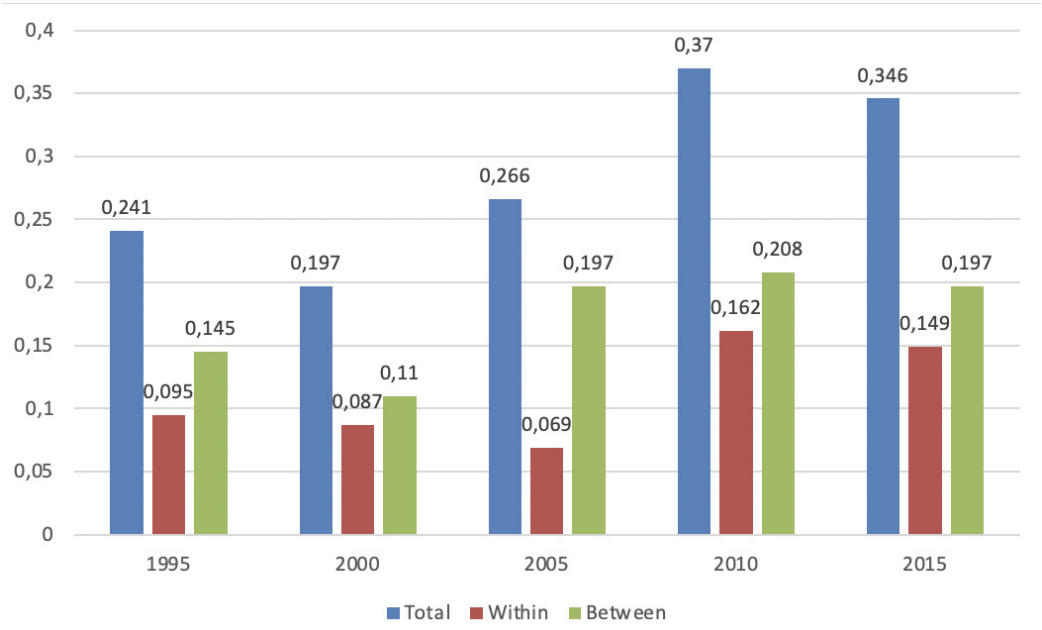
If the Theil Indexes are decomposed into only two components–namely *between-province* and *within-province* we can see a pattern, indicating that the disparity between provinces has increased since the pre-autonomy period (1995) to the post-autonomy period (2005, 2010, and 2015). The meaning of this index is similar to the Williamson Index discussed in the previous section. As explained earlier, the increased disparity is due to fiscal revenue per capita that is much higher in provinces that have rich deposits of mining materials compared to other provinces.

Table 8: Decomposition of Theil Indices Based on APBD per capita

	1995	2000	2005	2010	2015	2017
Between provinces due to sum of provincial & regency revenue*)	0.453	0.591	0.83	0.724	0.664	0.345
Between provinces due to sum of regency's revenue	0.602	0.529	0.79	0.574	0.566	0.166
Between regency's revenue nationally	0.888	0.78	0.998	0.899	0.802	0.179

Source: processed by author

Figure 9: Decomposition of Theil Indices Based on Government Revenue per capita



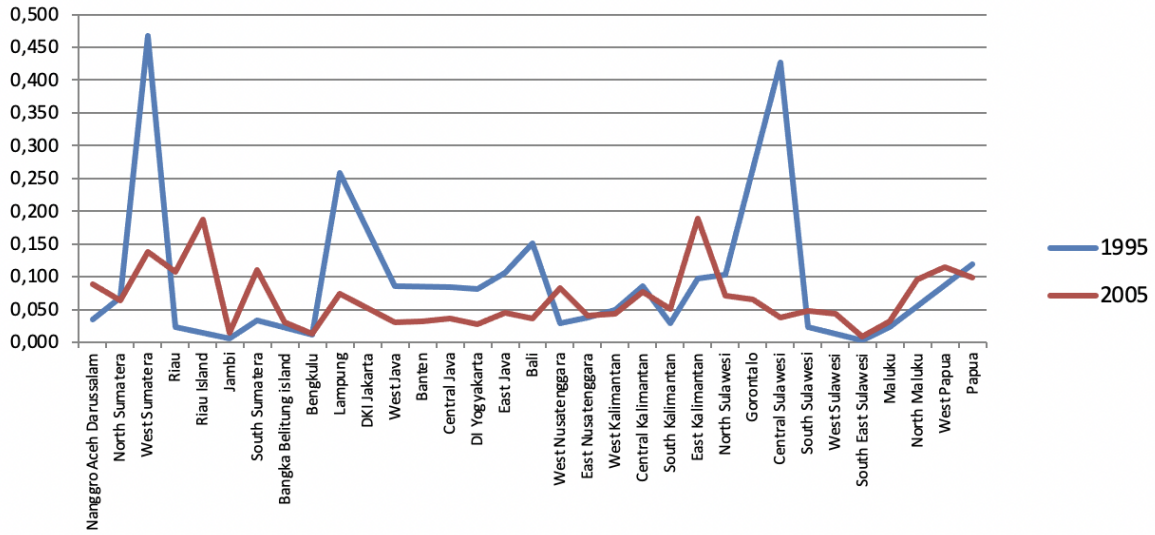
Source: processed by author

Conversely, the disparity *within-province* or disparity between regencies/municipalities in a province shows a declining pattern from the period before regional autonomy (1995) to the period of regional autonomy (2005). The decline in disparity between regencies in a province during the above two periods is, however, not significant statistically at a level of 5 percent and is only significant at alpha 7 percent.

Nevertheless, we still find between-regency fiscal disparity per capita that has grown worse in several provinces, namely the provinces that are rich in mining materials such as in Aceh, Riau, South Sumatra, West Nusa Tenggara, East Kalimantan, and South Sulawesi.

On the other hand, disparity that has improved is indicated by the lower between-regency Theil Indexes (Table 8). The highest cases of reduced disparity occurred in several regions, namely the provinces of West Sumatra, Lampung, Bali, East Java, West Java, DI Yogyakarta and Central Java. These regions are not rich in mining materials (oil, gas, and minerals), their economy is based on agriculture, manufacturing industries, services; and they are more densely populated.

Figure 10: Within-Province Theil Indexes Based on APBD per capita

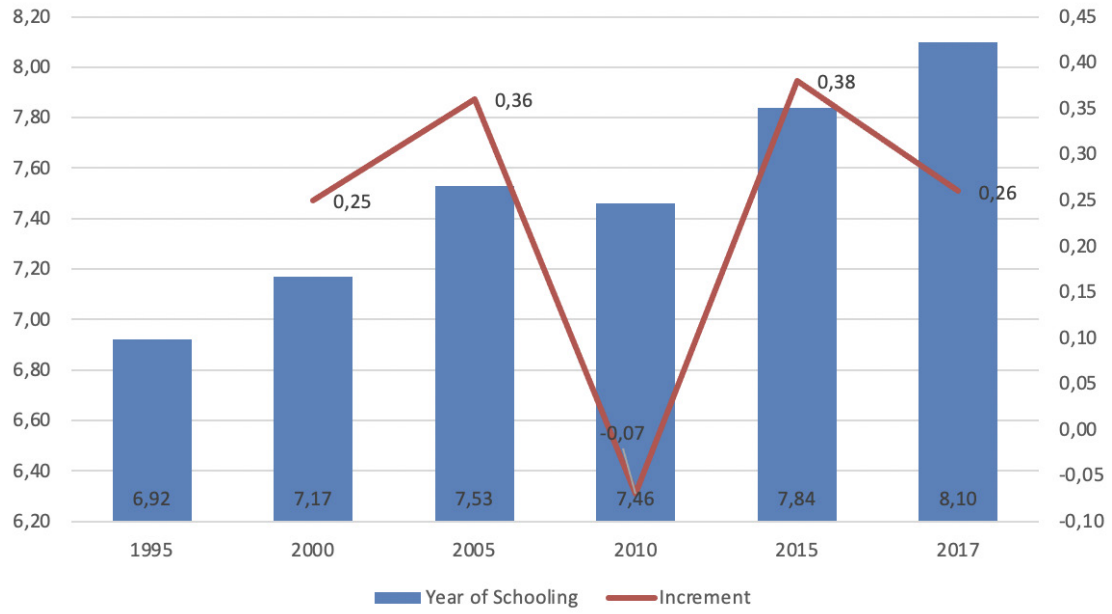


Source: processed by author

3. Years of Schooling

Statistical data indicates that the Mean Years of Schooling (MYS) on a national scale has increased gradually over the period from 1995 to 2017 (Figure 11). The graph shows us the rise in MYS figures becomes larger year by year. During the pre-regional autonomy period (1995 to 2000) the rise in MYS was on average 0.05 per year (0.26/5). At the beginning of the regional autonomy period, from 2000-05, the Years of Schooling (YOS) increased by 0.07 per year (0.36/5) and during 2005-17 it rose higher by up to 0.045 per year (0.57/12). The progressively higher rise in MYS during the period of regional autonomy is an early indication of the increasingly intense efforts to manage school education in the regions. These efforts are in line with the higher amount of fiscal revenue per capita of the regions.

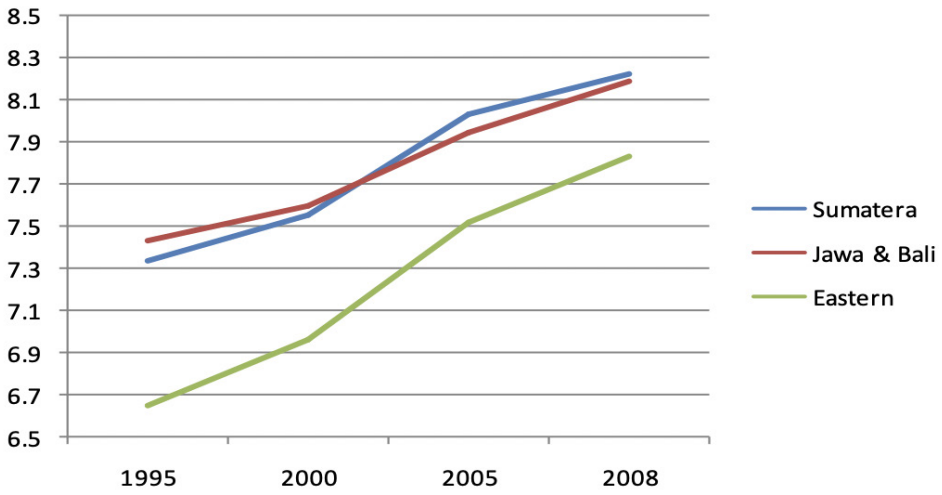
Figure 11: Years of Schooling at National Level



Source: Statistics Indonesia (few edition), BPS

The rise in MYS apparently varied or was not equally distributed between the regions (Figure 12), likewise the level of MYS varied between the regions, due to the different levels of progress of the regions. The highest MYS prior to the era of regional autonomy occurred in Java and Bali, followed by Sumatra, and the lowest MYS was found in Eastern Indonesia (Kalimantan, Sulawesi, Maluku, Papua, and Nusa Tenggara). After implementation of regional autonomy, the MYS in Sumatra became higher than in Java and Bali but Eastern Indonesia remained the lowest. Complete data on MYS can be seen in Appendix A5.

Figure 12: Years of Schooling by Island Group



Source: Statistics Indonesia (few edition), BPS

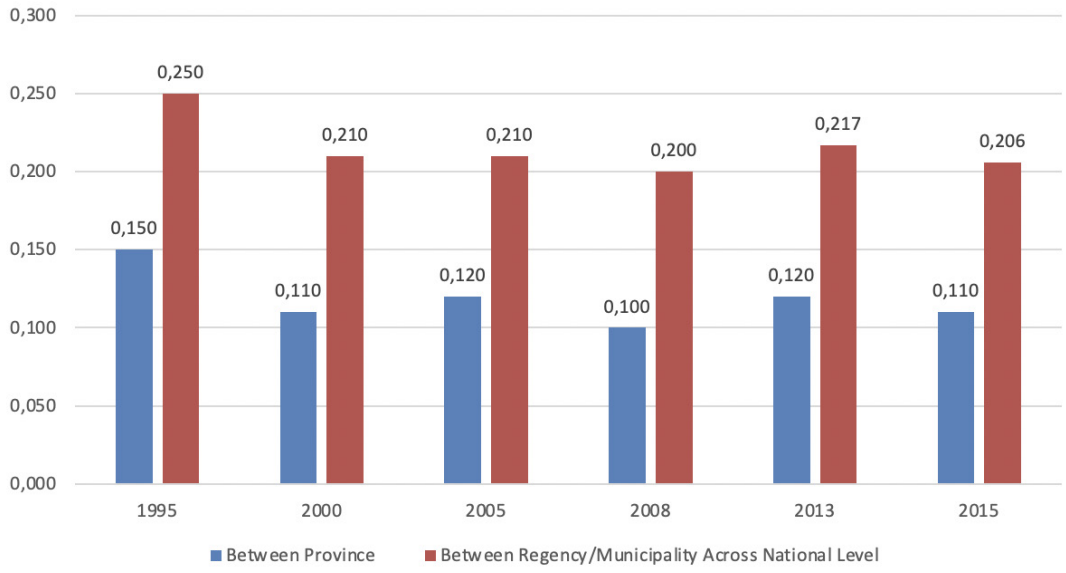
Figure 12 clearly indicates the development and different MYS between the regions, particularly between Eastern Indonesia and the other regions. This disparity continues to decline, however, so that the disparity between regions in 2008 is lower than in previous years. Evidence that the disparity in YOS has fallen is supported by the Williamson Index (Table 9 and Figure 13), namely that the indexes show a declining trend from 1995 through 2008, meaning that the disparity has lessened. The disparity in MYS between provinces is always lower than the disparity between regencies/municipalities on a national scale and the movement of the Williamson Index between provinces runs parallel with the index between regencies/municipalities. It can, therefore, be concluded that the era of regional autonomy has helped to accelerate the decline in disparity in MYS between regions.

Table 9: Williamson Index Between-Province Based on Means Years of Schooling (MYS)

	1995	2000	2005	2008	2013	2015
Between Province	0.15	0.11	0.12	0.10	0.12	0.11
Between Regency/Municipality Across National Level	0.25	0.21	0.21	0.20	0.217	0.206
Between regency's revenue nationally	0.888	0.78	0.998	0.899	0.802	0.179

Source: processed by author

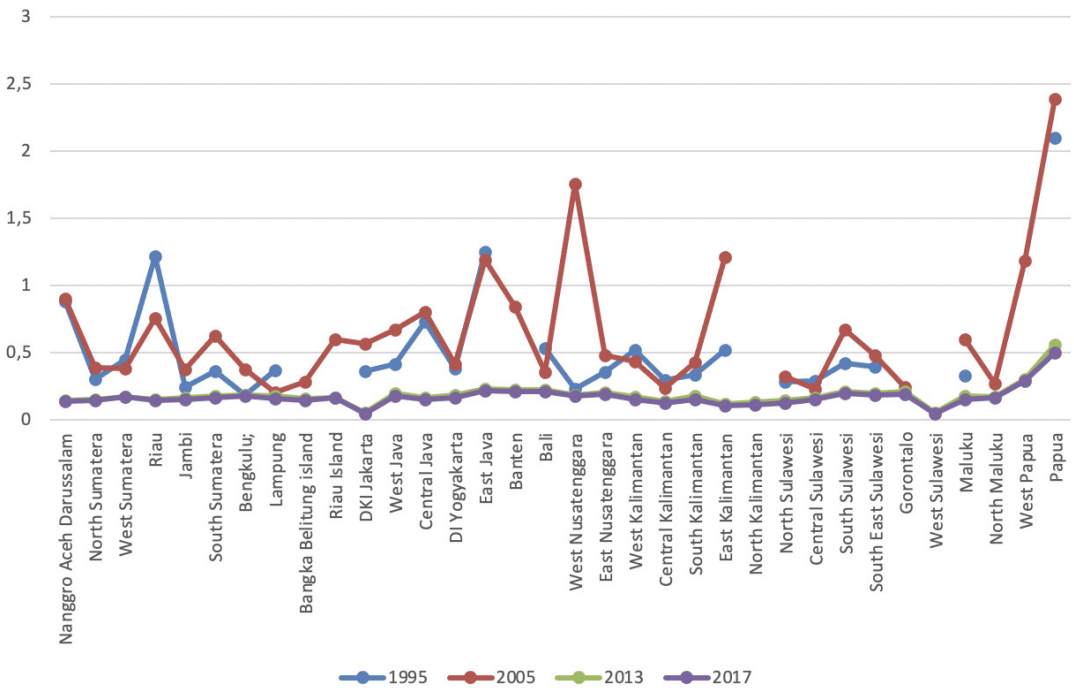
Figure 13: Williamson Index on Mean Years of Schooling (MYS)



Source: processed by author

The Williamson Index that involves all the regencies/municipalities in the country lies in the range of 0.20-0.25 while the indexes that indicate the disparity between regencies as calculated for each province varies from 0.05 to 0.45 (Figure 14). In general, the index of 2008 is lower than the same index in the year 1995. This means that the disparity in YOS between regencies/municipalities in the province had improved or fell during that period of time. The decline in index was not, however, the same for all provinces. In fact, an anomaly occurred in the provinces of Southeast Sulawesi and Papua, where the index in 2008 was higher than in 1995. In other words, both provinces experienced a rise in the disparity in YOS between regencies during that period. On the other hand, a sharp decline in disparity in YOS between regencies occurred in the provinces of Bengkulu and South Sulawesi.

Figure 14: Williamson Index on Means Years of Schooling Across Regencies in Province



Source: processed by author

CONCLUDING REMARK

Through calculation of the Williamson index as well as the Theil Index, it is found that during the period after implementation of regional autonomy, per capita income disparity between provinces became more pronounced. Disparity in income per capita between regencies/municipalities nationwide also increased and even more drastically. This is not surprising if we bear in mind the extremely varied conditions between one regency/municipality and another in Indonesia. Meanwhile the conditions of intra-province per capita income disparity (between regencies/municipalities within a province) are also very varied. There are several provinces that internally suffered a per capita income disparity that grew worse, namely the provinces of South Sumatra, DKI Jakarta, West Java, East Kalimantan, NTB, South Sulawesi, Maluku, and Papua. On the other hand, other provinces such as Riau, Lampung, and Bali experienced a sharp decline in regional income disparity. There are, however, 12 other provinces whose conditions of per capita income disparity remained the same during the period between 1995 (pre-regional autonomy) to 2005 (post-regional autonomy).

Something quite significant after the implementation of regional autonomy was the tendency for per capita income disparity between provinces to play a dominant role in the rise in disparity on a national scale. Whereas disparity within provinces played a smaller role in increasing the per capita income disparity between the regions in Indonesia.

Before the implementation of regional autonomy, there were differences among the regions related to the achievement of development goals. Western Indonesia (including Java, Bali, and Sumatra) experienced a faster rate of economic growth compared to Eastern Indonesia. After application of regional autonomy, each of the regions strived to boost their economic development using different strategies and policies. Consequently, there were some regions that succeeded with the application of a 'perfect' strategy while others failed to achieve any improvement in their welfare. During the period of establishing regional autonomy, many heads of regions had to be imprisoned for cases of corruption. The lavish flow of money transferred by the central government to the regions created many opportunities for corruption. As a result of the differing development conditions between the regions, it is not surprising that the per capita income disparity between regions became sharper.

Based on the results of calculating disparity among the regions related to per capita government expenditures, I find similar conditions to that of per capita income disparity. Regions with abundant natural resources, particularly mining resources, and regions that are a centre for manufacturing industries, will receive the larger proportion in revenue sharing. As a result, the development budget of these regions is plentiful and can be used to accelerate regional economic growth. Based on the data, we know that regions that are rich in mining resources and are industrial centres will tend to experience a higher rate of economic growth than the national average. The different rates of economic growth trigger a rise in the per capita income disparity between the regions.

One of the positive outcomes of implementing regional autonomy is the decline in educational disparity between the regions. This is reflected in the decreasing gap between regions for mean years of schooling (MYS). In the post-autonomy period, both elementary and secondary education were the full responsibility of the regional government. The regional governments tend to use the same strategy to encourage education among the people. In fact, in many areas the regional government provides free education for elementary and secondary school students. In various campaigns for the election of regional heads, each of the candidates would usually present a theme on education and health.

In general, descriptive statistics indicate that the years of schooling has increased more rapidly after the application of regional autonomy. This is one of the indications that improvement has been made in the basic services, particularly in the area of education. Development is no longer "Java-centred". Prior to regional autonomy, the increase in MYS was most rapid in Java and Bali. After regional autonomy, the best MYS was found in Sumatra, and the MYS of the Sumatra population was even better than the MYS in Java and Bali. Whereas for the eastern part of Indonesia (outside Java, Bali, and Sumatra), although the MYS continues to rise, it has not yet been able to catch up with the regions in Western Indonesia. A promising matter is that after regional autonomy there has been a tendency for the MYS disparity between regions to decline. This appears to be a sign that regional autonomy stimulates more equality in the provision of basic services, in particular, education. Whereas the result of calculating MYS disparity between regencies/municipalities within a province also shows us the same tendency. It is only in Southeast Sulawesi and Papua that the MYS disparity between regencies has increased.

Regional autonomy in Indonesia is at the level of regencies/municipalities. Each regency or municipality has acquired more authority in development than before the implementation of regional autonomy. This stimulates each region to formulate its own development policy in accordance with its own characteristics and needs. The different policies and strategies used by each region naturally produce different forms of economic development. From an economic viewpoint, the per capita income disparity between regions tends to rise. This matches the finding that fiscal capacity disparity has also increased. Regional autonomy can still be enjoyed by regions that are rich in natural resources, particularly mining resources. These mining regions will receive the majority of natural resources revenue sharing, while regions with little or no natural resources and have a dense population also tend to have slow economic growth. They require a strategy to overcome this unequal revenue sharing. The DAU that takes into consideration the size of the population and the number of poor people, has evidently not yet been able to create a more balanced fiscal capacity

It has been a decade since the implementation of regional autonomy in Indonesia, however, some regional governments have yet to perform their role satisfactorily. Corruption has spread from the central level to the regions. Many heads of regions have been found to be involved in corruption cases and been imprisoned. Consequently, regional development has never been optimal. It is this fact that leads to the different degrees of success in development among the regions and causes disparity. Nevertheless, the direct election of regional heads gives the people a choice and opportunity to choose the best leaders. If these elected leaders fail in their leadership, they most certainly will not be elected again.

Although Indonesia has experienced drastic changes in the relationship between the central government and the regions, it is a fact that there has never been any major problem to cause political upheaval and aggressive competition between the regions. Regional autonomy has at least succeeded in encouraging equitable development in providing basic services for the people, despite still being unable to create equal economic growth among the regions.

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APPENDIXES

Table A1: Williamson Index Between Regencies/Municipalities in Province Based on GRDP per capita

Province Names	1995	2005	2013	2014	2015	2016*	2017**
Aceh	0.878	0.901	0.42	0.39	0.38	0.38	0.38
North Sumatera	0.301	0.388	0.41	0.42	0.42	0.43	0.43
West Sumatera	0.448	0.38	0.26	0.26	0.26	0.27	0.27
Riau	1.216	0.756	0.49	0.45	0.43	0.40	0.38
Jambi	0.246	0.372	0.53	0.52	0.51	0.50	0.49
South Sumatera	0.362	0.623	0.56	0.56	0.56	0.55	0.55
Bengkulu;	0.184	0.374	0.37	0.37	0.37	0.37	0.37
Lampung	0.368	0.202	0.23	0.23	0.23	0.23	0.23
Bangka Belitung island		0.282	0.19	0.19	0.19	0.20	0.20
Riau Island		0.597	0.59	0.58	0.57	0.56	0.55
DKI Jakarta	0.363	0.563	0.56	0.57	0.57	0.58	0.58
West Java	0.414	0.668	0.66	0.67	0.66	0.66	0.66
Central Java	0.728	0.799	0.70	0.69	0.68	0.68	0.66
DI Yogyakarta	0.379	0.414	0.52	0.52	0.52	0.52	0.52
East Java	1.246	1.191	0.95	0.96	0.96	0.97	0.97
Banten		0.842	0.78	0.78	0.77	0.77	0.77
Bali	0.531	0.355	0.26	0.26	0.25	0.25	0.25
West Nusatenggara	0.231	1.754	0.86	0.80	1.41	1.42	1.12
East Nusatenggara	0.352	0.48	0.59	0.59	0.60	0.61	0.66
West Kalimantan	0.518	0.435	0.25	0.25	0.25	0.25	0.25
Central Kalimantan	0.294	0.235	0.22	0.21	0.21	0.20	0.20
South Kalimantan	0.334	0.427	0.52	0.51	0.50	0.49	0.48
East Kalimantan	0.519	1.209	0.57	0.54	0.54	0.53	0.51
North Kalimantan			0.22	0.20	0.18	0.16	0.15
North Sulawesi	0.282	0.32	0.38	0.39	0.39	0.39	0.40
Central Sulawesi	0.289	0.231	0.38	0.35	0.51	0.55	0.59
South Sulawesi	0.423	0.668	0.56	0.56	0.56	0.56	0.56
South East Sulawesi	0.397	0.477	0.58	0.53	0.53	0.52	0.54
Gorontalo		0.244	0.16	0.16	0.15	0.15	0.15
West Sulawesi			0.34	0.38	0.38	0.37	0.36
Maluku	0.329	0.598	0.29	0.28	0.27	0.26	0.25
North Maluku		0.272	0.27	0.26	0.26	0.27	0.27
West Papua		1.185	1.54	1.49	1.47	1.44	1.40
Papua	2.094	2.386	1.67	1.61	1.60	1.63	1.64

Source: GRDP Regency/Municipality, BPS (1995, 2005, 2013-17).

Table A2: Theil Index Between Regencies/Municipalities in Province Based on GRDP per capita

No.	Province Name	1995	2000	2005	2013	2015	2017
1	Aceh	0.327	0.185	0.283	0.077	0.061	0.061
2	North Sumatera	0.049	0.071	0.074	0.082	0.083	0.085
3	West Sumatera	0.088	0.079	0.065	0.033	0.034	0.035
4	Riau	0.328	0.242	0.246	0.102	0.080	0.063
5	Riau Island			0.219	0.116	0.108	0.100
6	Jambi	0.03	0.077	0.063	0.150	0.147	0.147
7	South Sumatera	0.063	0.08	0.163	0.062	0.062	0.062
8	Bangka Belitung island			0.035	0.027	0.028	0.028
9	Bengkulu	0.017	0.068	0.073	0.017	0.018	0.019
10	Lampung	0.059	0.107	0.02	0.130	0.121	0.111
11	DKI Jakarta	0.055	0.113	0.128	0.123	0.126	0.128
12	West Java	0.078	0.154	0.167	0.189	0.186	0.183
13	Banten			0.254	0.186	0.183	0.174
14	Central Java	0.214	0.205	0.239	0.107	0.108	0.108
15	DI Yogyakarta	0.063	0.062	0.071	0.301	0.307	0.310
16	East Java	0.433	0.378	0.38	0.198	0.191	0.188
17	Bali	0.118	0.071	0.059	0.033	0.031	0.029
18	West Nusatenggara	0.026	0.214	0.504	0.192	0.398	0.285
19	East Nusatenggara	0.057	0.063	0.09	0.127	0.131	0.170
20	West Kalimantan	0.117	0.085	0.085	0.030	0.030	0.030
21	Central Kalimantan	0.043	0.056	0.026	0.025	0.022	0.019
22	South Kalimantan	0.055	0.083	0.085	0.122	0.113	0.104
23	East Kalimantan	0.141	0.192	0.424	0.160	0.145	0.133
24	Nort Kalimantan				0.019	0.014	0.009
25	North Sulawesi	0.038	0.221	0.049	0.073	0.074	0.076
26	Central Sulawesi	0.039	0.074	0.029	0.057	0.093	0.119
27	South Sulawesi	0.078	0.081	0.165	0.140	0.137	0.135
28	South East Sulawesi	0.075	0.072	0.109	0.127	0.112	0.116
29	Gorontalo			0.029	0.013	0.011	0.011
30	West Sulawesi				0.053	0.064	0.059
31	Maluku	0.049	0.219	0.15	0.042	0.036	0.031
32	North Maluku			0.03	0.037	0.034	0.034
33	West Papua			0.506	0.631	0.579	0.535
34	Papua	0.943	1.093	1.237	0.771	0.729	0.754

Source: GRDP Regency/Municipality, BPS (1995, 2005, 2013-17).

Table A3: Williamson Index Between Regencies/Municipalities in Province Based on APBD per capita

	1995	2000	2005	2010	2015
Aceh	0.30	0.40	0.47	0.48	0.43
North Sumatera	0.39	0.42	0.38	0.39	0.37
West Sumatera		0.46	0.63	0.44	0.41
Riau	0.22	0.32	0.48	0.38	0.47
Jambi	-	-	0.69	0.32	0.31
South Sumatera	0.12	0.44	0.17	0.36	0.35
Bengkulu;	0.27	0.29	0.51	0.31	0.29
Lampung	-	-	0.26	0.30	0.31
Bangka Belitung island	0.16	0.13	0.16	0.29	0.29
Riau Island	0.92	0.23	0.51	0.83	0.89
DKI Jakarta					
West Java	0.49	0.37	0.26	0.34	0.35
Central Java	-	-	0.29	0.29	0.31
DI Yogyakarta	0.48	0.46	0.30	0.33	0.34
East Java	0.44	0.54	0.24	0.35	0.36
Banten	0.52	0.28	0.34	0.36	0.35
Bali	0.65	0.86	0.28	0.33	0.36
West Nusatenggara	0.25	0.31	0.45	0.45	0.35
East Nusatenggara	0.28	0.30	0.30	0.29	0.28
West Kalimantan	0.33	0.99	0.31	0.29	0.36
Central Kalimantan	0.43	0.41	0.41	0.40	0.37
South Kalimantan	0.26	0.33	0.33	0.35	0.33
East Kalimantan	0.49	0.35	0.63	0.90	0.86
North Kalimantan					
North Sulawesi	0.49	0.22	0.41	0.38	0.33
Central Sulawesi		0.48	0.29	0.32	0.31
South Sulawesi	0.23	0.44	0.33	0.37	0.30
South East Sulawesi	0.08	0.32	0.13	0.40	0.45
Gorontalo				0.29	0.29
West Sulawesi				0.29	0.32
Maluku	0.23	0.80	0.25	0.39	0.42
North Maluku				0.34	0.41
West Papua				0.58	0.70
Papua				0.57	0.57

Table A4: Theil Index Between Regencies/Municipalities in Province Based on APBD per Capita

	1995	2000	2005	2010	2015
Aceh	0.04	0.06	0.09	0.02	0.48
North Sumatera	0.07	0.07	0.07	(0.00)	0.74
West Sumatera	0.47	0.08	0.14	0.01	0.38
Riau	0.02	0.06	0.11	0.02	0.49
Jambi	0.01	0.10	0.02	0.01	0.25
South Sumatera	0.03	0.04	0.11	0.01	0.50
Bengkulu	0.01	0.01	0.01	0.01	0.16
Lampung	0.26	0.03	0.07	(0.01)	0.36
Bangka Belitung island	-	-	0.03	0.00	0.12
Riau Island	-	-	0.19	0.01	0.19
DKI Jakarta	-	-	-	-	-
West Java	0.09	0.06	0.03	(0.06)	1.39
Central Java	0.08	0.10	0.04	(0.04)	1.20
DI Yogyakarta	0.08	0.12	0.03	(0.00)	0.18
East Java	0.11	0.04	0.05	(0.04)	1.54
Banten	-	-	0.03	(0.02)	0.37
Bali	0.15	0.25	0.04	0.00	0.29
West Nusatenggara	0.03	0.05	0.08	(0.00)	0.25
East Nusatenggara	0.04	0.05	0.04	0.01	0.35
West Kalimantan	0.05	0.37	0.04	0.01	0.31
Central Kalimantan	0.09	0.08	0.08	0.02	0.30
South Kalimantan	0.03	0.05	0.05	0.01	0.32
East Kalimantan	0.10	0.06	0.19	0.06	0.61
North Sulawesi	0.10	0.02	0.07	0.02	0.15
Central Sulawesi	0.43	0.09	0.04	0.01	0.23
South Sulawesi	0.02	0.10	0.05	0.01	0.25
West Sulawesi	-	-	0.04	0.01	0.56
South East Sulawesi	0.00	0.05	0.01	0.01	0.25
Gorontalo	-	-	0.07	0.00	0.10
West Sukawesi				0.00	0.10
Maluku	0.02	0.28	0.03	0.01	0.18
North Maluku	-	-	0.10	0.01	0.15
West Papua	-	-	0.12	0.03	0.26
Papua	0.12	0.10	0.10	0.08	0.73

Table A5: Mean Years of Schooling By Province

No.	Province	1995	2000	2005	2008	2010	2015	2017
1	Aceh	7.5	-	-	8.6	8.3	8.8	9.0
2	North Sumatera	8.2	8.2	8.8	8.8	8.5	9.0	9.3
3	West Sumatera	7.8	8.0	8.1	8.6	8.1	8.4	8.7
4	Riau	7.6	7.9	8.3	8.8	8.3	8.5	8.8
5	Jambi	7.0	7.3	7.8	7.9	7.3	8.0	8.2
6	South Sumatera	6.9	7.3	7.9	7.8	7.3	7.8	8.0
7	Bengkulu	7.1	7.4	8.0	8.2	7.8	8.3	8.5
8	Lampung	6.6	6.8	7.2	7.5	7.3	7.6	7.8
9	Bangka Belitung island	-	-	6.9	7.7	7.1	7.5	7.8
10	Riau Island	-	-	9.3	8.3	9.4	9.7	9.8
11	DKI Jakarta	10.3	9.9	10.2	10.3	10.4	10.7	11.0
12	West Java	7.0	7.3	7.6	7.7	7.4	7.9	8.1
13	Central Java	6.2	6.6	6.6	7.1	6.7	7.0	7.3
14	DI Yogyakarta	8.2	7.8	8.6	9.0	8.5	9.0	9.2
15	East Java	6.1	6.6	7.0	7.2	6.7	7.1	7.3
16	Banten			7.9	8.0	7.9	8.3	8.5
17	Bali	6.8	7.4	7.7	8.0	7.7	8.3	8.6
18	West Nusatenggara	5.4	6.0	5.6	6.8	5.7	6.7	6.9
19	East Nusatenggara	5.9	6.0	6.3	6.8	6.5	6.9	7.2
20	West Kalimantan	5.8	6.4	6.9	6.9	6.3	6.9	7.1
21	Central Kalimantan	7.3	7.6	8.0	8.0	7.6	8.0	8.3
22	South Kalimantan	6.8	7.0	7.6	7.8	7.3	7.8	8.0
23	East Kalimantan	8.1	8.1	8.9	8.9	8.6	9.1	9.4
24	Nort Kalimantan						8.4	8.6
25	North Sulawesi	8.2	8.1	9.0	9.0	8.7	8.9	9.1
26	Central Sulawesi	7.4	7.4	7.6	8.1	7.7	8.0	8.3
27	South Sulawesi	6.8	6.9	7.3	7.6	7.3	7.6	8.0
28	South East Sulawesi	7.2	7.5	7.5	8.1	7.6	8.2	8.5
29	Gorontalo					6.9	7.1	7.3
30	West Sulawesi					6.6	6.9	7.3
31	Maluku	7.8	-	8.5	8.8	8.6	9.2	9.4
32	North Maluku	-	-	8.2	8.3	7.9	8.4	8.6
33	West Papua	-	-	-	8.0	6.8	7.0	7.2
34	Papua	5.8	5.6	6.4	6.5	5.6	6.0	6.3
National		6.9	7.2	7.5	7.8	7.5	7.8	8.1

Table A6: Williamson Index Between Regencies in Province on Years of Schooling

Province Names	1995	2005	2013	2014	2015	2016*	2017
Aceh	0.878	0.901	0.15	0.14	0.14	0.14	0.13
North Sumatra	0.301	0.388	0.16	0.15	0.15	0.15	0.15
West Sumatra	0.448	0.38	0.17	0.17	0.17	0.17	0.17
Riau	1.216	0.756	0.16	0.15	0.15	0.15	0.14
Jambi	0.246	0.372	0.17	0.17	0.16	0.15	0.15
South Sumatra	0.362	0.623	0.19	0.18	0.17	0.17	0.16
Bengkulu	0.184	0.374	0.19	0.18	0.18	0.18	0.18
Lampung	0.368	0.202	0.19	0.18	0.17	0.17	0.16
Bangka Belitung		0.282	0.16	0.16	0.16	0.15	0.14
Riau Island		0.597	0.17	0.16	0.16	0.17	0.16
DKI Jakarta	0.363	0.563	0.05	0.05	0.05	0.05	0.05
West Java	0.414	0.668	0.20	0.19	0.19	0.19	0.18
Central Java	0.728	0.799	0.17	0.17	0.16	0.16	0.15
DI Yogyakarta	0.379	0.414	0.18	0.18	0.18	0.18	0.16
East Java	1.246	1.191	0.24	0.23	0.23	0.23	0.22
Banten		0.842	0.22	0.23	0.22	0.21	0.21
Bali	0.531	0.355	0.22	0.22	0.22	0.22	0.21
West Nusa Tenggara	0.231	1.754	0.19	0.19	0.19	0.19	0.18
East Nusa Tenggara	0.352	0.48	0.21	0.20	0.20	0.19	0.19
West Kalimantan	0.518	0.435	0.17	0.17	0.16	0.15	0.15
Central Kalimantan	0.294	0.235	0.14	0.14	0.13	0.13	0.12
South Kalimantan	0.334	0.427	0.18	0.18	0.17	0.16	0.15
East Kalimantan	0.519	1.209	0.13	0.12	0.11	0.11	0.10
North Kalimantan			0.11	0.13	0.13	0.12	0.11
North Sulawesi	0.282	0.32	0.14	0.14	0.14	0.13	0.13
Central Sulawesi	0.289	0.231	0.17	0.16	0.16	0.16	0.15
South Sulawesi	0.423	0.668	0.21	0.21	0.20	0.21	0.20
Southeast Sulawesi	0.397	0.477	0.38	0.20	0.19	0.19	0.18
Gorontalo		0.244	0.21	0.21	0.21	0.20	0.19
West Sulawesi			0.05	0.05	0.05	0.04	0.05
Maluku	0.329	0.598	0.18	0.17	0.17	0.16	0.15
North Maluku		0.272	0.17	0.17	0.17	0.16	0.16
West Papua		1.185	0.30	0.30	0.30	0.30	0.29
Papua	2.094	2.386	0.54	0.56	0.53	0.52	0.50

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LEADING INDICATORS OF POVERTY IN INDONESIA: APPLICATION IN THE SHORT-TERM OUTLOOK

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ABSTRACT

Development indicators operate very dynamically in line with the government's program and policy response. The government, therefore, needs an estimate of the poverty rate for a specific period in line with the development of its constituent indicators. The rate is required by the government to ensure the implemented policy can achieve the target according to the plan. Given the available indicators, these leading indicators are more dynamic than the poverty line so they need to be monitored earlier to estimate the poverty line in a specific period.

This study varies from previous similar studies, where the poverty projection was made against all poverty indicators. In addition, an analysis was conducted at the national and regional (provincial, rural, and urban) levels in line with the indicators in the official publication of Statistics Indonesia *(Badan Pusat Statistik: BPS)*. This study measures the impact of price increases on expenditure per capita, so the impact on the poverty line can be measured by observing changes in expenditure per capita. This study also formulates a method that can be replicated by policy makers by using inflation rate, economic growth, and population estimate for a specific period. This study concludes that it is very possible to apply the total inflation rate as a leading indicator to project the poverty rate if the government and other stakeholders require an alternative calculation before official figures become available. Nevertheless, the use of inflation in projecting the poverty rate is clearer than economic growth.

Keywords: Inflation, Economic Growth, Poverty Line

Abstract

Development indicators operate very dynamically in line with the government's program and policy response. The government, therefore, needs an estimate of the poverty rate for a specific period in line with the development of its constituent indicators. The rate is required by the government to ensure the implemented policy can achieve the target according to the plan. Given the available indicators, these leading indicators are more dynamic than the poverty line so they need to be monitored earlier to estimate the poverty line in a specific period.

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Overview

Introduction

Poverty alleviation constitutes one of the main policy priorities of the Government of Indonesia. This is in line with the commitment to achieve the first objective in the Sustainable Development Goals (SDGs)–namely eradicating poverty. The availability of an accurate poverty rate in each region that can be compared at the national level constitutes an absolute pre-condition to developing a poverty alleviation policy.

The poverty rate has several functions in national development. The first function is to provide a basis for development of a national development policy and plan, including a policy and plan to improve people's welfare and sectoral development. The second function, used in targeting, is based on geographical location and individuals and households that are the target of development programs. The third function is to determine the allocation of poverty alleviation and welfare improvement programs. Fourthly, to serve as a monitoring and evaluation indicator of development programs including achievement of the National Medium- and Long-Term Development Plans (*Rencana Pembangunan Jangka Menengah Nasional*: RPJMN/*Rencana Pembangunan Jangka Panjang Nasional*: RPJPN) and the Sustainable Development Goals (SDGs). The last function is as an instrument to measure the performance of central and regional governments.

Development indicators operate very dynamically in line with the government's program and policy response. The government, therefore, needs an estimate of the poverty rate for a specific period that aligns with the development of its constituent indicators. The poverty rate is required by the government to ensure the implemented policy can achieve the target according to the plan. The macro indicator dynamics at least have an impact on poverty rate, both directly and indirectly.

There are several leading indicators that can be used as a benchmark for estimating the poverty rate: inflation rate, economic growth, and population growth. Given the available indicators, these leading indicators are more dynamic than the poverty line so they need to be monitored earlier to estimate the poverty line in a specific period.

Economic growth describes the increase in aggregate income capacity. Aggregate economic growth is a reflection of household consumption growth in a specific period. In the calculation of poverty rate, the main component is household consumption per capita. The scale of the rate can more or less be estimated through the economic growth indicator. In addition, the economic growth rate is generally published earlier than the poverty rate, thus allowing it to be used as a leading indicator in estimating the poverty rate.

Inflation describes changes in the price of people's needs from time to time. The price change in important commodities, therefore, needs to be taken into account by policy makers. On the other hand, a specific basket of goods has a direct impact on calculation of the poverty rate, especially 52 food commodities and 36 non-

food commodities. This component further influences the size of the poverty line and poverty rate during a specific period.

In addition, population growth becomes one of the three indicators determining the calculation of poverty rate. Population growth basically uses the result of population projection calculations usually provided by BPS. This rate determines the calculation of poverty rate, especially in the indicator for the number of poor.

The government does not yet have the standard tools or format to estimate the poverty rate for a specific period in the future, although the leading indicator is available earlier than the poverty rate. This condition, therefore, serves as the basis for the importance of developing a poverty projection model that can be used as a means to detect achievements in poverty alleviation and the steps needed to anticipate an increase in the poverty rate.

This poverty projection study is different to previously conducted studies. Firstly, in this study, the poverty projection was made on all poverty indicators. The indicators produced include: poverty line, poverty level, number of poor people, poverty gap, poverty severity, and expenditure per capita which are the main instruments of calculation. The analysis was conducted at the national and regional (provincial, rural, and urban) levels in line with the indicators in official BPS publications. Second, this study measures the impact of price increases on expenditure per capita so the impact on the poverty line can be measured by observing changes in expenditure per capita. Third, this study also formulates a method that can be replicated by policy makers by using inflation rate, economic growth, and an estimate of population numbers in a specific period .

Calculation of Poverty Rate in Indonesia

In calculating poverty in Indonesia, BPS uses a household capability concept to meet basic needs–known as the "basic needs approach". The "basic needs" refer to the fundamental requirements for fulfilling the minimum needs for a decent life, namely fulfilling the minimum food and non-food needs. With this approach, the measurement of poverty is an inability in terms of expenditure or income to provide for a minimum decent life based on a minimum number of food commodities (food basket) to fulfil calorie needs, together with a number of non-food expenditures (non-food basket). Insufficient income or expenditure or revenue for a minimum decent life is a monetary or poverty line approach or poverty line, namely the value of expenditure to fulfil minimum basic needs in rupiah (monetary approach). The poor population is, therefore, the population having an average expenditure per capita per month below the poverty line.

The poverty line is the sum of the Food Poverty Line *(Garis Kemiskinan Makanan:* GKM) and Non-Food Poverty Line *(Garis Kemiskinan Bukan Makanan:* GKBM). GKM constitutes the expenditure value of minimum food needs equal to 2,100 calories per capita per day. The package of basic food commodity needs is represented by 52 types of commodity (grains, tubers, fish, meat, eggs and milk, vegetables, legumes, fruits, oil, and fats). The GKBM constitutes the package of basic non-food needs to meet the minimum need for housing, clothing, education, and health. It includes 51 types of commodity in urban areas and 47 types of commodity in rural areas.

The focus of this study defines poverty as a household's or individual's inability to meet the minimum needs for a decent living standard. Nevertheless, poverty in general can have a broad meaning. The definition of minimum decent need and the method of measuring it determines the magnitude of the poverty line and, therefore, of the poverty rate.

BPS is the institution authorised by the government to calculate and map the official rate of poverty in Indonesia from time to time. BPS has calculated poverty since the early 1980s and published it officially in 1984. The publication covers the poverty rate for the period 1976-1981. Since then, every three years, BPS has calculated the number and percentage of the poor population in Indonesia together with available household consumption data collected from the National Socioeconomic Survey (SUSENAS). Since 2002, the poverty calculation is undertaken annually through the household consumption module survey of SUSENAS.

Poverty Indicators

Poverty Level

The Head Count Index (HCI-P0) is the percentage of the population with expenditure per capita below the poverty line. The poor are those below the poverty line. The poverty level is calculated using the following formula:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^\alpha \quad (1)$$

Where α is 0; z is the poverty line; y_i is the average expenditure per capita in a month for those below the poverty line (i=1, 2, 3, …., q), y_i < z; q is the population number below the poverty line; and n is the population number.

Number of Poor

The poor population is the number of people living below the poverty line during a specific period. In accordance with the previous formulation, the poor population is calculated every six months, namely in March and September. For the government, the poor population number is the development target which needs to be lowered every year.

Various government programs and policies are directed to achieving a poor population number in accordance with the target in the development plan. Several programs are aimed at reducing the expenditure burden through the social protection program. In addition, to increase household incomes, a similar policy is also applied, but in a different dimension, such as the people's business credit program and village fund.

Poverty Gap

The Poverty Gap Index-P1 is the average measure of expenditure gap between each poor person and the poverty line. The higher the index value, the further the average person's expenditure is from the poverty line:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^\alpha \quad (2)$$

Where α is 1; z is the poverty line; y_i is the average expenditure per capita in a month for those below the poverty line (i=1, 2, 3, …., q), y_i < z; q is the population number below the poverty line; and n is the population number.

In general, this index is useful for determining the cost of poverty eradication by creating an ideal transfer target for the poor population by assuming perfect targeting–without any leakages or program obstacles. The lower the poverty gap value, the greater the economic potential for poverty eradication funds based on identifying the characteristics of the poor population and targeting assistance and programs. A fall in the value of the poverty gap index indicates that the average expenditure of the poor tends to become closer to the poverty line and the expenditure inequity of the poor also narrows.

Poverty Severity

The Poverty Severity Index-P2 gives an illustration of expenditure spread across the poor population. The formula used to determine the index is:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left[\frac{z - y_i}{z}\right]^\alpha \quad (3)$$

Where α is 2; z is the poverty line; y_i is the average expenditure per capita in a month for those below the poverty line (i=1, 2, 3, …., q), $y_i < z$; q is the population number below the poverty line; and n ais the population number.

In general, the higher the index value, the higher the expenditure imbalance among the poor population. This index is useful for providing complementary information on poverty incidence. For example, there may be cases where some groups of poor have a high poverty incidence but their poverty gap is low, while other population groups have a low poverty incidence but a high poverty gap for the poor population.

Leading Indicators of Poverty Rate

Inflation Rate

The inflation rate is generally published by BPS through the Statistics Official News *(Berita Resmi Statistik: BRS)* in the first week after the end of the reporting month. For example, the inflation rate of March is published in the first week of April. The inflation rate rolled out in this publication includes monthly, annual, and current year inflation. Meanwhile, the poverty rate and its indicators are published in the first week after the quarterly survey. The inflation rate in this study has, therefore, been established as a leading indicator of the poverty rate. Establishing the inflation rate as a leading indicator is based on the impact of inflation on the poverty rate and being the number published before the poverty rate.

Several studies related to the impact of inflation on the poverty rate and household expenditure have been conducted. To measure the impact of price changes on public welfare, Son and Kakwani (2008) and Son (2008) assume that expenditure per capita is the function of price (p) and utility (u) reflecting living needs.

$$x = [e(u, p)] \quad (4)$$

The formula indicates that the expenditure per capita depends on the efforts of these individuals to meet their expected living needs at a specific price. A price change, like an increase in p to p^*, forces these individuals to compensate the increase in price in order to achieve the same utility level. This assumption serves as the basis for these two researchers to measure the real change of expenditure per capita as a consequence of a price increase, which is then expressed in the following equation:

$$\Delta x = -[e(u, p^*) - e(u, p)] \quad (5)$$

By applying the Taylor expansion rule, the following equation is obtained.

$$dx = -\sum_{i=1}^{k} \frac{\partial e}{\partial p_i}(p_i^* - p_i) \quad (6)$$

The above equation assumes that there is no substitution effect of goods when there is a price increase in the goods. From a relative increase in commodity *i*, the impact of a fall in expenditure per capita can be calculated in accordance with the price elasticity of commodity *i*, as set out in the following equation:

$$\frac{p_i \, \partial x}{x \, \partial p_i} = -\frac{v_i(x)}{x} \quad (7)$$

The equation above indicates that there is an increase in the price of commodity i by 1 per cent causing a decrease in welfare of the individual by a percentage proportionate to the expenditure per capita of the individual for commodity *i* against its total expenditure per capita $\left(-\frac{v_i(x)}{x}\%\right)$.

At the population level, the impact of a price increase has the same principle as that on the individual's expenditure per capita. This calculation concept commences by changing the concept of individual expenditure per capita $x = \sum_{i=1}^{n} v_i(x)$ into the concept of expenditure per capita at the population level $\mu = \int_0^\infty xf(x)dx$. Where $f(x)$ is the density function of x. To obtain the price elasticity of the population's expenditure per capita, the following equation is lowered against price, thus the following elasticity formula is obtained:

$$\frac{p_i}{\mu}\frac{\partial \mu}{\partial p_i} = -\frac{\mu_i}{\mu} = -\overline{w}_i. \quad (8)$$

The average expenditure per capita of the entire population for commodity i is marked as μi while μ reflects the total expenditure per capita of the entire population. Meanwhile, $\overline{w}_i$ is the average proportion of expenditure per capita for commodity i. Interpretation of this equation is identical to equation 6, where every 1 per cent increase in commodity i will reduce population welfare by $\overline{w}_i$%, or equal to the price elasticity of such goods.

Given that changes in commodity prices vary from one commodity to another, the resulting impact between commodities will differ. To capture the impact of a price change of each commodity on a change in welfare level, equation 8 can be composed into the following equation:

$$\frac{\mu^* - \mu}{\mu} = \sum_{i=1}^{n} \frac{(p_i^* - p_i)}{p_i}\frac{\partial \mu}{\partial p_i}\frac{p_i}{\mu} = -\sum_{i=1}^{n}(p_i^* - 1)\,\overline{w}_i \quad (9)$$

The equation above measures the real change occurring in public welfare as a consequence of a price change in every commodity. This can be seen from the average public welfare in the base (period) year when the price of commodity i is p. When there is a price increase from p to p*, the average public welfare also undergoes an increase to μ*. In a more mathematical manner, every price increase by r per cent will decrease the welfare level by $(p_i^* - 1)\overline{w}_i$. The impact of a price increase in each commodity on the public welfare is then referred to as the *within effect.*

Economic Growth

One of the important indicators to identify the economic condition in a country in a specific period is Gross Domestic Product (GDP), based on both the prevailing price and constant price. In general, GDP is basically the amount of additional value generated by all business units in a specific country, or the final value amount of all goods and services produced by all economic units.

GDP based on prevailing price describes the additional value of goods and services calculated using the prevailing price in every year. GDP based on constant price indicates the additional value of the goods and services calculated by using the prevailing price in one specific year as the basis. GDP based on the prevailing price can be used to observe economic structure and movements, while the constant price is used to determine economic growth from year to year.

The regular economic growth rate is published by BPS through BRS during the first week in the second month after the report. For example, economic growth for the first quarter is published in the first week of May. The economic growth rate reported in this publication includes quarterly and annual economic growth. The poverty rate and its indicators are published in the first week after the three month survey.

The economic growth rate is used in this study as a leading indicator of the poverty rate and is based on the impact of economic growth on poverty rate. It is also published before the poverty rate. For example, the poverty rate for March is published by BPS through BRS in the first week of July while the economic growth rate has already been published in May.

Population Growth

Population growth indicates the annual population increase for a specific period. The method most often used by BPS is the geometrical method, although the population growth rate can also be calculated using the arithmetic or exponential method. In each survey conducted by BPS, population growth is the change in individual weighting, and this also has implications on the calculation of poverty rate.

The population projection has been published by BPS for 2015 until 2045. This rate is available based on age group, gender, and province, for both rural and urban areas. Referring to the publication, it is quite relevant to use population growth as one of the leading indicators in making poverty indicator projections in Indonesia.

Poverty Rate Calculation Components

Expenditure per Capita

Expenditure per capita is the cost incurred for consumption of all household members for a month divided by the number of household members. Data on expenditure can reveal the household consumption pattern in general by using the indicator of proportion of expenditure allocated to food and non-food commodities. The household expenditure composition can be used to assess the economic welfare level of the population–a lower level of total expenditure spent on food is generally an indication of an improved welfare level of the household or individual.

Household expenditure is differentiated based on food and non-food groups. A change in someone's income will influence a shift in their expenditure pattern. The higher the income, the higher their non-food expenditure. Expenditure pattern can, therefore, be used as one tool to measure people's welfare level, where a change in its composition is used as an indicator of a change in welfare level.

Expenditure per capita is the main instrument used for calculation of the poverty rate. A person is included in the poor category if their expenditure per capita is lower than the poverty line. The availability of expenditure per capita, therefore, constitutes the main data source for calculation of the poverty rate and serves as the basis for estimating the national and regional (provincial, urban, and rural) poverty rate estimation.

Inflation

The inflation rate is a change in the Consumer Price Index (CPI). In general, CPI is an economic indicator that provides information on the price of goods and services purchased by consumers. Calculating the CPI is undertaken to record changes in the purchasing price at the consumer level (purchasing cost) of a fixed group of goods and services (fixed basket) that are generally consumed by the community–more commonly referred to as the inflation rate.

CPI is the cost price index of a group of consumer goods, each of which is weighted according to the proportion of public spending on the commodity concerned. CPI measures the price of a group of specific goods such as main foodstuffs, clothing, housing, and miscellaneous goods and services purchased by consumers in a specific period.

Calculation of the CPI is done by referring to the cost of living survey to determine the type of commodity in the CPI. This survey is conducted once every seven years, with the last survey conducted in 2012. At the moment, CPI records 859 types of commodity classified into seven groups: (i) foodstuffs; (ii) processed food, beverages, cigarettes, and tobacco; (iii) housing, water, electricity, gas, and fuel; (iv) clothing; (v) health; (vi) education, recreation, and sports; and (vii) financial services. The number of recorded commodities has increased in comparison with the CPI based on the Cost of Living Survey 2007 which only recorded 774 commodities. Table 1 shows the change in the weighting composition of seven groups of goods in the calculation of Indonesia's CPI.

Inflation contributes to the calculation of poverty rate–especially in the calculation of the poverty line. Inflation is the inflator of temporary poverty line before it is applied in the reference population. Availability of the inflation rate in each time period is an inseparable component in the calculation of poverty rate in Indonesia.

Table 1 Weight composition of goods 2007 & 2012

Group of household expenditure	2007	2012
1. Foods	19,57	18,85
2. Processed food, beverages, cigarette, and tobacco	16,55	16,19
3. Housing, water, electricity, gas, and fuel	25,41	25,37
4. Clothing	7,09	7,25
5. Health	4,45	4,73
6. Education, sports, and entertainment	7,81	8,46
7. Transportation, communication, and financial services	19,12	19,15

Temporary Poverty Line

The temporary poverty line is defined as the poverty line of the previous period adjusted for general inflation in the CPI. This temporary poverty line is calculated using the following formula:

$$z_{stij} = z_{tij-1} * (1 + \pi_{tij}) \quad (10)$$

Where z_s is the temporary poverty line in period t of province i and area j; z_{tij-1} is the poverty line in period t-1 of province i and area j; π_{tij} is the inflation in period t of province i and area j.

Calculating the temporary poverty line is the first step in calculating the poverty rate. The rate serves as the basis for determining reference population that is the benchmark for calculating the poverty line. The reference population is the 20 per cent of the population above the temporary poverty line. Based on this reference population, the GKM and GKBM are subsequently calculated.

The reference population serves as a method for calculating the poverty line. This reference population is defined as the population having expenditure per capita between the temporary poverty line and its maximum reference, namely 20 per cent above the temporary poverty line:

$$z_s \leq y_r \leq z_s + 20\% \quad (11)$$

Where z_s is the temporary poverty line and y_r is expenditure per capita between the temporary poverty line and its cap.

Poverty Line

Calculating the poverty line in Indonesia is conducted by following the cost of basic needs (CBN) method. This method uses a consumption sufficiency approach equal to 2,100 calories per individual per day. There are two expenditure components used to calculate the total poverty line, namely the food consumption group poverty line and non-food consumption group poverty line. There are 52 types of food commodity used to calculate the GKBM, while the non-food group poverty line is calculated based on 36 types of goods.

$$z = z_m + z_{bm} \quad (12)$$

Where Z is the total poverty line, z_m dan z_{bm} are the food and non-food poverty lines respectively. Furthermore, the poverty line is calculated based on location–namely based on province and region (urban and rural).

Food Group

The consumption value per capita for 52 types of food commodity is used in calculating the poverty line for the food group. This consumption value is also calculated based on location, in this case based on province j and area type a (urban or rural). The formula for calculating individual consumption value per location per area is in the following mathematical equation:

$$z_{maj} = \sum_{i=1}^{52} \tilde{p}_{iaj} * \tilde{q}_{iaj} = \sum_{i=1}^{52} \tilde{v}_{iaj} \quad (13)$$

Where z_{maj} is the poverty line for the food group (m) in province j and area a. The average price of commodity i in province j and area a is marked as $\tilde{p}_{iaj}$, while $\tilde{q}_{iaj}$ is the average amount of the same commodity in this location consumed by an individual. Meanwhile, $\tilde{v}_{iaj}$ indicates the average consumption value consumed by an individual in province j and area a. Furthermore, this consumption value is the equivalent of the daily minimum calorie need of 2,100 calories. This is calculated by applying the following formula:

$$\bar{z}_{maj} = \frac{\sum_{i=1}^{52} \tilde{V}_{iaj}}{\sum_{i=1}^{52} \tilde{C}_{iaj}} \quad (14)$$

Where $\bar{z}_{maj}$ is the average implicit price per calorie in area a and province j for the food group which has been equated to 2,100 calories. Notation c_{iaj} is the calorie value for every commodity i in area a and province j.

Non-Food Group

Unlike the calculation for the food group poverty line, the poverty line for the non-food group is calculated by applying a ratio between commodity i and total non-food consumption in each (urban and rural) area. This is done due to a difference in data structure, where the non-food group does not contain any calories as in the foodstuffs group. The non-food group consumption ratio used refers to the basic need commodity package survey conducted in 2004. This ratio value is multiplied by the consumption value per non-food commodity type in every area by following the formula:

$$z_{bmaj} = \sum_{i=1}^{n} r_{ia}\, v_{ij} \quad (15)$$

Where z_{bmaj} is the non-food poverty line in province j and area a. Meanwhile r_{ia} and v_{ij} are respectively the consumption ratio of commodity i in non-food group in area a to total non-food consumption in area a and the consumption value of commodity i in province j.

Population Number

The availability of population data has at least several benefits. The data is required to estimate various population parameters down to a specific administrative region. The data is also used to collect population information that can be used/utilised to compose the basis for population data.

The population number is defined by BPS as the number of people who have a permanent residence, and whose census details are collected where they usually reside. People who are travelling for six months or more, or who have been in a residence for six months or more, are counted where they reside at the time of census.

In accordance with this definition, the population of a region consists of five groups. The first one is a person residing in a region permanently or who has already been there for six months or more. The second one is a person residing in a region for less than six months but intending to permanently reside there. The third one is a person who is travelling to another region for less than six months and does not intend to settle permanently in the destination region. The fourth one is a person residing in a region by contracting/renting/staying in a boarding house, for work or school and might move again for various reasons. The fifth one is a member of the Indonesian diplomatic corps (ambassador, consul, and other Indonesian representatives having the status of diplomat) and his/her family members residing overseas.

In addition, there are five categories of people who are not included as residents of a region. The first one is a guest who is visiting for less than six months and who does not intend to reside there permanently. The second one is a person who is travelling to another region for six months or more. The third one is a person who has moved and intends to reside permanently in the destination region although he/she has not left this residence for six months. The fourth one is a person who has resided in another region by contracting/renting/staying in a boarding house, although during holidays he/she returns (visits) to the house of his/her family or parents. The last one is a member of the diplomatic corps (ambassador, consul, and other representatives having the status of diplomat) of a foreign country and his/her family members residing in Indonesia.

In relation to the calculation of poverty rate, data on population number is required to calculate the proportion of the population living below the poverty line. The calculation subsequently determines the size of the population living below the poverty line–what is commonly referred to as the poverty rate.

Assumptions, Data, and Methodology

Projection Assumptions and Scenarios

The assumptions used determine the simulation result in each projection. Furthermore, the assumptions are developed as the basis for setting scenarios. In short, there are two large groups in the assumptions used to calculate the poverty rate projection.

The first assumption is permanent and is not directly counted. This group consists of: (i) population growth using the rate in the 2015-2045 Population Projection published by BPS; and (ii) the quantity of goods consumed by households in a permanent condition. Population growth indirectly contributes to the calculation of poverty rate, where the size of population growth determines the number of poor in a specific area. Population growth is, therefore, one of the assumptions in this study, with the rate positioned as a constant indicator referring to the outcome of the 2015-2045 Population Projection.

The second group consists of variable assumptions–namely assumptions based on leading indicators that directly influence consumption and the price level of goods and services. These assumptions are among others: (i) price growth (inflation); and (ii) economic growth. The second assumption of this indicator is a leading indicator and the real rate is published by BPS before the poverty rate is published. In general, the economic growth rate is published two months before the poverty rate is published, while the inflation rate for the same period as the poverty rate is published three months before the poverty rate.

Data

National Socioeconomic Survey (SUSENAS)

This study uses the data published by BPS, namely SUSENAS and CPI. SUSENAS are survey data that record household consumption expenditures and demographic data on members of these households. BPS divides SUSENAS into two data groups (modules), namely individual modules that measure individual demographic characteristics including population demography, education, health, and information related to housing and household assets. The second module measures household expenditures for both food group consumption and non-food group consumption.

The number of samples collected in this survey is 300,000 household respondents spread across 34 provinces and 511 regencies/cities in Indonesia. This study specifically uses the consumption module of SUSENAS that measures household consumption for 358 types of goods, which can be divided into 236 food groups and 122 non-food groups. SUSENAS data is sourced from BPS dissemination and represents the same data set as the one used in the calculation of poverty rate.

CPI

The CPI is one of the indicators used to record price changes occurring at the consumer level for a number of goods and services. The CPI recording method has undergone five evolutions since this method was first adopted by BPS. At the moment, CPI records 859 goods and services generally consumed by the community. This method refers to the 2012 cost of living survey conducted in 82 cities. These 859 commodities are subsequently divided into seven commodity groups: (i) foodstuffs; (ii) processed food; (iii) housing, water, electricity, gas, and fuel; (iv) clothing; (v) health; (vi) education, recreation, and sport; and (vii) transportation, communication, and financial services. The CPI data originates from BRS that is routinely published by BPS and is earlier than the poverty rate.

Economic Growth

Economic growth is one of the indicators describing the economic condition. This rate represents the level of development success of a region in a specific period. Positive economic growth, therefore, indicates an increase in the production of goods and services that might directly impact on household consumption. In this study, aggregate economic growth and household consumption growth are factors that determine the poverty rate. Economic growth data are sourced from the BRS journal routinely published by BPS and is earlier than the poverty rate.

Population Growth

Population growth depicts the level of population increase per year in a specific period. The method most often used by BPS is the geometrical method although the population growth rate can be calculated using the arithmetic or exponential method. Data on population growth is an output of BPS published in the 2015-2045 Population Projection.

Methodology

The poverty rate prediction in this study follows the concept introduced by Son and Kakwani (2008) and Son (2008) with a number of modifications to adjust for prevailing conditions in Indonesia. To make a prediction, two stages of analysis are undertaken: (i) identifying the magnitude of the impact of price rises on expenditure per capita; and (ii) its impact on the poverty line. By identifying the change occurring in these two components, the poor population after a price increase is defined as individuals having expenditure per capita less than, or equal to, the poverty line.

Modification to Expenditure per Capita

The calculation of the impact of CPI on the level of community welfare level, as expressed in equation 10, is the estimated impact of real price increases on household expenditure. It means that when there is no increase in an individual's income, the CPI (inflation) causes a real decrease in an individual's welfare level.

Given that the main objective of this study is predicting expenditure per capita and the poverty rate by using inflation, this study has modified the concept introduced by Son and Kakwani (2008) above. Unlike these two researchers, this study focuses on measuring the impact of a nominal price increase on expenditure per capita and the poverty rate. As an initial stage, this study proposes a hypothesis that a price increase represents direct price elasticity against expenditure per capita. This concept is mathematically expressed as follows:

$$y_t = y_{t-1}\left(1 + \frac{p^* - p_{t-1}}{p_{t-1}}\right) \quad (16)$$

Where y_t and y_{t-1} are the expenditure per capita of periods t and t-1, while p_{t-1} and p^* are the CPI occurring in periods $t-1$ and t respectively. Equation 16 above may be interpreted that to meet the basic minimum need per day, an individual must increase his/her expenditure per capita to equal the price increase.

Furthermore, the impact of this price increase can be measured on the basis of location–in this case provinces. To make this decomposition, equation 16 above is modified into the following formula:

$$y_t = \frac{1}{\pi}\sum_{j=1}^{k} y_{jt-1}\left(1 + \frac{p^*_{jt} - pj_{t-1}}{p_{jt-1}}\right) \quad (17)$$

This equation shows that national expenditure per capita constitutes the weighted average of a change in expenditure per capita in each province j due to a price increase in the province. The weighted proportion used is the proportion of inflation in each province j in establishing the national inflation rate $(\frac{1}{\pi})$. This concept is a method that can measure the between effect of inflation on expenditure per capita.

Like the decomposition of the impact of price increases based on location, the impact of price increases can also be decomposed based on the type of goods group consumed by an individual. There are two goods groups measured, namely the food group and non-food group. To do this, equation 16 can be modified as follows:

$$y_t = \frac{1}{\pi_{fnf}}\sum_{i=1}^{n} y_{it-1}\left(1 + \frac{p^*_{it} - p_{it-1}}{p_{it-1}}\right) \quad (18)$$

Like equation 17, the equation above sorts out the effects of price increases based on changes occurring by goods group i. Where p_{it-1} is the average price of goods group i in period $t-1$, while p^*_{it} is the average price of goods group i in period t. Meanwhile, $\frac{1}{\pi_{fnf}}$ is the weighting between the food group and non-food group used to determine the magnitude of the impact of each goods group on expenditure per capita.

Modification to Poverty Line

Unlike Son and Kakwani (2008) and Son (2008) who measure the impact of price increases on changes in the poverty rate, in the second stage, analysis of the measured impact of price increase is conducted on poverty line. The reason for identifying the impact on poverty line is the poverty line principle that measures the expenditure per capita of the poor population group in meeting their minimum needs.

There are some benefits to be obtained by measuring the impact of price increases on the poverty line.

First, the concept of poverty line that measures the expenditure per capita of a poor individual in meeting his/her daily needs allows this study to measure the inflation occurring in the poor population group. This method is, therefore, able to overcome the bias of CPI as a measure of price increase faced by all individuals. The importance of identifying the price index faced by the poor is in line with the opinion expressed by Adam and Levell (2014). They are of the opinion that an individual's consumption pattern at each income distribution level varies from one to another.

Second, the adjustment made to the poverty line makes the conducted analysis dynamic. It means that the poverty line is not considered a fixed line, but changes in line with movements in expenditure per capita. The proposed hypothesis is that a price increase will cause an increase in the poverty line. The impact of price increase on poverty line can be expressed in the following formula.

$$z_t^* = z_{t-1}\left(1 + \frac{p_t^* - p_{t-1}}{p_{t-1}}\eta_{zp}\right) \quad (19)$$

Where z_{t-1} and Z are the poverty line in periods $t-1$ and t. Meanwhile, η_{zp} indicates the scale of the price index faced by the poor population group. If η_{zp} <1, the inflation rate faced by the poor is lower than inflation faced by the non-poor population.

There is one assumption that must be taken into account in this study, namely individual expenditure per capita represents their ability to consume. It means that a price increase for individuals has been compensated by an income increase. With this assumption, if η_{zp} <1 , the poverty line experiences a lower increase than the increase in expenditure per capita. This implies a fall in the poor population in a specific period, given that the ability to meet their daily minimum needs increases at a higher rate than the poverty line. Likewise, when > 1, the poverty line undergoes a higher increase than expenditure per capita. This can also mean that a price increase faced by the poor is greater compared to the price increase faced by the non-poor population.

Like the impact of a price increase on expenditure per capita, the impact of a price increase on the poverty line can be sorted based on goods group (within effect) and on location (between effect). To identify the impact of a price increase based on location, equation 19 may be assumed as the applicable formula for one province:

$$z_j = z_{jt-1}\left(1 + \frac{p_{jt}^* - p_{jt-1}}{p_{jt-1}}\eta_{zjp}\right) \quad (20)$$

Where z_j is the poverty line in province j, while pj is the CPI in province j. The national poverty line is the weighted average of provincial poverty line, whereby the weighting used is the proportion of the population of province j to total national population. The national poverty line as the weighted average of poverty line of province j can be expressed in the following equation.

$$z_t^* = \sum_{j=1}^{k} \alpha_j z_j \quad (21)$$

Substituting equation 20 into equation 21 obtains a formula to calculate the impact of a price increase occurring in each province in Indonesia on the national poverty line:

$$z_t^* = \sum_{j=1}^{k} \alpha_j z_{jt-1}\left(1 + \frac{p_{jt}^* - p_{jt-1}}{p_{jt-1}}\eta_{zjp}\right) \quad (22)$$

Equation 22 indicates that a price increase in province j has a proportionate impact on the change of national poverty line. The greater the weighting of province j in the establishment of national poverty line, the greater its influence. Every 1 per cent increase in CPI in province j will, therefore, raise the poverty line by η_{zjp} per cent multiplied by the weighting of that province (α_j) . Nevertheless, given that CPI in Indonesia is not measured at the area (urban and rural) level, decomposing the impact of a price increase based on location cannot be done at the smaller (area) level and is limited to the provincial level.

The same principle also applies in conducting a review of price increases based on commodity groups on the poverty line. In this study, the commodity groups used are the food group and non-food group. As an initial stage, equation 19 above can be re-expressed in the following equation.

$$z_{it}^* = z_{it-1}\left(1 + \frac{p_{it}^* - p_{it-1}}{p_{it-1}}\eta_{zip}\right) \quad (23)$$

The equation above indicates the relationship between a price increase of commodity group i with the commodity group poverty line. If it has the same meaning as the poverty line at the provincial level, then every 1 per cent increase in CPI in commodity group i will be transformed into an increase in the poverty line by its elasticit η_{zip} %). The impact of a price increase in commodity group i on the total poverty line can be obtained by calculating the weighted average of the poverty line of each commodity group. This relationship is shown by the following formula:

$$z_t^* = \sum_{i=1}^{n} \alpha_i z_i \quad (24)$$

Where α_i and z_i are the weighting of commodity group i and commodity group i respectively on the poverty line. Inserting equation 20 into equation 21 obtains a relationship between the total poverty line and every price change (CPI) in each commodity group.

$$z_t^* = \sum_{i=1}^{n} \alpha_i z_{it-1} \left(1 + \frac{p_{it}^* - p_{it-1}}{p_{it-1}} \eta_{zip}\right) \quad (25)$$

Equation 25 shows the relationship between a price increase of commodity group i and the national poverty line. Every price increase (CPI) in commodity group i will increase the poverty line by the elasticity percentage multiplied by the weighting of this commodity group ($\eta_{zip}\, \alpha_i$ %).

Outcomes and Discussion

Consumption Growth at the Household Level

The calculation of inflation in Indonesia follows the modified Laspeyers formula (BPS 2016). As the initial stage, this study conducted a simple analysis to see the impact of a national price increase on welfare level–represented by expenditure per capita and the poverty line. In this stage, the magnitude of the real rate of inflation faced by the poor population commodity is also estimated (Table 1).

Table 2 National Inflation and Inflation for the Poor (March-September 2018)(%)

Indicator	General Inflation (%)	Food Inflation (%)	Non-food Inflation (%)
Assumption			
General Inflation		0.94%	
Food Inflation		0.35%	
Non-food Inflation		1.34%	
Economic Growth		5.17%	
Household Expenditure Growth		5.03%	
Population Growth		0.62%	
General			
Scenario 1	0.94%	0.94%	0.94%
Scenario 2	0.85%	0.35%	1.34%
Scenario 3	5.17%	5.17%	5.17%
Scenario 4	5.03%	5.03%	5.03%
Poor Group			
Scenario 1	0.58%	0.62%	0.51%
Scenario 2	0.44%	0.16%	0.99%
Scenario 3	2.05%	2.31%	1.55%
Scenario 4	2.03%	2.28%	1.55%

Source: BPS and calculation result.

The table above gives an illustration of the application of equations 16 and 19. By following equation 16, the expenditure per capita occurring between March and September 2018 experienced a greater increase compared to the one faced by the poor in all calculation scenarios. The calculation is based on a decomposition conducted in equation 19, where it is known that the actual price increase faced by the poor tends to be lower than general inflation.

The assumption used in this calculation is that the amount of food and non-food commodity consumption of each household does not change. It is, therefore, assumed that an income increase is also fully expended to cover the price increase of the goods consumed. Inflation and growth reflect national economic growth which is fully reflected in an increase in nominal expenditure constituting the aggregated average of the increase in income obtained by each individual. For that reason, the lower inflation faced by the poor compared to the average national population indicates that the impact faced by the poor from a price increase is smaller than the national population average.

Poverty Indicator Overview

The simulation result indicates an inter-scenario variation although, in general, the poverty line tends to be lower than the actual rate published. As an illustration, in March 2018, the poverty line is about 2 per cent lower than the actual rate while, in September 2018, it is lower by about 3 per cent. In addition, the simulation model used generates a lower deviation in the non-food poverty line group with a difference for all calculation scenarios.

The result of the non-food poverty line projection has a smaller deviation for urban regions than rural regions. Nevertheless, for the food group poverty line, a smaller deviation in fact is found in rural regions. This can be understood, whereby the calculation of inflation rate is conducted in urban regions consisting of 88 big cities in Indonesia, so rural regions are possibly not fully reflected in the rate calculation. For more details, the rates above can be seen in the attachment.

The estimation simulation of the inter-scenario poverty rate indicates a rate closer to the published rate if the inflation approach is used, rather than the economic growth rate. By using the inflation rate as a leading indicator, the poverty rate in March 2018 is projected with an average deviation below 0.5 per cent. On the other hand, using economic growth as the leading indicator, indicates that the poverty rate projection has a higher deviation, with an average of more than 1 per cent.

Table 3 Future Prospect of Poverty Rate in March and September 2018

Description	City		Village		Total	
	Mar-18	Sep-18	Mar-18	Sep-18	Mar-18	Sep-18
Actual Rate	6.89	7.02	13.47	13.20	9.66	9.82
Projection Result						
Scenario 1	6.91	6.93	13.03	12.92	9.69	9.69
Scenario 2	6.93	6.80	13.10	12.63	9.73	9.49
Scenario 3	5.94	6.22	11.37	11.45	8.40	8.63
Scenario 4	5.97	6.36	11.45	11.66	8.45	8.80

Source: Calculation result based on SUSENAS.

As previously explained, the simulation of future poverty line prospects tends to reflect the actual rate more accurately for urban regions than for rural regions. On average, the deviation of urban regions is below 0.5 per cent if the inflation indicator is used and below 1 per cent if economic growth is used. Nevertheless, the simulation result indicates a greater deviation in the rural regions, for both the inflation and economic growth indicators.

Conclusions and Recommendations

Conclusion

The poverty rate in Indonesia is published by BPS in March and September every year. During this time span, there are published indicators that can be used as leading indicators to predict the poverty rate for the following period. The inflation and economic growth rates are two indicators that can be used as instruments to estimate the poverty rate. It is, however, possible that a number of factors can influence the movements in expenditure per capita and the poverty line, thus eventually influencing the national poverty rate percentage.

This study differs from previous studies that measure the real impact on welfare level, as this study measures more the impact resulting from price increases and economic growth on the poverty line calculated by BPS using a nominal approach. This study measured the effect of price increases and economic growth in 2018 on individual expenditure per capita and the nominal poverty line. The result is used to calculate the poverty rate projection which is then compared to the actual rate published for the same period. This concept is in line with the concept of poverty line measurement in Indonesia which uses expenditure per capita of the reference population to determine the poverty line.

Of the four proposed scenarios, the approach of the first scenario is more accurate than the others. This scenario has the lowest deviation compared to the alternatives, both in urban and rural regions, and for the food and non-food poverty line groups. This result might occur given that the mechanism for calculating the temporary poverty line conducted by BPS uses the total inflation rate as a multiplying factor, instead of using the food or non-food inflation component. In addition, the poverty rate calculated by BPS also does not directly consider economic growth, either in total or by household consumption.

The total inflation rate as a leading indicator can be used to project the poverty rate if the government or other stakeholders require an alternative methodology before the official rate is available. As well as considering the above simulation results, the use of inflation in projecting the poverty rate is clearer compared to economic growth. Changes in the price of goods needed by households directly affects consumption reflected from the cumulative change in prices for each goods group and in total expenditure per capita.

The indicator of economic growth cannot be directly seen in a change of household consumption pattern, especially if the calculation of poverty rate is directly conducted using SUSENAS. In addition, the government and other stakeholders can also identify the consumption pattern of the Indonesian community when there is a price increase in a specific commodity. A good understanding of movements in inflation generally provides an opportunity for stakeholders to determine the policy direction to reduce the poverty rate, at least for the following six-month period.

Recommendation

With the urgency to estimate the upcoming poverty rate, while official figure has not been released, utilizing inflation rate as a leading indicator could be beneficial for the government of Indonesia. The estimated figure can capture the household's purchasing power with the increase in price in a monthly basis, hence providing more updated estimate as compared to quarterly economic growth or official figure in an annual basis. However, additional consideration is still needed to use this approach:

1. Decomposing poverty rate by considering the inflation rate by type of commodity to fulfil basic needs as the calculation instrument. This measure would benefit the policy makers to identify commodities with significant impact should price increase occurred. Thus, reducing the impact by formulating social assistance program targeting these commodities for specific individuals could be formulated.
2. Regular estimate for poverty rate estimation needs to be made in a monthly basis. This measure can at least improve the understanding of policy makers to apply the appropriate intervention in accordance with movements in the price of basic needs, especially those related to the poverty line commodity components and achieve a poverty rate in accordance with the target.

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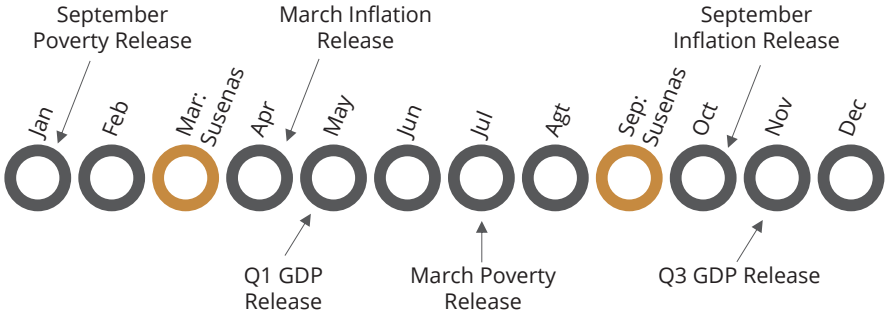
Appendix

Poverty Rate, Inflation, and Economic Growth Publication Timeline



Source: BPS and Bank Indonesia

Table 4 Future Calculation Scenario of Poverty Indicator (September 2018 Poverty Release)

Base Assumption		Scenario			
		2	3	4	
Constant Variable Group	Quantity of Food/Non-Food Consumption	•	•	•	•
	Population Growth	•	•	•	•
Dynamic Variable Group	General Inflation	•			
	Food/Non-Food Inflation		•		
	Total Economic Growth (GDP)			•	
	Household Consumption Growth (GDP)				•

Poverty Rate Simulation Result

Description	March 2018			September 2018		
	Village	City	Total	Village	City	Total
Actual Rate	6.89	13.47	9.66	7.02	13.20	9.82
Projection Result						
Scenario 1	6.91	13.03	9.69	6.93	12.92	9.69
Scenario 2	6.93	13.10	9.73	6.80	12.63	9.49
Scenario 3	5.94	11.37	8.40	6.22	11.45	8.63
Scenario 4	5.97	11.45	8.45	6.36	11.66	8.80
Deviation Rate						
Scenario 1	-0.02	0.44	-0.03	0.09	0.28	0.13
Scenario 2	-0.04	0.37	-0.07	0.22	0.57	0.33
Scenario 3	0.95	2.10	1.26	0.80	1.75	1.19
Scenario 4	0.92	2.02	1.21	0.66	1.54	1.02

Poverty Gap

Description	March 2018			September 2018		
	Village	City	Total	Village	City	Total
Actual Rate	1.08	2.32	1.63	1.17	2.37	1.71
Projection Result						
Scenario 1	1.11	2.27	1.64	1.12	2.22	1.63
Scenario 2	1.13	2.30	1.66	1.08	2.14	1.57
Scenario 3	0.89	1.85	1.32	0.93	1.87	1.37
Scenario 4	0.89	1.86	1.33	0.96	1.92	1.40
Deviation Rate						
Scenario 1	-0.03	0.05	-0.01	0.05	0.15	0.08
Scenario 2	-0.05	0.02	-0.03	0.09	0.23	0.14
Scenario 3	0.19	0.47	0.31	0.24	0.50	0.34
Scenario 4	0.19	0.46	0.30	0.21	0.45	0.31

Poverty Severity

Description	March 2018			September 2018		
	Village	City	Total	Village	City	Total
Actual Rate	0.25	0.62	0.41	0.29	0.63	0.44
Projection Result						
Scenario 1	0.27	0.60	0.42	0.27	0.58	0.41
Scenario 2	0.27	0.60	0.42	0.26	0.56	0.40
Scenario 3	0.21	0.47	0.33	0.22	0.48	0.34
Scenario 4	0.21	0.48	0.33	0.22	0.49	0.35
Deviation Rate						
Scenario 1	-0.02	0.02	-0.01	0.02	0.05	0.03
Scenario 2	-0.02	0.02	-0.01	0.03	0.07	0.04
Scenario 3	0.04	0.15	0.08	0.07	0.15	0.10
Scenario 4	0.04	0.14	0.08	0.07	0.14	0.09

Future Outlook of Poverty Rate by Province

Table 5 Poverty Rate Simulation Result (September 2018)

Provinsi		Actual	Scenario							
			Simulation Result				Deviation			
			1	2	3	4	1	2	3	4
1	Aceh	15.68	15.76	15.86	13.61	13.71	-0.08	-0.18	2.07	1.97
2	North Sumatra	8.94	8.96	9.04	7.57	7.65	-0.02	-0.10	1.37	1.29
3	West Sumatra	6.55	6.60	6.61	5.66	5.69	-0.05	-0.06	0.89	0.86
4	Riau	7.21	7.30	7.33	5.99	6.01	-0.09	-0.12	1.22	1.20
5	Jambi	7.85	7.61	7.75	6.62	6.62	0.24	0.10	1.23	1.23
6	South Sumatra	12.82	12.56	12.60	11.59	11.61	0.26	0.22	1.23	1.21
7	Bengkulu	15.41	15.33	15.34	13.82	13.95	0.08	0.07	1.59	1.46
8	Lampung	13.01	12.64	12.79	10.95	11.04	0.37	0.22	2.06	1.97
9	Bangka Belitung	4.77	5.04	5.04	4.19	4.30	-0.27	-0.27	0.58	0.47
10	Riau Island	5.83	6.09	6.10	5.28	5.50	-0.26	-0.27	0.55	0.33
11	DKI Jakarta	3.55	3.54	3.57	2.88	2.94	0.01	-0.02	0.67	0.61
12	West Java	7.25	7.41	7.44	6.44	6.46	-0.16	-0.19	0.81	0.79
13	Central Java	11.19	11.22	11.25	9.40	9.48	-0.03	-0.06	1.79	1.71
14	DI Yogyakarta	11.81	12.13	12.13	10.21	10.21	-0.32	-0.32	1.60	1.60
15	East Java	10.85	10.83	10.85	9.50	9.57	0.02	0.00	1.35	1.28
16	Banten	5.25	5.01	5.03	4.38	4.44	0.24	0.22	0.87	0.81
17	Bali	3.91	3.95	3.98	3.60	3.64	-0.04	-0.07	0.31	0.27
18	NTB	14.63	14.73	14.73	13.58	13.65	-0.10	-0.10	1.05	0.98
19	NTT	21.03	21.05	21.17	18.36	18.42	-0.02	-0.14	2.67	2.61
20	West Kalimantan	7.37	7.71	7.75	6.30	6.33	-0.34	-0.38	1.07	1.04
21	Central Kalimantan	5.10	5.03	5.14	4.07	4.08	0.07	-0.04	1.03	1.02
22	South Kalimantan	4.65	4.42	4.50	3.68	3.72	0.23	0.15	0.97	0.93
23	East Kalimantan	6.06	5.91	5.99	4.59	4.60	0.15	0.07	1.47	1.46
24	North Kalimantan	6.86	7.03	7.03	5.77	5.77	-0.17	-0.17	1.09	1.09
25	North Sulawesi	7.59	7.74	7.74	6.93	7.08	-0.15	-0.15	0.66	0.51
26	Central Sulawesi	13.69	13.75	13.87	12.21	12.25	-0.06	-0.18	1.48	1.44
27	South Sulawesi	8.87	8.96	8.96	7.86	7.88	-0.09	-0.09	1.01	0.99
28	South East Sulawesi	11.32	11.61	11.61	10.48	10.55	-0.29	-0.29	0.84	0.77
29	Gorontalo	15.83	16.74	16.74	15.95	16.00	-0.91	-0.91	-0.12	-0.17
30	West Sulawesi	11.22	10.83	11.11	8.45	8.56	0.39	0.11	2.77	2.66
31	Maluku	17.85	17.78	17.90	15.66	15.68	0.07	-0.05	2.19	2.17
32	North Maluku	6.62	6.35	6.35	5.11	5.15	0.27	0.27	1.51	1.47
33	West Papua	22.66	22.91	22.97	20.72	20.72	-0.25	-0.31	1.94	1.94
34	Papua	27.43	27.49	27.53	25.10	25.25	-0.06	-0.10	2.33	2.18
	National	**9.66**	**9.69**	**9.73**	**8.40**	**8.45**	**-0.03**	**-0.07**	**1.26**	**1.21**

Table 6 Poverty Rate Simulation Result (March 2018)

Provinsi		Actual	Scenario							
			Simulation Result				Deviation			
			1	2	3	4	1	2	3	4
1	Aceh	15.97	15.45	15.07	13.79	13.84	0.52	0.90	2.18	2.13
2	North Sumatra	9.22	8.89	8.69	7.51	7.85	0.33	0.53	1.71	1.37
3	West Sumatra	6.65	6.24	6.10	5.22	5.47	0.41	0.55	1.43	1.18
4	Riau	7.39	6.86	6.83	5.43	5.61	0.53	0.56	1.96	1.78
5	Jambi	7.92	7.15	6.85	5.80	5.80	0.77	1.07	2.12	2.12
6	South Sumatra	12.80	12.90	12.79	11.82	11.84	-0.10	0.01	0.98	0.96
7	Bengkulu	15.43	15.17	15.05	13.71	14.04	0.26	0.38	1.72	1.39
8	Lampung	13.14	12.27	12.14	10.42	10.60	0.87	1.00	2.72	2.54
9	Bangka Belitung	5.25	4.41	4.41	2.96	3.14	0.84	0.84	2.29	2.11
10	Riau Island	6.20	5.86	5.64	4.85	5.43	0.34	0.56	1.35	0.77
11	DKI Jakarta	3.57	3.61	3.61	3.17	3.17	-0.04	-0.04	0.40	0.40
12	West Java	7.45	7.61	7.36	6.82	7.01	-0.16	0.09	0.63	0.44
13	Central Java	11.32	11.74	11.48	10.29	10.49	-0.42	-0.16	1.03	0.83
14	DI Yogyakarta	12.13	12.28	12.08	11.88	11.88	-0.15	0.05	0.25	0.25
15	East Java	10.98	10.68	10.40	9.74	9.91	0.30	0.58	1.24	1.07
16	Banten	5.24	5.00	4.75	4.12	4.12	0.24	0.49	1.12	1.12
17	Bali	4.01	3.73	3.73	3.14	3.24	0.28	0.28	0.87	0.77
18	NTB	14.75	14.39	13.98	13.30	13.43	0.36	0.77	1.45	1.32
19	NTT	21.35	20.44	20.17	18.32	18.86	0.91	1.18	3.03	2.49
20	West Kalimantan	7.77	7.55	7.55	6.13	6.27	0.22	0.22	1.64	1.50
21	Central Kalimantan	5.17	5.06	4.73	4.18	4.33	0.11	0.44	0.99	0.84
22	South Kalimantan	4.54	4.60	4.55	4.08	4.18	-0.06	-0.01	0.46	0.36
23	East Kalimantan	6.03	5.57	5.57	5.20	5.20	0.46	0.46	0.83	0.83
24	North Kalimantan	7.09	6.23	6.23	5.94	5.97	0.86	0.86	1.15	1.12
25	North Sulawesi	7.80	7.57	7.48	6.97	7.11	0.23	0.32	0.83	0.69
26	Central Sulawesi	14.01	13.97	13.97	12.98	13.39	0.04	0.04	1.03	0.62
27	South Sulawesi	9.06	9.39	9.39	9.24	9.27	-0.33	-0.33	-0.18	-0.21
28	South East Sulawesi	11.63	11.37	11.37	10.06	10.24	0.26	0.26	1.57	1.39
29	Gorontalo	16.81	16.86	16.86	15.86	16.17	-0.05	-0.05	0.95	0.64
30	West Sulawesi	11.25	10.92	10.74	9.47	9.72	0.33	0.51	1.78	1.53
31	Maluku	18.12	17.39	17.17	15.93	16.31	0.73	0.95	2.19	1.81
32	North Maluku	6.64	6.36	5.75	5.35	5.35	0.28	0.89	1.29	1.29
33	West Papua	23.01	22.79	22.73	22.38	22.38	0.22	0.28	0.63	0.63
34	Papua	27.74	25.80	25.46	23.20	23.81	1.94	2.28	4.54	3.93
	Nasional	**9.82**	**9.69**	**9.49**	**8.63**	**8.80**	**0.13**	**0.33**	**1.19**	**1.02**

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MISMATCH OF VILLAGE DEVELOPMENT INDICATORS IN INDONESIA

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ABSTRACT

The aim of this paper is to analyse the achievement of village development indicators in 2014 and 2018 after the release of Rp 250 trillion in Village Funds since 2015. There are three indicators related to village development in Indonesia, namely the Geographical Difficulty Index (Indeks Kesulitan Geografis: IKG) which is used as the basis for the Allocation Formula of the Village Fund and the Village Development Index (Indeks Pembangunan Desa: IPD) which measures the achievement of basic service development to meet minimum service standards (Standar Pelayanan Minimal: SPM) at the village level, and the Developing Village Index (Indeks Desa Membangun: IDM) that evaluates the continuity of village development. The three village development measurement tools have similar shortcomings, namely that there are indicators that cannot be followed up by village officials and policies in the village. The methodology used includes the Paired Comparative Indicator Change Test, namely by applying the McNemar-Bowker Statistical Test and Wilcoxon Signed Rank Test, with paired data at ordinal or interval scale but without normal distribution. The study on changes in the category of achievements in the village development indicators for 2014 and 2018, namely: (i) the availability of, and access to, TK/RA/BA;[1] (ii) the availability of shops, minimarkets or grocery stores; (iii) the handling of extraordinary events (Kejadian Luar Biasa: KLB); (iv) village autonomy; and (v) village assets, found that there is no significant difference between 2014 and 2018. This indicates the existence of indicators that are not measured and the measurement of indicators that is not established through the Village Fund budget.

***Key words**: Village Fund budget, Village Development Indicators.*

ABBREVIATIONS AND ACRONYMS

Bappenas	: *Badan Perencanaan dan Pembangunan Nasional* (National Planning and Development Agency)
BPS	: *Badan Pusat Statistik* (Statistics Indonesia)
BTS	: Base Transceiver Station
BUMDes	: *Badan Usaha Milik Desa* (Village-Owned Enterprise)
IDM	: *Indeks Desa Membangun* (Developing Village Index)
IKG	: *Indeks Kesulitan Geografis* (Geographical Difficulty Index)
IPD	: *Indeks Pembangunan Desa* (Village Development Index)
KLB	: *Kejadian Luar Biasa* (Extraordinary Event)
Podes	: *Potensi Desa* (Village Potential)
Polindes	: *Pondok Bersalin Desa* (Village Maternity Clinic)
Poskesdes	: *Pos Kesehatan Desa* (Village Health Post)
Posyandu	: *Pos Pelayanan Kesehatan Terpadu* (Integrated Village Health Post)
PPMD	: *Pembangunan dan Pemberdayaan Masyarakat Desa* (Development and Empowerment of Rural Community)
Puskesmas	: *Pusat Kesehatan Masyarakat* (Public Health Centre)
RPJMN	: *Rencana Pembangunan Jangka Menengah Nasional* (National Medium-term Development Plan)
SDM	: *Sumber Daya Manusia* (Human Resources)
SMA	: *Sekolah Menengah Atas* (Senior High School)
SMP	: *Sekolah Menengah Pertama* (Junior High School)
SPM	: *Standar Pelayanan Minimal* (Minimum Public Services)
TK/RA/BA	: *Taman Kanak-kanak/Raudlatul Athfal/Bustanul Athfal* (Kindergarten/Islamic Kindergarten Islamic Playgroup)

SECTION ONE: INTRODUCTION

The accelerated village development program has marked its fifth year with a total allocation of village funds from 2015 to 2019 of more than Rp 252 trillion. The acceleration program started off in 2014, following the enactment of Law No. 6/2014. One of the key achievements is a drop in the number of disadvantaged villages by 6,518 and an increase in the number of established villages by 2,665 in 2018.

The paradigm of village development has adopted the decentralisation model. This condition has given rise to a new paradigm for village economic agency by gaining an understanding of the financial system and empowering members of the community and, therefore, it is necessary to strengthen institutions at the village level to encourage the village government to perform well (Antlöv et al. 2016). For this reason, an increase in village budgets offers new hope, by providing a positive stimulus for the growth of the village economy.

As a stimulus, disbursements from the Village Fund advance the village economy at a faster rate. The acceleration of development through the restoration of infrastructure that improves access to the economy and empowerment in the form of labour-intensive projects creates a fiscal stimulus that furthers the economic advancement of the village.

The success of development at the village level depends on the roles of the village government and community empowerment. Although the Village Fund program has been created as a stimulus mechanism, in practice the village head's role as the central figure and leader motivating the village economy remains vital. In addition, all active village instrumentalities will provide more chance for success in village development.

Developing countries adopt various approaches in village development, one of which is by providing locally run revolving capital. For example, in Thailand, after the Village and Urban Fund program was launched in Thailand in 2001, people were able to provide working capital for locally owned revolving loan associations, however, because the Bank for Agriculture and Agriculture Cooperative dominated the loan market, the Village and Urban Fund had little impact on the pool of working capital sourced by low-income households (Boonperm et al. 2013). Micro-credit in Nepal has become an effective tool to increase the socioeconomic status of the poor, particularly women (Adhikari and Shrestha 2013). In addition to micro-credit, there are other countries designing villages with a master plan.

Iran has taken a different approach with the Iran Rural Development Project that has successfully increased the motivation of Iranian people to live in villages. It has also stimulated a rise in the land price and increased participation in village construction projects, improved access to agricultural inputs and markets for agricultural products as well as strengthened the foundation of steps to attract the participation of villagers (Ebrahimi et al. 2014). In Tajikistan, village leadership has a vital role in the successful management of the allocated budget so that, village leaders and their administrations are able to run development projects by using the funds allocated by the representatives of the Aga Khan Foundation (Jones et al. 2016).

In Indonesia, the acceleration of village development is closely related to the development of infrastructure. Some of the development projects that have been implemented include reservoirs, village roads, bridges, village markets, riprap, mooring docks, clean water, drainage, irrigation channels, bathing, washing, and latrine facilities, and wells. The scope of development also covers socioeconomic activities such as Village-Owned Enterprises (Badan Usaha Milik Desa: BUMDes), development of village sport centres, development of early childhood education, village maternity clinics (Pondok Bersalin Desa: polindes), integrated health services posts (Pos Pelayanan Kesehatan Terpadu: posyandu), and other infrastructure. This is consistent with the mandate of the Regulation of the Minister of Villages, PDT, and Transmigration Number 16/2018 concerning Priority for the Use of Village Funds 2019, Development of Disadvantaged Regions and Transmigration (2018 Performance Report of the Directorate General for Development and Empowerment of Rural Community, PPMD).

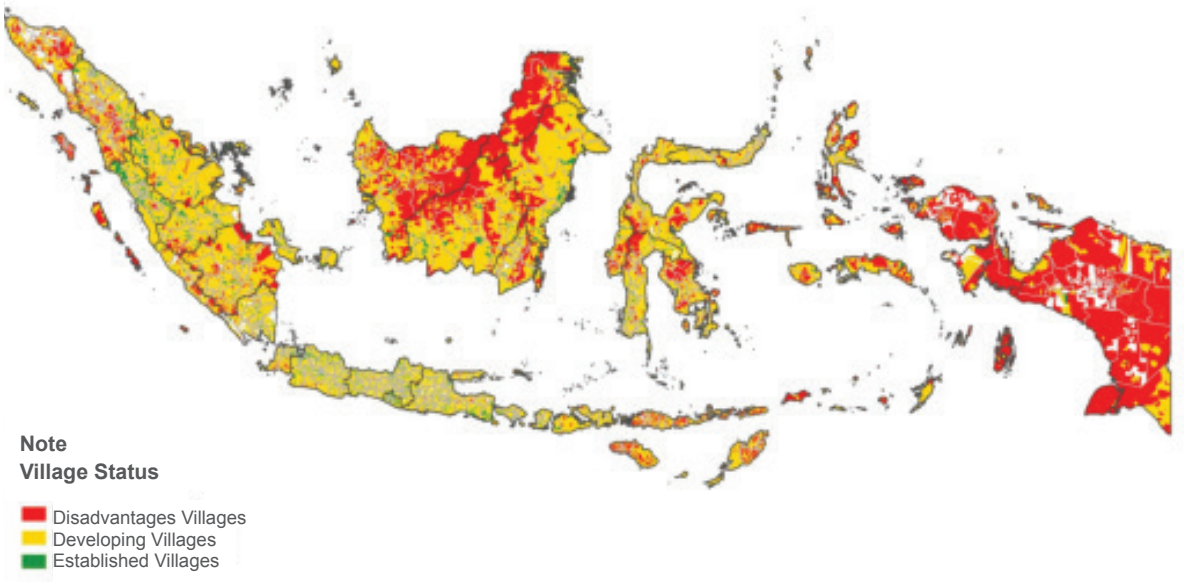
In addition to infrastructure, the impact of village development on the poverty level in villages remains the subject of debate. In fact, in a case study in Gemeh District, Talaud Islands Regency, North Sulawesi, Village Fund allocations have not affected the poverty rate (Lalira et al. 2018). In addition, village funds used for infrastructure development do not directly lead to the productivity of the agricultural sector, while the agricultural sector contributes greatly to rising poverty because most of the poor work as farmers. A similar failure occurred after the 1998 crisis, the World Bank tried to make the poor more productive, but in fact informal social security arrangements were inefficient and ineffective for a large proportion of the rural population in Java. Because, farm workers will only be employed by people who used to work with him. (Bremen 2001).

The progress of village development has been described in at least three indexes, each of which is used for different purposes. The first is the Geographical Difficulty Index (Indeks Kesulitan Geografis: IKG) which is the determining factor in the distribution of village funds. The lower of the value of IKG, the better process village development. The second index is the Village Development Index (Indeks Pembangunan Desa: IPD) which aims to achieve the development of basic services in order to meet the Minimum Service Standards (Standar Pelayanan Minimal: SPM) at the village level. The better the village development is, the more established the village would be to increase the village competitiveness. Thirdly, the Developing Village Index (Indeks Desa Membangun: IDM) that evaluates the continuity of village development. Good village development also benefits environmental and social outcomes.

These three village development indicators have similar shortcomings, in that village officials and stakeholders in the village are unable to influence them. One of the examples is school facilities as the indicator of basic education services as the village government has no capacity to build schools. Pursuant to the Minister of Villages, Development of Disadvantaged Regions and Transmigration Regulation No. 16/2018 on the Priority Appropriation of Village Funds for 2019, village governments are not allowed to build this facility because the regulation specifically sets out in detail which infrastructure that village government is allowed to build with Village Funds. In addition, there are many other indicators that cannot be actioned.

Of these three village development indicators, the IKG and IPD are closely related to one another as all indicators in the IKG also form part of the indicators in the IPD. As a result, when IPD indicators are evaluated, the IKG indicators are automatically assessed. According to the writers' note, out of 42 village development indicators in the IPD, there are only 23 indicators that can be managed by village paralegals under the guidelines of the Minister of Villages, Development of Disadvantaged Regions and Transmigration Regulation No. 16/2018 on the Priority Appropriation of Village Funds for 2019.

Figure 1.1: Distribution of Villages by Village Status (Disadvantaged, Developing, and Established)



Source: Publication of IPD (BPS 2018).

One of the impacts that the provisions in this ministerial regulation creates is that, if a village already has these 23 indicators, it is difficult for the village to gain a degree of independence. This means that the currently applied village development indicators will trap these villages in their current status as a developing village. This situation can, however, be anticipated with policies by regency and provincial governments, as the higher-level government administration above the village government. In addition to this issue, another reason for the disparity in village development is that the majority of Village Funds is absorbed in Sumatra, Java, and Bali.

Table 1.1: Number and Percentage of Villages by Region (2018)

Number	Area of Archipelago	Number of Villages	Percentage	Cumulative Percentage
1	Sumatra	23.241	30.8	30.8
2	Java – Bali	23.108	30.6	61.4
3	Nusa Tenggara	4.043	5.4	66.8
4	Kalimantan	6.624	8.8	75.6
5	Sulawesi	8.804	11.7	87.3
6	Maluku	2.268	3	90.3
7	Papua	7.348	9.7	100
	Total	**75.436**	**100**	**100**

Source: Processed from Village Potential (*Potensi desa: Podes*) statistics of 2018.

This uneven distribution of budget absorption is considered to be one of the reasons it becomes more difficult to redress the inequality. In 2018, Sumatra, Java, Bali, and Nusa Tenggara had 50,392 villages (66.8 percent), while there were only 25,044 villages (33.2 percent) in Kalimantan, Sulawesi, Maluku, and Papua (Table 1.1). The resulting data in Podes gives an illustration of this disparity.

In addition to the budget absorption of the Village Fund, the indicators that serve as the basis for calculating village development also need to be adjusted. It is necessary to reach a mutual agreement on the application of the SPM in accordance with the existing obligations and workload, particularly in relation to the basic service facilities that cannot be met by policy makers in the village. Regardless of this, the indicators of progress in village development that are based on the SPM approach still raise an issue, that is, “Measuring What Is Not Built and Building What Is Not Measured”.

Sources of Data

In this study, the sources of data used are consistent with the sources of data used for calculating the IPD, that is, the Podes data. Podes data are area-based data in the lowest administrative unit in Indonesia–the village/subdistrict. These data are collected comprehensively by Statistics Indonesia (Badan Pusat Statistik: BPS) from all villages, subdistricts and transmigration settlement units. BPS collects this data every two years before the population, agricultural, and economic censuses are conducted.

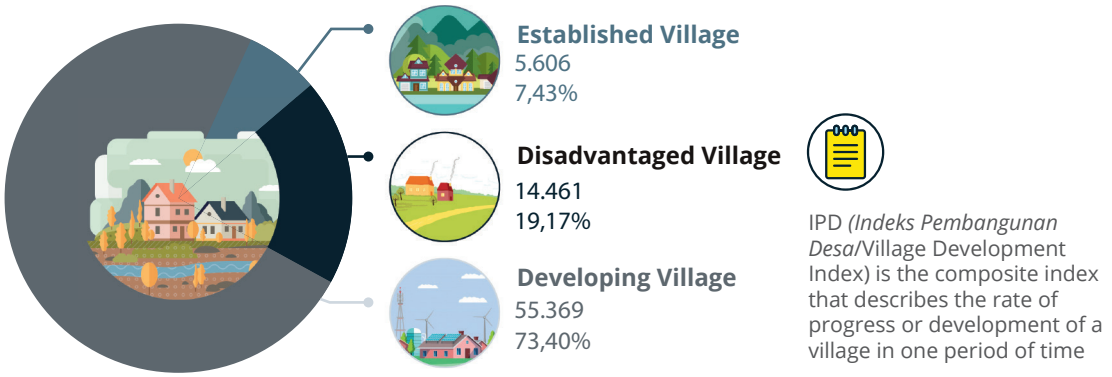
Podes data show the condition of infrastructure existing in the village within the period that the data are collected. The recorded data include: (i) village typology; (ii) population and manpower; (iii) housing and environment; (iv) disaster and mitigation; (v) education and health; (vi) social and culture; (vii) sports and entertainment; (viii) transportation, communication and information; (ix) economy; (x) security; (xi) village assets; (xii) development and empowerment; and (xiii) the condition of the village/subdistrict apparatus.

SECTION TWO:
EVALUATION OF 2018 VILLAGE DEVELOPMENT

This study evaluates the IPD–the composite index that describes the rate of progress or development of a village in one period of time. We selected IPD for this evaluation so that we would be able to simultaneously produce two outcomes. The first is to evaluate the determining factors in the allocation of the Village Fund, which is the IKG, and the second is to evaluate the IPD itself.

The IPD and IKG share the same sources of data, namely the collected data on Podes. Based on the data gathered, there are five dimensions and 42 indicators which illustrate the availability and accessibility of services in the village community. Villages are classified as Established (mandiri), Developing (berkembang), or Disadvantaged (tertinggal). The results of the 2018 IPD show that there are 5,606 established villages, 55,369 developing villages, and 14,461 disadvantaged villages (Figure 2.1). Nationwide, the state of Indonesia's village development falls into the category of developing village with an IPD of 59.36.

Figure 2.1: Number of Villages by IPD Status (2018)



Source: IPD publication (BPS 2018).

The IPD has been applied in designing the target villages under the RPJMN (*Rencana Pembangunan Jangka Menengah Nasional: National Medium-term Development Plan*) 2015-2019. The target achievement is to reduce the number of disadvantaged villages by 5,000 and to raise the number of established villages by 2,000.

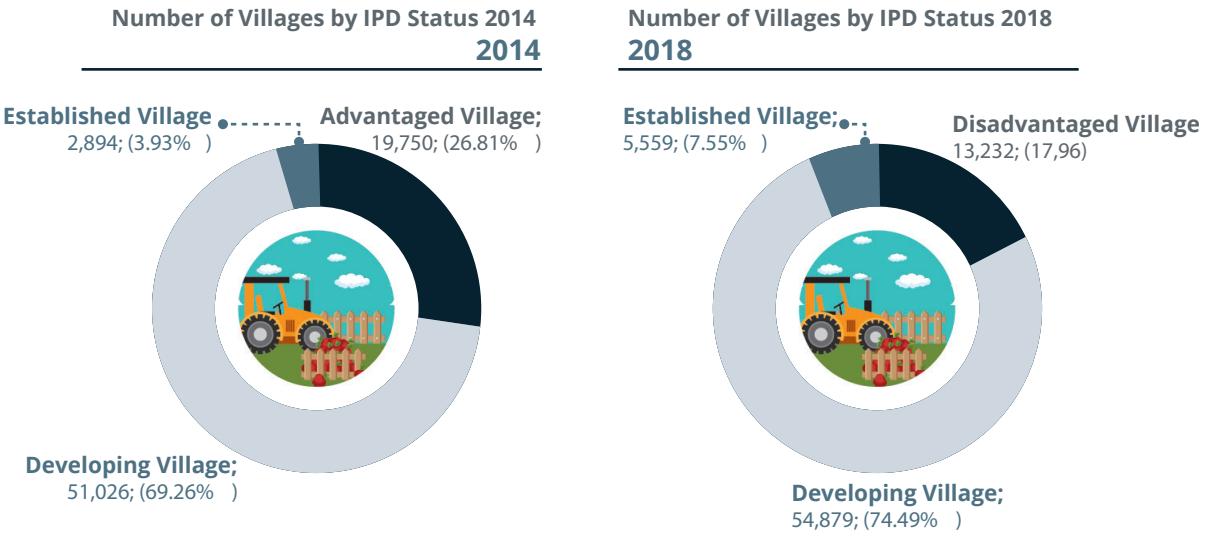
The IPD has been calculated two times–in 2014 and 2018–covering the planning and evaluation phases and with the same methods and scales of indicators used in both. The condition of the 2014 data is crucial in determining the basic indicators, such as the distance from the village to the district or regency. As an outcome of the formulation of the IPD, all villages in Indonesia are properly mapped based on the level of village development in accordance with the specifications of the IPD above.

The first phase was the planning phase in which the measurement was carried out in 2015 by measuring the villages registered under the Minister of Home Affairs (Permendagri) Regulation No. 39/2015. The *Podes* data of 2014 were used as the source. The results of the 2015 IPD were published in a book titled the "2014 Village Development Index: Challenges in Meeting the Village Minimum Service Standards" in 2015, being the product of a collaboration between the National Planning and Development Agency (*Badan Perencanaan Pembangunan Nasional:* Bappenas) and BPS.

The second was the evaluation phase in which IPD was calculated again in 2018. The calculation of the 2018 IPD used the list and data of villages resulting from the 2018 *Podes* data collection. The results of this calculation are presented in a book titled the 2018 Village Development Index, prepared by BPS. This book gives an overview of the outcomes of village development through the IPD for every village, province, and area in the big islands. The IPD summarises various outcomes of village development in accordance with the locality requirements of the respective village.

The results of the 2018 IPD show the success of the 2018 village development which is apparent in a fall in the number of disadvantaged villages by 6,518, and an increase in the number of established villages by 2,665 (Figure 2.2). The progress of the foregoing village development is observed from five dimensions of the SPM with various degrees of achievement. The highest level of achievement is evident in the government administration dimension, marking a 9.81 point increase, while the lowest level of achievement is identified in the basic service dimension of 0.92 points.

Figure 2.2: Ratio of IPD Outcomes of 2014 and 2018



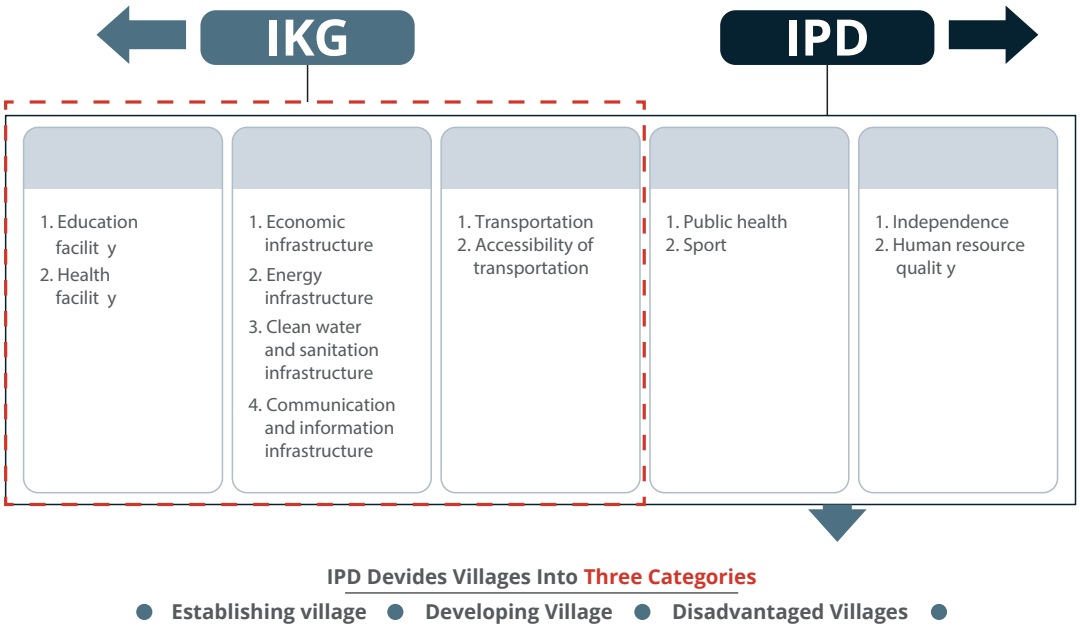
Source: BPS 2018.
Note: The comparison made on the status of IPD uses the same number of villages as that in 2014 (73,670 villages).

SECTION THREE:
VILLAGE DEVELOPMENT MEASUREMENT

Measurement of the progress in village development is designed based on the SPM approach which the village government is obliged to meet, however, this approach still creates a problem of how to measure what is not built and build what is not measured. Village government administrations carry out development in compliance with the regulations of the Minister of Villages, Development of Disadvantaged Regions and Transmigration on village funds which has been issued every year since 2015. The most recent guideline is set out in the Regulation No. 16/2018.

Both the IPD and IKG represent the indicators of achievement of basic services at the village level, however, a high IPD value indicates that the community easily reaches basic service locations, while a high IKG value indicates the level of difficulty people reach basic service facilities. The IPD covers three dimensions (availability of basic services, condition of infrastructure, and accessibility of transportation) of the IKG with two additional dimensions (public services and government administration). So, while the IPD is calculated based on five dimensions, 12 variables, and 42 indicators, the IKG is calculated based on three dimensions, 6 variables, and 28 indicators (Figure 3.1). The measurable basic services should at least comply with the set of rules established in Law No. 6/2014 on Villages and Presidential Regulation No. 2/2015 on the RPJMN 2015–2019 with regard to Village Development and Village Areas. This legal foundation serves as a reference for BPS in measuring village development through the IPD.

Figure 3.1: Correlation Between IPD and IKG



Source: BPS 2018.

3.1 Analysis Method

In this study, the test is conducted by using the paired comparative indicator change test, with two test statistics–the McNemar-Bowker Test and the Wilcoxon Test**.** The test statistics of McNemar-Bowker Test are applied to analyse changes in the categories resulting from the paired symmetry table, while the Wilcoxon Test is used to measure the significance of such changes from the resulting categories. Both of these tests are adopted to identify the pattern of changes in the indicators used to measure the IPD and IKG in 2014 and 2018.

McNemar-Bowker Test

The McNemar-Bowker Test is used to test the paired symmetry table with more than two categories. The resulting paired data are summarised in the K x K contingency table. This test is calculated with the formula of T_{MB} as follows:

$$T_{MB} = \sum_{i<j} \frac{(n_{ij} - n_{ji})^2}{n_{ij} - n_{ji}}$$

Hypothesis:

H_o : No changes found in the categories of the village development indicators from 2014 to 2018.

H_a : Changes found in the categories of the village development indicators from 2014 to 2018

Condition: if the chi square is less than the chi table, H0 is acceptable, otherwise Ha is rejected, or if Asymp. Sig. (2-sided) is greater than the allowable degree of significance, H0 is acceptable, otherwise Ha is rejected.

Wilcoxon

The Wilcoxon Signed Rank Test is a non-parametric test to measure the significance of the difference between the two groups of paired data on ordinal or interval scale, but not distributed normally. The Wilcoxon Signed Rank Test is an alternative test to the pairing t test or t paired test if the normality assumption is not met. This test is also known as the Wilcoxon Match Pair Test. This test is calculated with the *W* formula below:

$$W = \sum_{i=1}^{N_r} \left[sgn\left(x_{2,i} - x_{1,i}\right) . R_i \right]$$

Hypothesis:

H_o : No changes found in the categories of the village development indicators from 2014 to 2018.

H_a : Changes found in the categories of the village development indicators from 2014 to 2018.

This test has assumptions or conditions that must be met, such as dependent variables on a scale of ordinal or interval/ratio data, but not distributed normally. The independent variables consist of two pairing categories. The forms and distribution of data between the two pairing groups are symmetrical.

Qualitative

This study reviews the authorities that the village could implement. The authorities of the village instrumentalities are set out in the Minister of Villages, Development of Disadvantaged Regions and Transmigration Regulation No.16/2018 regarding the Priority Appropriation of Village Funds for 2019. This review is conducted not only to identify which of the village development indicators could be followed up by policy makers, but also which village development indicators fall under the authority of the village apparatus. The fact that there are basic service facilities that could not be provided by the policy makers in the village shows that the authority of the village apparatus is very limited.

SECTION FOUR:
RESULTS OF ANALYSIS

Every indicator which forms the index value is evaluated in this village development indicator study. The paired comparative indicator change test produces indicators that experience both significant and insignificant changes. Furthermore, this study also tests the qualitative aspect to recognize the extent of authority of the village instrumentalities to follow up policies at the village level. The outcome is in the form of indicators that could and could not be followed up under the village authorities. As a result, the generated index does not depict the entire progress of village development. Each of the indicators is analysed by dimension, from the availability of basic education and health service facilities to the human resources of the village apparatus. The complete results of the McNemar-Bowker Test and Wilcoxon Test are available in Annex 1.

4.1 Availability of Basic Services

The availability of, and access to, basic services such as education infrastructure is a key factor in how close government services are to citizens. Easy access to these services is expected to lower the cost of transportation to the education and health facilities. Furthermore, they can hopefully be used as tools to measure the government's performance in serving its citizens.

4.1.1 Education Facilities

The availability of basic education facilities is the key component in improving human resources. Under this indicator, the basic education services are measured from kindergarten to high school with access calculated from the office of the village head to the closest facility (Table 4.1).

Table 4.1: Results of Education Facility Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Education Facilities	Availability of, and access to, TK/RA/BA[1]	+*	+
	Availability of, and access to, primary school and equivalent	+*	+*
	Availability of, and access to, SMP[2] and equivalent	+*	+*
	Availability of, and access to, SMA[3] and equivalent	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

The results of Wilcoxon test prove that this indicator does not show any changes in the significance level of alpha 0.05. The availability of facilities and access to TK/RA/BA did not experience a significant change in this category.

The list of limitations to the education facilities variable are:

- Basic education facilities cannot be built by village government. Primary schools and SMP/SMA fall under the authority of government above the village government level.
- Infrastructure indicators do not address ease of access.
- Infrastructure indicators are divided by population, not by the total school-aged population at their level.
- The nearest distance to the infrastructure is calculated based on the distribution of *Podes* data of 2014, rather than the government regulation on SPM administration.

4.1.2 Health Facilities

The availability of health facilities is the key element in the provision of government health services to its citizens. Health services are measured from access to the health facility of hospitals to the fulfillment of medication needs–that is, pharmacies. Accessibility is identified from the distance between the office of the village head to the nearest facility. Ease of access is the perception of the respondent, however, if a village already has health facilities, it is assumed that availability and ease of access to the facilities have been fulfilled.

Not all basic health facilities are able to be developed by the village government. For instance, hospitals, maternity hospitals, and public health centres *(Pusat Kesehatan Masyarakat: puskesmas*) fall under the authority of government administrations above village government. In addition to the above facilities, the community can build treatment center, polyclinics, midwives' practices, and pharmacies. In this variable, only village health posts (*Pos Kesehatan Desa: Poskesdes*) and *polindes* can be developed under the authority of the village administration.

The list of limitations related to the health facilities variable are:

- In terms of basic health facilities, the village government only has the authority to build infrastructure for poskesdes and polindes, while other health infrastructure does not fall under the village government authority.
- The indicators for education and health infrastructure are divided by total population, not by the number of people in need of the services. For example, for education infrastructure, the number of SMPs is divided by the total population, rather than SMP-aged population. Health facilities like midwives' practices are also divided by the total population, not by the number of women and children.

- The closest distance to the infrastructure is identified from the distribution of the *Podes* data of 2014, rather than implementation o the regulation on SPM.

- The involvement of other infrastructure in the calculation of lower-order indicators. For instance, in preparing the indicator of *puskesmas,* hospitals are included and in preparing the indicator of midwives' practices, hospitals, maternity hospitals, and *puskesmas* are included. The health facility indicator does not only reflect the condition of the relevant health facility, but also reflects the presence of facilities in the higher category.

Table 4.2: Results of Health Facilities Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Health Facilities	Availability of, and access to, hospitals	+*	+*
	Availability of, and access to, maternity hospitals	+*	+*
	Availability of, and access to, puskesmas	+*	+*
	Availability of, and ease of access to, polyclinic/medical centre	+*	+*
	Access to physician practice	+*	+*
	Availability of, and ease of access to, midwife's practice	+*	+*
	Availability of, and ease of access to, poskesdes or polindes	+*	+*
	Availability of, and ease of access to, pharmacies	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

4.2 Infrastructure Condition

Infrastructure condition reflects the ease of fulfilling people's living needs. This infrastructure may include economic facilities, access to energy sources for household use, clean water and sanitation, as well as communication and information.

4.2.1 Economic Infrastructure

The economic infrastructure indicator illustrates a citizen's access to their daily needs. This dimension indicates the level of easy access of the villagers to the resources and service facilities that they require. The expectation is that they will be able to meet all of the same necessities as their counterparts in the city. BUMDes can develop economic facilities in the village. Many villages that have tourism potential have developed lodging and homestays to provide services to tourists. In addition, villages could also build village markets, including grocery stores.

Table 4.3: Results of Economic Facility Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Economic Facilities	Availability of shops, mini markets, or grocery stores	+*	+
	Availability of, and access to, markets	+*	+*
	Availability of, and access to, restaurants, eating places, or food shops/stalls	+*	+*

Source: Processed from Podes Statistics of 2014 and 2018.
Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

- Village government may develop the economic facilities through BUMDes. This aims to support village economic hubs such as village developments for tourism and other economic hubs, however, financial service infrastructure (banks) does not fall under the authority of the village government.

- Availability of, and access to, banks is identified through the existing cash office in a village that does not include a bank agent.

- The market indicator is observed from the ratio of market adequacy to the total population.

4.2.2 Energy Infrastructure

The energy infrastructure indicator provides an overview of the public's ability to fulfill their day-to-day needs for electricity, street lighting, and fuel. *This dimension can show whether or not the people's daily needs–from lighting to fuel for cooking–are met.*

Table 4.4: Results of Energy Facility Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Energy Infrastructure	Access to electric power	+*	+*
	Access to street lighting	+*	+*
	Access to fuel	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.
Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

- Most energy infrastructure is not facilitated by the village government. For example, electricity distribution to the village is facilitated by PLN, however, villages that have not been electrified could build micro-hydro power facilities that would fall under the authority of the village government. This is also the case with access to, and supply of, fuel (such as kerosene and gas) which is mostly not facilitated by the village government.

- Indicators of the energy infrastructure variable show the output of infrastructure that is directly related to energy.

- This indicator is based on an approach where the more citizens' energy need is fulfilled, the better the energy infrastructure available in that village.

4.2.3 Clean Water and Sanitation Facilities

Clean water and sanitation are vital infrastructure in the village. The clean water and sanitation indicator depicts the ability of villagers to access the essential resources, from a water source for drinking, bathing/washing to access to sanitation for latrine for the majority of families living in the village. The clean water and sanitation variable is used to measure how easy it is for people to obtain clean water and to measure the level of cleanliness of household waste such as latrine waste.

Limitations:

- Clean water and sanitation infrastructure can be facilitated under authority of the village government.

- Sanitation is only indicated by the latrines that are accessible by the majority of families. Furthermore, the sanitation level of village people could be represented better if other supporting indicators of public sanitation are added, by including for example, garbage and liquid waste to measure the sanitation indicator.

- Sanitation and pollution are closely related, however, this indicator does not include information on pollution and slums.

- The latrine indicator is divided into four categories (0, 2, 3, 5). This is different to other indicators that consist of six categories (0-5).

Table 4.5: Results of Clean Water and Sanitation Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Clean Water and Sanitation Infrastructure	Source of drinking water	+*	+*
	Source water for bathing/ washing	+*	+*
	Latrine for majority of family	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

4.2.4 Communication and Information Infrastructure

Communication needs are reflected in the communication and information variables. Indicators of this variable are the availability and quality of cellular communication facilities and access to postal or goods services. The aim is to make it easier for members of the community to communicate and send information and goods to and from the village so the community is not isolated geographically.

Table 4.6: Results of Communication and Information Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Communication and Information Infrastructure	Availability and quality of cellular communication facility	+*	+*
	Access to postal service or goods delivery	+*	+*

Source: Processed from *Podes* statistics of 2014 and 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

- Communication and information infrastructure–such as the provision of a cellular network through the procurement of a BTS (Base Transceiver Station)–is mostly facilitated by government outside the village. Postal or goods delivery services are also not facilitated under the authority of the village government.

- Indicators of the availability and quality of cellular communication facilities are the presence of a BTS and the strength of a cellular phone signal.

- Indicators of postal or goods delivery services are prepared from a combination of the Internet services available at the village office, the availability of an Internet kiosk in the village, the availability of postal and mobile postal services as well as a forwarding company.

- Only the Internet services at the village office are facilitated by the village government.

4.3 Accessibility/Transportation

Accessibility and transportation services are the key factors in determining the ease of access that the village has to the basic service resources and facilities that people need so villagers can meet the necessities of life as easily as their counterparts in the city.

Table 4.7: Results of Accessibility/Transportation Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Accessibility/ Transportation Infrastructure	Traffic and road quality for inter-village transportation	+*	+*
	Road accessibility	+*	+*
	Availability of public transportation	+*	+*
	Public transportation operation	+*	+*
	Transportation travel time per kilometre to the office of subdistrict head	+*	+*
	Transportation cost per kilometre to the office of subdistrict head	+*	+*
	Transportation travel time per kilometre to the regent/ mayor's office	+*	+*
	Transportation cost per kilometre to the regent/ mayor's office	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.
Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

- Accessibility/transportation infrastructure can be developed under the authority of the village government.
- Law No. 6/2014 on Villages mandates that a new village has access to places outside the village. The impact of this legal requirement is that all villages now have access to places outside the village. Consequently, the established categories of this indicator do not begin from 0-5, but from 1-5.
- The 1-5 categories are found in two indicators, namely traffic and road quality for inter-village transportation and road accessibility.

- The indicator of road accessibility to and from the village by water falls into indicator category 1 (the lowest). Although access is relatively easy, the villages that can only be reached by water (river, sea) cannot change the categories in this indicator.

- Furthermore, code 0 is assigned to the indicator of public transportation operation by water (the lowest).

4.1 Public Services

The public services dimension represents the community's public health environment, ranging from efforts to maintain public health to medical treatment. Due to the limited *Podes* data, the variable used to review this dimension is restricted to the handling of extraordinary events and poor nutrition as well as the availability of sporting facilities such as sport fields and sport activity groups.

Table 4.8: Results of Public Services Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Public Services	Handling of extraordinary events	+*	+
	Handling of poor nutrition	+*	+*
	Availability of sports facilities	+*	+*
	Existence of sports activity groups	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

- Some public services can be facilitated under the authority of the village government through *posyandu, poskesdes*, or *polindes*. Furthermore, sport facilities and groups are also facilitated by the village government through the village government authority. The handling of extraordinary events does not, however, fall under the village government authority, but rather *puskesmas*.

- Variations in the indicator on the handling of extraordinary events are not significant.

- The indicator of extraordinary events consists of five categories, namely 0, 1, 2, 3, and 5. Code 4 is not assigned in this indicator.

- The public services variable adopts the approach of output to identify the handling of diseases and health maintenance efforts in the village.

- The indicator of poor nutrition handling is divided into five categories which are 0, 1, 2, 3, 5. Code 4 is not assigned in this indicator.

- The availability of sports facilities and groups may be facilitated by the village government.

- The handling of extraordinary events and poor nutrition is implemented by *puskesmas* and the local health services office.

4.5 Government Administration

The government administration dimension was analysed to recognise, in general, the capacity of the village to manage its administration, particularly to identify the independence of the village government in generating village own-source revenues and to assess the human resources (*Sumber Daya Manusia:* SDM) quality of the village head and secretary. At the same time, this dimension provides a snapshot of the performance of the village government in managing its village.

4.5.1 Independence

Government administration illustrates the village government performance in the provision of administrative services. This variable is required as an indicator of village development given its nature as an instrument to achieve the objective of village development. The constituent variables include independence in: (i) village government apparatus; (ii) village autonomy; (iii) village assets/property; and (iv) the quality of human resources for example: the SDM quality of village head and village secretary.

Table 4.9: Results of Government Administration Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
Government Administration	Village government apparatus	+*	+*
	Village autonomy	+	+*
	Village assets/property	+*	+**
	Public transportation operation	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.

Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

- Government administration falls under the authority of the village government.

- Information on village own-source revenues (PAD) is used more than once, namely for the village autonomy and village assets/property indicators.

- The categorisation of village autonomy indicator does not depict the pattern of changes in the data used. This is apparent as the changes in the village autonomy indicator tend to be statistically insignificant in the McNemar-Bowker test.

4.5.2 Human Resources (SDM) Quality

The quality of SDM–the village head and secretary–is a reference point on the productivity of development in the village. The quality assessment is conducted by taking into account the highest education level completed by the village head and secretary. Prior to the promulgation of Law No. 6/2014, the village secretary was appointed as a civil servant, however, since this Law came into effect, the village secretary has been appointed and dismissed by the village head.

Table 4.10: Results of SDM Indicator Test

Variable	Remarks	McNemar-Bowker	Wilcoxon
SDM Quality	SDM quality of village head	+*	+*
	SDM quality of village secretary	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.
Note: * significant with alpha 0.01; ** significant with alpha 0.05.

Limitations:

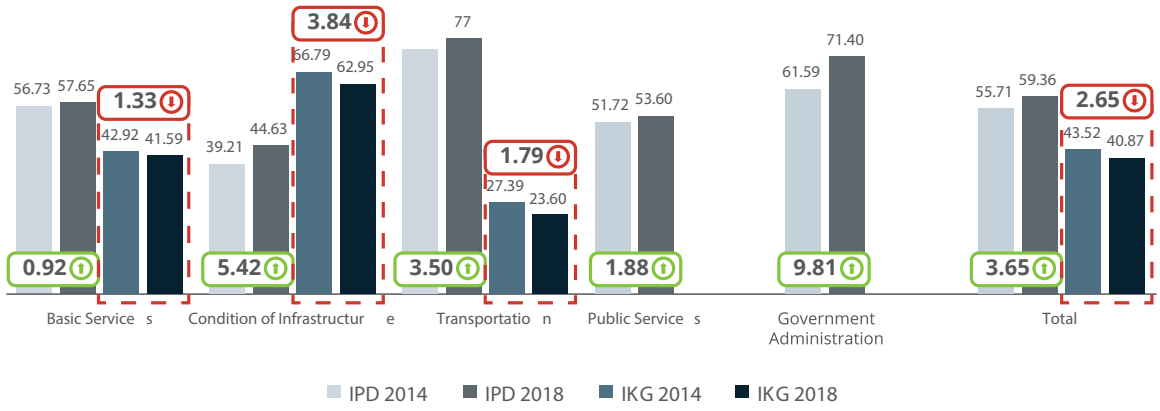
- The quality of SDM relies heavily on the public in electing the village head.
- SDM quality is measured from the highest education level completed by the village head and secretary.

4.6 Index Result Evaluation

The IPD and IKG have reverse viewpoints–the IKG reflects the level of difficulty for villagers to access basic services, while the IPD represents the achievement of village development in bringing the basic services closer to the villagers. The IKG is used in determining the distribution of Village Funds, and the IPD is used for evaluating the outcomes of village development.

As a result, the village development has successfully reduced the relatively high level of geographical difficulties in the infrastructure dimension. Nevertheless, the infrastructure condition still has a significantly higher value if compared to the average value of the IKG.

Figure 4.1: Comparison of the Results of IPD and IKG Per Dimension



Source: Processed from 2018 IPD and IKG.

The village infrastructure condition is still better than that of basic services and transportation. If compared at a glance, the dimension of IPD shows a greater increase than the IKG. This is because the IPD has more variables (14 indicators), while the IKG only has eight indicators that are part of IPD. The contrasting IPD indicators include the use of liquefied petroleum gas, latrines, and availability of postal services that are not present in the measurement of the IKG. Furthermore, the contribution of each indicator also has a different pattern.

Table 4.11: Causes of Difference in the Value of IPD and IKG in the Infrastructure Condition Dimension

Remarks	Change	Indicator of IKG	Indicator of IPD
Access to fuel	Number of villages where LPG station/agent/seller is available increased by 14% from 2014.	Yes	Yes
Latrine for majority of family	Number of villages where the majority of families use their own latrine increased by 26% from 2014.	No	Yes
Access to postal or goods delivery	Number of villages that have postal services increased by 59% from 2014.	No	Yes
Shop categories	Number of villages that have shop categories decrease by 4.74% from 2014	Yes	Yes
Non-structural market	Number of villages that have non-structural markets fell by 10.70% from 2014.	Yes	Yes
Food stand/stall	Number of villages that have food stand/stalls fell by 0.54% from 2014.	Yes	Yes

Source: Processed from Podes statistics of 2014 and 2018.

In addition due to the application of different indicators, each of the indicators that constitute the IPD and IKG also vary. The contributions produced from the main component analysis (PCA) for 2014 are presented in full in Annex 2.

SECTION FIVE:CONCLUSIONS

1. The results of the McNemar-Bowker Test and Wilcoxon Test show that several indicators have not significantly change between 2014 and 2018:

   a. Availability of, and access to, TK/RA/BA;

   b. Availability of shops, minimarkets, or grocery stores;

   c. Handling extraordinary events (KLB);

   d. Village autonomy; and

   e. Village assets/property.

2. In general, the success of village development requires the synergy of efforts from the village apparatus itself and from the higher level of government administration above the village government. This includes the procurement of elementary to secondary school facilities, health facilities (hospital and *puskesmas*), BTS facilities and signal strength, and postal services.

3. When preparing the village development indicators which involve the distance and easy public access to the nearest facility, there is an indication that the surrounding village is also affected positively.

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ANNEX 1

Table A1: Results of McNemar- Bowker and Wilcoxon Statistics Test (IPD 2018)

Number	Name of Indicator	McNemar- Bowker	Wilcoxon
I1	Availability of, and access to, TK/RA/BA	+*	+
I2	Availability of, and access to, primary school and equivalent	+*	+*
I3	Availability of, and access to, SMP and equivalent	+*	+*
I4	Availability of, and access to, SMA and equivalent	+*	+*
I5	Availability of, and access to, hospital	+*	+*
I6	Availability of, and access to, maternity hospital	+*	+*
I7	Availability of, and access to, Puskesmas	+*	+*
I8	Availability of, and ease of access to polyclinic/ medical centre	+*	+*
I9	Access to physician practice	+*	+*
I10	Availability of, and ease of access to, midwife practice	+*	+*
I11	Availability of, and ease of access to Poskesdes or Polindes	+*	+*
I12	Availability of, and ease of access to pharmacy	+*	+*
I13	Availability of shops, minimarkets, or grocery stores	+*	+
I14	Availability of, and access to, market	+*	+*
I15	Availability of, and access to, restaurant, eating place or food stall/stand	+*	+*
I16	Access to hotel accommodation or lodging	+*	+*
I17	Availability of, and access to, bank	+*	+*
I18	Access to electricity	+*	+*
I19	Access to street lightning	+*	+*
I20	Access to fuel	+*	+*

Indikator IPD 2018		McNemar- Bowker	Wilcoxon
Number	Keterangan		
I21	Source of drinking water	+*	+*
I22	Source of water for bathing/washing	+*	+*
I23	Latrine for majority of family	+*	+*
I24	Availability and quality of cellular communication facilities	+*	+*
I25	Access to postal service or goods delivery	+*	+*
I26	Road traffic and quality for inter-village transportation	+*	+*
I27	Road accessibility	+*	+*
I28	Availability of public transportation	+*	+*
I29	Operation of public transportation	+*	+*
I30	Transportation traveling time per kilometre to the office of the subdistrict head	+*	+*
I31	Transportation cost per kilometre to the office of the subdistrict head	+*	+*
I32	Transportation traveling time per kilometre to the office of the regent/mayor	+*	+*
I33	Transportation cost per kilometre to the office of the regent/mayor	+*	+*
I34	Handling of extraordinary events (KLB)	+*	+
I35	Handling of poor nutrition	+*	+*
I36	Availability of sports facilities	+*	+*
I37	Availability of sports activity groups	+*	+*
I38	Village government apparatus	+*	+*
I39	Village autonomy	+	+*
I40	Village assets/property	+*	+**
I41	SDM quality of village head	+*	+*
I42	SDM quality of village secretary	+*	+*

Source: Processed from Podes statistics of 2014 and 2018.
Note: * significant with alpha 0.01; ** significant with alpha 0.05.

ANNEX 2

Table A2: Weight of Each Indicator in the Constituting Index

Number	Name of Indicator	IKG	IPD
I1	Availability of, and access to, TK/RA/BA	0.0345	0.0228
I2	Availability of, and access to, primary school and equivalent	0.0208	0.0116
I3	Availability of, and access to, SMP and equivalent	0.0397	0.0321
I4	Availability of, and access to, SMA and equivalent	0.0365	0.0317
I5	Availability of, and ease of access to, hospital	0.0409	0.0272
I6	Availability of, and ease of access to, maternity hospital	0.0392	0.0258
I7	Availability of, and ease of access to, Puskesmas	0.0387	0.0310
I8	Availability of, and ease of access to, polyclinic/medical centre	0.0479	0.0309
I9	Availability of, and ease of access to, physician practice	0.0454	0.0326
I10	Availability of, and ease of access to, midwife practice	0.0447	0.0299
I11	Availability of, and ease of access to poskesdes or polindes	0.0441	0.0252
I12	Availability of, and ease of access to pharmacy	0.0376	0.0254
I13	Availability of shops, minimarkets, or grocery stores	0.0298	0.0196
I14	Availability of market	0.0275	0.0180
I15	Availability of restaurant, eating place or food stand/stall	0.0227	0.0152
I16	Availability of hotel accommodation or lodging	0.0268	0.0186
I17	Availability of, and access to, bank	0.0240	0.0230
I18	Access to electricity	0.0300	0.0230
I19	Access to street lighting	0.0308	0.0188
I20	Access to fuel	0.0326	0.0178
I21	Source of drinking water	n.a.	0.0299
I22	Source of water for bathing/washing	n.a.	0.0301

Number	Name of Indicator	IKG	IPD
I23	Latrine facility	n.a.	0.0137
I24	Availability and quality of cellular communication facility	n.a.	0.0160
I25	Access to postal service or goods delivery	n.a.	0.0173
I26	Road traffic and quality for inter-village transportation	0.0268	0.0174
I27	Road accessibility	0.0238	0.0150
I28	Availability of public transportation	0.0653	0.0427
I29	Operation of public transportation	0.0648	0.0423
I30	Transportation traveling time per kilometre to the office of the subdistrict head	0.0294	0.0177
I31	Transportation cost per kilometre to the office of the subdistrict head	0.0383	0.0280
I32	Transportation traveling time per kilometre to the office of the regent/mayor	0.0228	0.0142
I33	Transportation cost per kilometre to the office of the regent/mayor	0.0348	0.0265
I34	Handling of extraordinary events (KLB)	n.a.	0.0195
I35	Handling of poor nutrition	n.a.	0.0209
I36	Availability of sports facilities	n.a.	0.0335
I37	Availability of sports activity groups	n.a.	0.0352
I38	Village government apparatus	n.a.	0.0260
I39	Village autonomy	n.a.	0.0163
I40	Village assets/property	n.a.	0.0199
I41	SDM quality of village head	n.a.	0.0186
I42	SDM quality of village secretary	n.a.	0.0279

Source: IKG Weight: Regulation of the Minister of Finance of the Republic of Indonesia Number 49/PMK.07/2016 regarding Procedures for the Allocation, Distribution, Appropriation, Monitoring and Evaluation of Village Fund.
Note: IPD Weight: Village Development Index Publication of 2018.

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

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ABSTRACT

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

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

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

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

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

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

Section One: Introduction

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

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

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

(c) determining the allocation of poverty alleviation programs;

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

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

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

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

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

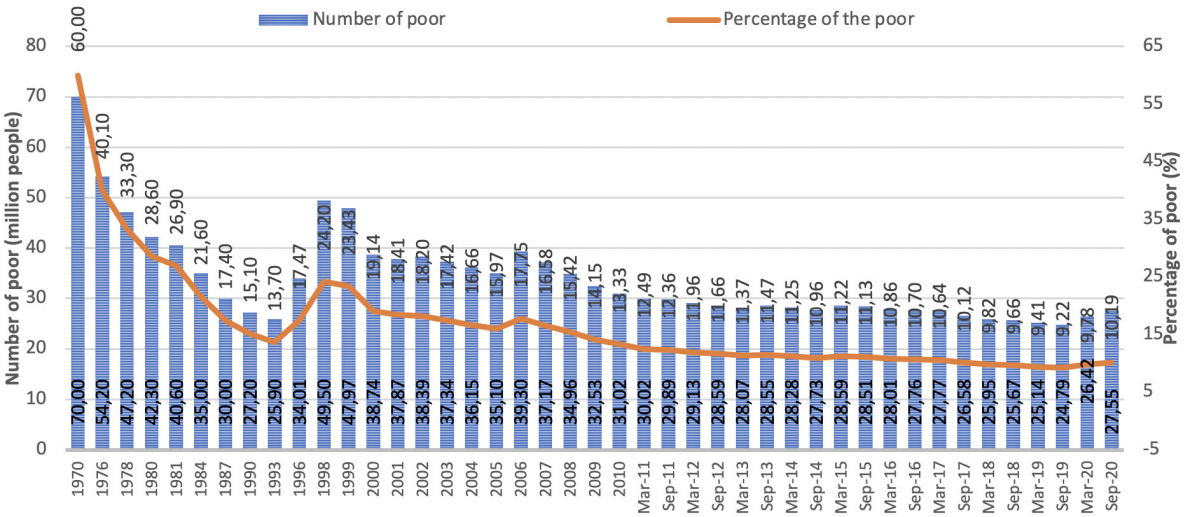
People's consumption pattern in Indonesia has changed and is reflected in an increase in the minimum daily calorie consumption per capita to 2,150 calories. This change is the result of WNPG 2012 and is in accordance with the most recent Recommended Nutritional Allowance (*Angka Kecukupan Gizi*: AKG)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

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

1.1 Poverty Condition in Indonesia

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

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



Sourcer: Statistics Indonesia, Few Edition

Note: The poverty line calculation methodology was refined in 1996

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

Section Two: Literature Study on Poverty[1]

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

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

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

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

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

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

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

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

2.1 Absolute Poverty and Relative Poverty

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

2.1.1 Absolute Poverty

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

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

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

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

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

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

2.1.2 Relative Poverty

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

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

2.2. Multidimensional Poverty

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

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

Table 2.1: Dimension, Indicators, and Weight of MPI

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

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

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

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

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

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

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

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

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

$$MPI = H \times A$$

Section Three: Literature Study on Calculation of the Poverty Line

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

3.1. Food Energy Intake versus Cost of Basic Needs

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

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

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

Section Four: Calculation of Poverty Line

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

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

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

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

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

    - 49 countries (58 per cent) measure the poverty rate based on expenditure information. These countries include Albania, Armenia, Hungary, Macedonia, Moldova, Turkey, Iran, Sri Lanka, Cambodia, Bangladesh, and Myanmar.
    - 25 countries (30 per cent) calculate poverty rate based on income data. These countries include Germany, France, Greece, Malaysia, and Thailand.
    - 10 countries (12 per cent) measure poverty rate by using the expenditure and income approach. These countries include Lithuania, Russia, Republic of Korea, China, Vietnam, and Mongolia.
- In Indonesia, the expenditure records tend to emphasise more the economic condition or purchasing power of a household.
- Information on income tends to be unreliable for use as calculation basis.
    - For example, one of the indicators of income often used in developed countries is the income amount contained in the individual income tax return. If this data is used, problems will arise in the calculation in Indonesia. With a total population of approximately 256 million, only 27 million have a Taxpayer Identification Number (*Nomor Pokok Wajib Pajak*: NPWP). Out of the aforementioned total, only 10 million filed the Annual Tax Return (2017).

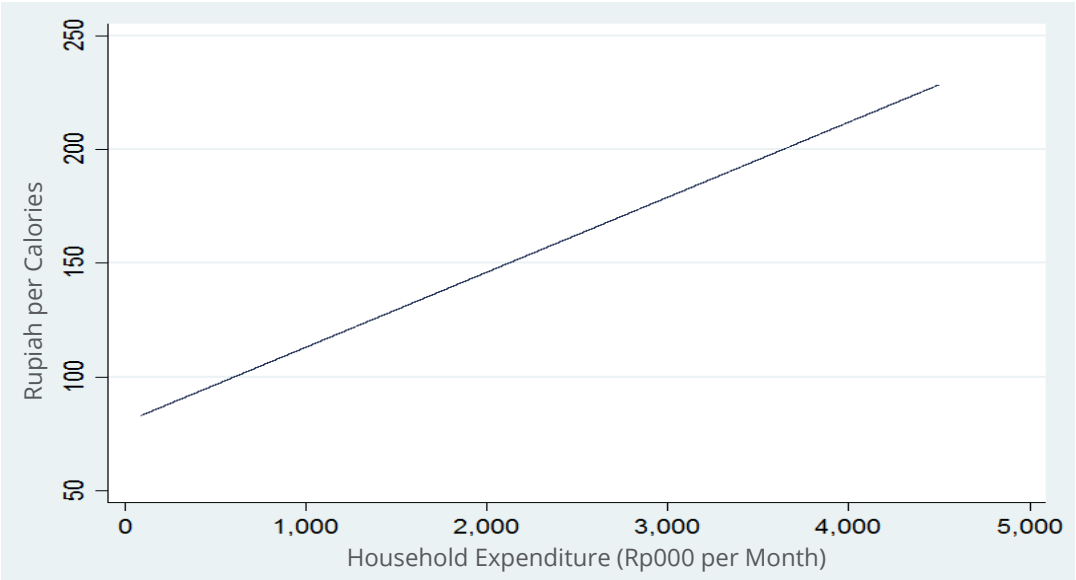
- Data collection in developing countries like Indonesia encounters difficulties in obtaining information on income for various reasons:
    - The respondents usually refrain from disclosing their actual income for fear of consequences from providing information on, among other things, taxes.
    - Around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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

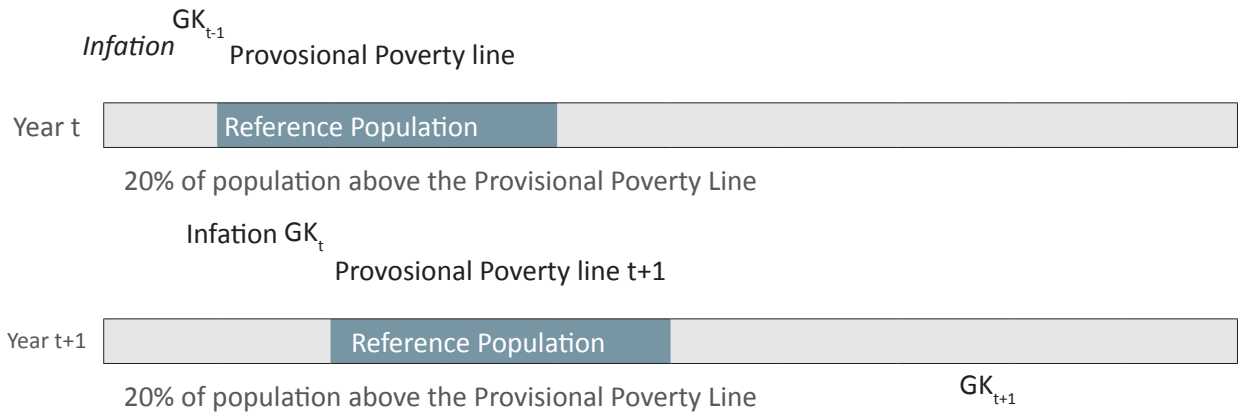
$$GKM_t = \left[\sum_{i=1}^{n} (\tilde{P}_{i,t} \cdot \bar{Q}_{i,td}) \times \frac{2150}{\sum_{i=1}^{n} \bar{C}_{i,td}}\right] + \tilde{P}_{cig,t} \cdot \bar{Q}_{cig,td}$$

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

5.2 The Use of Comparable Reference Population

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

Figure 5.1: Reference Population Designated Based on Provisional Poverty Line



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

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

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

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

5.3 Updating of the Number of Commodities

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

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

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

Source: Susenas 1998 and 2017, processed.

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

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

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

Source: Susenas 1998 and 2017, processed.

5.4 Minimum Per Capita Need for Calorie

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

This minimum limit of RDA was set by considering:

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

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

5.5 Small Number of Samples and Commodity Price Outliers

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

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

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

Table 5.4: List of Commodities with Inadequate Samples

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

Source: Susenas March 2017, processed.

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

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

Source: Susenas 2015 and 2016, processed.

Section Six: Proposal for Updating Poverty Line Calculation

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

Table 6.1: Proposal for Updating the Poverty Line Calculation Method

Aspects	Proposed Improvement
Provisional poverty line (GKS)	Eliminate GKS calculation phase.
Different reference populations	Change reference population. The alternative reference population proposed is population group in decile 1 up to decile 3 and dynamic reference population, namely 10 per cent above and below the poverty line in the base year.
Change of consumption pattern in the food basket	Re-select food commodities to be used in the calculation of poverty line which meet the following criteria: • Commodities deemed essential. • Commodities consumed by 50-60 per cent of the reference population. • Commodities having calorie value higher than zero.
Non-food Poverty Line (GKNM) calculation method	Indirect approach is calculating non-food consumption by applying a statistical approach. One advantage of the indirect method is that it is simpler and can capture a wider range of non-food needs. As an indirect method, though, it may include expenditures on alcohol, tobacco, lotteries, certain religious ceremonies, and other categories that might be deemed (rightly or wrongly) inappropriate as constituents of a poverty line designed to measure ìbasic needs. Non-food consumption estimate is the difference between the total per capita expenditures of households in the reference population and the proportion of expenditures for food.
Minimum per capita calorie needs per day	• Minister of Health Regulation No. 75/2013 on AKG sets out that the minimum calorie need is 2,150 calories per capita per day. • Calculated the poverty line by comparing the use of the amounts of 2,150 and 2,100 calories per capita per day as the minimum calorie needs.

Too limited samples	Several solutions to such issue include among others:
	• Re-select commodities in the poverty line baskets.
	• Increase the number of Susenas samples.
	• Combine regions higher than province.
	  • In this concept, several neighbouring provinces are to be combined in one zone so that they have one single poverty line.
	  • Information and the results of simulation by using zoning approach are still being calculated by the World Bank. The results are to be conveyed on the next occasion.

6.1 Reference Population

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

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

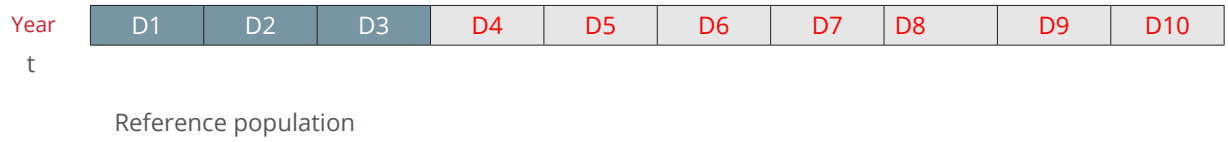
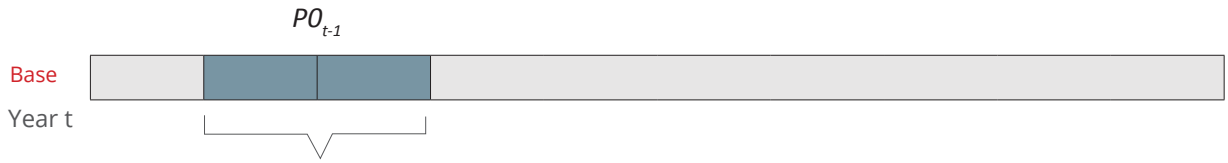


Figure 6.2: Use of Reference Population in Percentile of ± 10 Per Cent of P0 in the Year Prior to the Base Year



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

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

6.2 Updating of Food Poverty Line and Calories

Poverty Line Calculation Method: Food Commodity Basket

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

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

Poverty Line Calculation Method: Calorie Value

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

6.3 Non-Food Poverty Line Calculation Method

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

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

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

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

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

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

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

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

6.4 Use of the Real Method

Comparability Over Time and Between Regions

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

This approach has several advantages, among others:

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

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

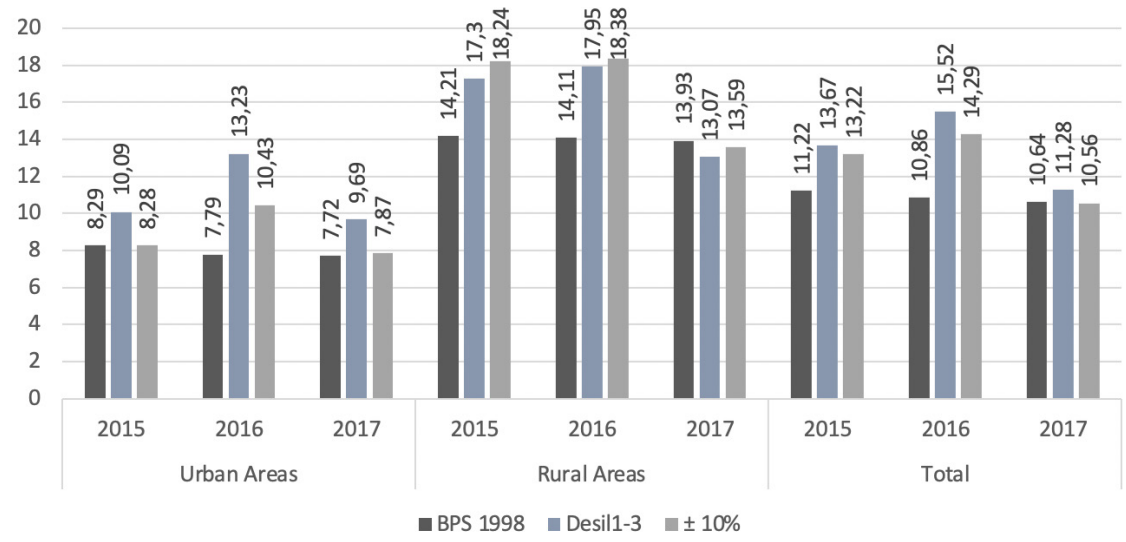
Section Seven: Simulation of Poverty Indicator Calculation

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

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

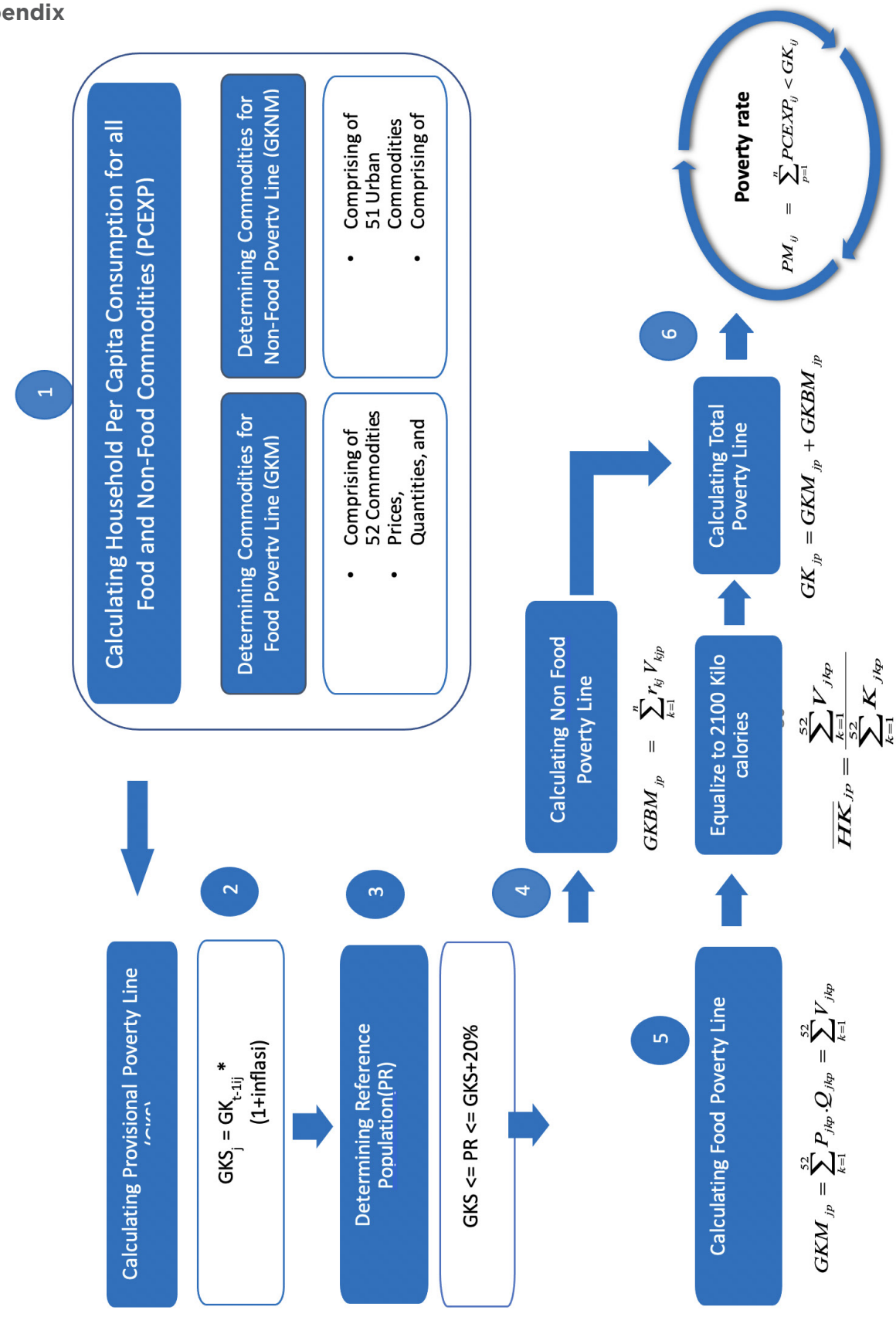
	Urban Areas			Rural Areas			Total		
Year	2015	2016	2017	2015	2016	2017	2015	2016	2017
BPS 1998	342,541	364,527	385,621	317,881	343,647	361,496	330,776	354,386	374,477
Reference Population	**Urban Areas: Simulation Value (Rp/Capita)**			**Rural Areas: Simulation Value (Rp/Capita)**			**Total: Simulation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

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



Appendix

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



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