The Spatial Pattern of Poverty and It's Alleviation Strategy through The Village Fund Policy

Sutresno [1], Ernan Rustiadi [2], Galuh Syahbana Indraprahasta [3]

Abstract:

The aims of this study are: (1) To analyze the spatial distribution of Poverty in Brebes Regency in 2021. (2) To analyze the effect of implementing village funds and other factors (MSMEs) on the poverty rate in Brebes Regency from a spatial aspect in 2021. Locations in This research located in Brebes Regency, Central Java Province. The number of villages observed was 298 villages. This research is a quantitate research using secondary data. The methods used to achieve the objectives of this study are: (1) Moran and LISA analysis (Moran Index and LISA Index) to analyze the spatial pattern of Poverty; (2) weighted spatial regression analysis (GWR) to determine the effect of variables thought to influence Poverty. The results of this research indicated by the Moran Index value of 0.509409 which indicates a positive autocorrelation or clustering (cluster). This value indicates that adjacent villages have relatively the same characteristics. The Lisa test illustrates the spatial pattern of Poverty that is clustered into four poverty criteria, namely 40 villages with high-high criteria, 69 villages with low-low criteria. A total of 6 villages are low-high and 3 are high-low criteria. Based on the results of the GWR analysis, it was also found that all the variables tested, namely spending on village funds and the number of MSMEs in each village, reduced in reducing Pove significantly reduced several villages.

Keywords: *Cluster Analysis; Management Policies; Poverty; Spatial Autocorrelations; Village Fund*

1. Introduction

In absolute terms, the number of poor people in Indonesia is still quite high. Based on the BPS release in 2022, the number of people in Indonesia in September 2021 is 26.50 million, of which 11.86 million (55.24%) live in rural areas. The problem of rural Poverty is also found in Brebes Regency. The poverty rate in Brebes Regency is even higher than the percentage of poor people in Central Java Province and the surrounding cities/regencies, as explained in Table 1.

[1] *Regional Development Planning Program, Institut Pertanian Bogor, Indonesia. sutresno.tin47@gmail.com*
[2] *Regional Development Planning Program, Institut Pertanian Bogor, Indonesia. ernan@indo.net.id*
[3] *Regional Development Planning Program, Institut Pertanian Bogor, Indonesia. galuh.indraprahasta@gmail.com*

Table 1. The Percentage Of Poverty In Brebes Regency Compared To Surrounding Districts And Central Java Province

Regency/City	Percentage of Poor Population (%)						
	2015	2016	2017	2018	2019	2020	2021
Jawa Tengah	13,58	13,27	13,01	11,32	10,80	11,41	11,79
Brebes	19,79	19,47	19,14	17,17	16,22	17,03	17,43
Kota Tegal	8,26	8,20	8,11	7,81	7,48	7,80	8,12
Kab. Tegal	10,09	10,10	9,90	7,94	7,64	8,14	8,60
Banyumas	17,52	17,23	17,05	13,50	12,53	13,26	13,66

Source: Central Bureau of Statistics Brebes Regency, (2021)

The following table shows that the poverty rate for Brebes Regency has decreased from 2015 to 2019, but in 2020 and 2021 it will increase again due to the Covind-19 pandemic. Efforts to reduce Poverty continue to be carried out with synergy between the central and regional governments. One of them is village funds which will be distributed sin 2015. The allocation of village funds in Brebes Regency in 2021 is IDR 280,275,770,996.00. According to in the process of economic growth, one of the indicators used to see symptoms of economic growth in a country or region is to use the Gross Regional Domestic Product (GRDP).

Apart from village funds, one of the factors affecting Poverty during the Covid-19 pandemic in Brebes Regency cannot be separated from the role of Micro, Small and Medium Enterprises (MSMEs). Based on data from the Department of Cooperatives, Micro Enterprises and Trade of Brebes Regency during the pandemic period in 2020-2021 the number of MSMEs in Brebes Regency experienced an increase of 65.5%, with an increase in employment of 57.3%. The results of this study show that unemployment, GRDP and the number or population of Central Java significantly affect Poverty in Central Java province (Puspita, 2015), (Rusdarti and Sebayang, 2013). Statistically, GRDP and other variables such as public spending significantly affect Poverty while unemployment has no significant effect (Adetayo, 2014).

Studies on Poverty with positive contributions have been carried out by (Prasetyo, 2010) showing positive results that the Unemployment Variable affects Poverty. Researchers, in this case, used time series data (Time Series Data) from the period 2003 – 2007 as well as cross-section data covering 35 Regencies/Cities in Central Java Province, and processed using Panel Data Analysis. Subsequent research analyzed the Effects of GRDP, Education and Unemployment on Poverty in Central Java Districts/Cities in 2005 – 2008. It showed negative results that the variable Unemployment affected Poverty. Researchers in this case use Panel Data Analysis (Anselin, 2018). Subsequent research analyzed the factors that influenced the Poverty Level in Central Java Province in 2004 - 2009. It showed positive results that the Unemployment Variable affected Poverty. Researchers in this case use Panel Data Analysis (Timmer, 2017).

Judging from the area's characteristics, Brebes Regency has various characteristics of rural areas, namely villages located on the coast, mountainous areas and areas close to cities. In line with this, in efforts to reduce Poverty in Brebes Regency, it is necessary to spatially identify the root causes of Poverty to obtain an appropriate and

effective poverty reduction program. According to Irawadi (2018) efforts to reduce Poverty are not enough only with general policies and through sectoral approaches that have been implemented so far. Spatial and local approaches are needed to get to the root of the problem so that solutions and work programs for poverty alleviation can be adapted to the area's characteristics. Poverty is one of the fundamental issues that are the center of attention of the government in any country. Poverty is a problem in economic development that hinders the creation of a just, prosperous and equitable life which is the goal of achievement by every country (Anwar, 2017). The problem of Poverty has always been a major concern in Indonesia. Failure to overcome the problem of Poverty can lead to the emergence of various social, economic and political problems in society (Purwanto, 2007). Poverty is a multidimensional problem, so the government must create specific strategies to deal with this problem (Krisnawati, Suman, & Saputra, 2018). Arlinghaus (2016) states that reducing Poverty and increasing levels of inequality are at the core of all development problems. Therefore, development must continue to be carried out at the central and regional levels to overcome poverty.

Village funds are part of the fiscal decentralization channelled by the centre to improve the community's economy, improve people's welfare, and alleviate Poverty in rural areas through meeting basic needs (Education and Health), developing village economic potential (Providers of microfinance services and MSME development), improvement of village infrastructure, and management of available natural resources in a sustainable manner. Based on Law no. 6 of 2014 concerning villages article 72, paragraph (1) letter d regarding village finances states that village income comes from allocations from the State Revenue and Expenditure Budget (APBN). Furthermore, it is regulated into PP. No. 60 of 2014 concerning village funds sourced from the State Revenue and Expenditure Budget (APBN) earmarked for villages. Musliha *et al.,* (2019) said that the allocation of village funds can increase the development of physical infrastructure and social welfare between before village funds are available and after village funds are given. Thus the distribution of village funds provided by the central government impacts physical development such as village community facilities and welfare and community welfare in empowerment activities that explore the potential possessed by the community (Permana, 2012).

Apart from utilizing village funds, one of the poverty alleviation efforts that the government can carry out is the development of Micro, Small and Medium Enterprises (MSMEs). MSMEs have provided a bright spot, attention and strategy for poverty alleviation and are now a universal issue, especially among the stages of the developing economy. In addition, MSME development has been described as an important mechanism to increase economic growth (Baiyegunhi and Fraser, 2014).

Efforts to eradicate Poverty must be carried out systematically, structured, and following the region's characteristics. Differences in regional characteristics or spatial characteristics will also require different treatment. This suitability will make poverty alleviation efforts more effective. (Riadi *et al.*, 2011) stated, "Spatial data is reliable information to describe existing facts, especially regarding the condition of an area in an area. To optimize the handling of development planning and management of a

region, it is necessary to develop a Spatial Information System (SIS) to inform the potential of an area.

Several studies have been conducted to find solutions to poverty alleviation using village funds and other factors from a spatial perspective. (Artino *et al*, 2019). examines the linkage of village funds to Poverty in North Lombok Regency. This research aims to see the relationship between village funds and Poverty in North Lombok Regency. The method used is Geographically Weighted Regression (GWR). The results of the study say that village funds can reduce Poverty in every village in Central Sulawesi, but this does not have a significant effect because the resulting model is still influenced by other variables outside the model (Anggadini F., 2016), (Kotambunan L., 2016).

Daryanto and Morison (2015) also examined the influence of village funds on poverty levels and community welfare in the districts/cities of Queesnland. This research aims to analyze the effect of village funds on poverty levels and people's welfare in the districts/cities of Queensland. The results of this study indicate that village funds have a negative and significant effect on poverty levels. This means that the higher the village fund, the lower the poverty rate. Village funds have a positive and significant effect on community welfare. This means that the higher the village fund, the higher the welfare of the people in the area. The poverty rate negatively and significantly affects people's welfare, meaning that the higher the poverty level, the lower the community's welfare. In addition, (Guo & M.A, 2020) examined the measurement of the effect of village spending on village development performance using Geographically Weighted Regression. The study results show the influence of village expenditures listed in the Village Revenue and Expenditure Budget (APBDes). Spending on village development (infrastructure) has the most significant effect on village development performance with an elasticity value of 0.637.

The influence of village spending on the GWR model is strongly influenced by the geographical, demographic, and socio-economic conditions of the village community, so the results vary in each village. Analysis with spatial econometrics in this study uses the GMM system due to the emergence of endogeneity problems in the growth model and especially in the dynamic panel model (Anwar, 2015). Variations from the studies that have been carried out previously have varied results and indicate that conditions in one region will be different from other regions. This further reinforces that the spatial characteristics factor is very influential in poverty alleviation both in relation to the use of village funds and other variables. The aims of this study are: (1) To analyze the spatial distribution of Poverty in Brebes Regency in 2021. (2) To analyze the effect of implementing village funds and other factors (MSMEs) on the poverty rate in Brebes Regency from a spatial aspect in 2021.

2. Methodology

The location in this study is in Brebes Regency, Central Java Province. The number of villages observed was 298 villages. This research is quantitative research using secondary data. In addition, observations and interviews with related parties were carried out to see real conditions in the field. Several parties involved in this study were the Brebes Regency Regional Development Planning Agency (Bappeda), the Central Bureau of Statistics for Brebes Regency, the Social Service Office for Brebes Regency and the Community and Village Empowerment Service for Brebes Regency.

The methods used to achieve the objectives of this study are: (1) Moran and LISA analysis (Moran Index and LISA Index) to analyze the spatial pattern of Poverty; (2) weighted spatial regression analysis (GWR) to determine the effect of variables that are thought to affect Poverty (Bekhet, 2021). From the two analyzes, alternatives and policy implications were developed in relation to poverty alleviation in Brebes Regency. The data units analyzed were villages, namely 298 villages in Brebes Regency.

Identification of the GWR model used to determine the spatial diversity of the influence of Village Fund implementation on Poverty is as follows:

$$Yi = \beta_0 (ui, vi) + \beta_1 (ui, vi) BPPHi + \beta_2 (ui, vi) BPPNi + \beta_3 (ui, vi) BPKMSi + _4 (ui, vi)$$
$$BPMKTi + \beta_5 (ui, vi) BPBKDi + \beta_6 (ui, vi) UMKMi + \varepsilon_t$$

Explanation :
Yi   = The number of poor people per village per area in Brebes Regencyvyear i (number of poor people/km^2)
B_0 = Constant
BPPHi   = Expenditures for the implementation of the 1st year village government (rupiah)
BPPNi   = Expenditures for the implementation of the 1st year of village development (rupiah)
BPKMSi   = Expenditures for village community development-i year i (rupiah)
BPMKTi   = Expenditures for village community empowerment i year (rupiah)
BPBKDi = Expenditure for village disaster management, year i (rupiah)
UMKMi   = Number of MSMEs per village ith year i
ε_t = Error

The tools used in this study were Microsoft Excel software and ArcGIS 10.3 software

3. Empirical Findings/Result

Analysis of Spatial Patterns of Poverty in Brebes Regency

The global spatial pattern of poverty distribution in Brebes Regency is clustered. This was obtained based on the Global Moran Index analysis results, which showed a value of 0.509409 and a z-score of 27.412050. The range of values of the Moran Index 0 <

I ≤ 1 indicates a positive spatial autocorrelation. The pattern of Poverty resulting from the Moran Index in Brebes Regency can be seen in Figure 1.
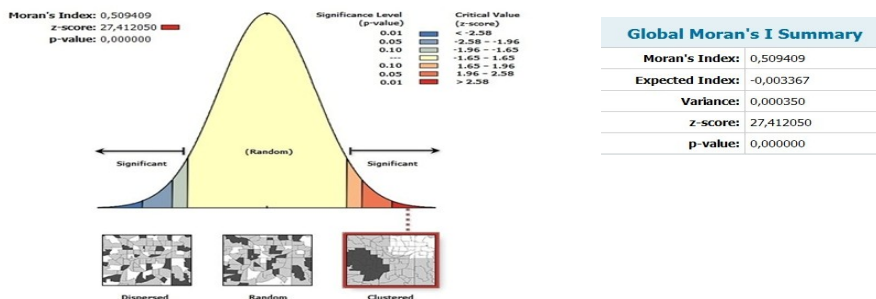

Figure 1. General Spatial Poverty Pattern in Brebes Regency Based on the Moran Index.

The pattern of clustered poverty distribution explains that each village has a strong spatial influence in influencing its poverty level. A village that has a high poverty rate will affect other village that are its neighbours. Vice versa, every village that has a low poverty rate will affect other village which are its neighbours.

Furthermore, to obtain patterns of Poverty locally, it is carried out through the Local Indicators of Spatial Autocorrelation (LISA) Analysis test (Todaro and Smith, 2009). The test results show that out of 298 village, 118 village are significant or have spatial linkages, while 180 village are not significant or do not have spatial linkages (neighborhoods) with other villages. Of the 118 villages that have neighboring properties, they are divided into 4 quadrants or clusters, namely quadrant I (high-high), quadrant II (low-high), quadrant III (low-low), quadrant IV (high-low) with an explanation as in the table following. Quadrant I described a village with a high poverty rate surrounded by village with a high poverty rate. Quadrant II describes villages with low Poverty surrounded by villages with high Poverty. Quadrant III describes villages with low Poverty surrounded by villages with low Poverty. Quadrant IV explains that village with high Poverty are surrounded by village with low Poverty.

Identifying poverty clusters in Brebes Regency based on quadrants I, II, III, and IV following their neighbouring areas is important in the study of village development. This is done to know the spatial characteristics of each village so that it can build synergy between villages. Harmes *et al*., (2017) stated that policy suitability must carry out spatial identification so that village relations with neighboring villages can influence each other in alleviating Poverty.

The results of research on village poverty clusters in Brebes Regency based on the LISA Test can be seen in Table 2.

Table 2. Categories of Village in Brebes Regency Results of Distribution and Pattern Analysis Spatial Poverty

Cluster	Village Name
High-High	Windusakti, Tembongraja, Gandoang, Gunungtajem, Salem, Ganggawang, Kadumanis, Indrajaya, Gunungjaya, Gunungsugih, Citimbang, Gununglarang, Banjaran, Adisana, Dukuhturi_Bu, Bumiayu, Cilibur, Langkap, Kalierang, Pamijen, Laren, Jatisawit_Bu, Negaradaha, Pruwatan, Pagojengan, Kretek, Taraban, Wanatirta, Pakujati, Paguyangan, Winduaji, dan Kedungoleng.
High-Low	Pesantunan, Glonggong, dan Rengaspendawa.
Low-High	Sindangwangi, Terlaya, Bantarwaru, Legok, Bantarkawung dan Ragatunjung.
Low-Low	Sigambir, Kaligangsa_Kulon, Brebes, Pebatan, Siasem, Banjaranyar, Gandasuli, Pulosari, Wanasari, Wangandalem, Padasugih, Sigentong, Lembarawa, Krasak, Terlangu, Sidamulya, Tanjungsari, Pemaron, Kalimati, Kalipucang, Lengkong, Sisalam, Kalialang, Kramat, Kedungtukang, Siwungkuk, Jagallempeni, Rengasbandung, Pedeslohor, Tembelang, Tegalgandu, Buaran, Kebogadung, Tegalwulung, Bojong, Kendawa, Klikiran, Pamengger, Kertasinduyasa, Janegara, Jatibarang_Lor, Wanacala, Klampis, Kebonagung, Kemiriamba, Karanglo, Karangsembung, Jatibarang_Kidul, Dukuhmaja, Wanatawang, Kedungbokor, Cenang, Jatirokeh, Jatimakmur, Gegerkunci, Songgom_Lor, dan Songgom.

From the following table it can be seen that as many as 40 village in Brebes Regency are included in the high-high category, as many as 3 village are included in the high-low criteria, 6 village are included in the low-high criteria and as many as 69 village included in the low-low cluster criteria. The distribution map and spatial pattern of Poverty in Brebes Regency can be seen in Figure 2.

(a)   (b)

Figure 2. (a) Map of Distribution of the Percentage of Poor Population (b) *LISA Cluster Map*
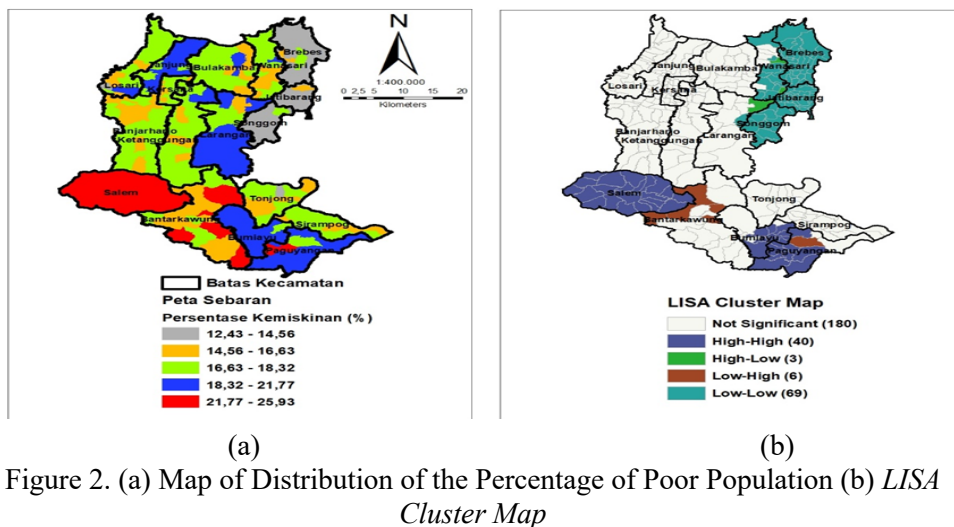
If we look at the locations of the 40 village that fall into the high-high cluster criteria, namely village in Salem, Bumiayu and Paguyangan Districts, geographically these village are located in the southern part of Brebes Regency which is a plateau, access road damaged and far from the centre of government or the capital city of Brebes

Regency. Geographical conditions and inadequate supporting facilities cause these villages to have high poverty rates. On the other hand, villages included in the low-low cluster are located in the Districts of Brebes, Jatibarang, Wanasari and Sanggom. This area is the closest area to the government centre of Brebes Regency. Easy access to transportation as well as being the main route between districts/provinces, makes the region more developed and has a lower poverty rate.

Whereas for villages in high-low or low-high clusters where villages with low Poverty are neighbours to villages with high Poverty or vice versa, the government must provide programs or activities that build cooperation between these villages. This is in line with Village Law No. 6 of 2014 concerning Villages, namely article 91 which explains that villages can collaborate with other villages and/or with third parties. So that there can be exchanges both in terms of knowledge, economics or other aspects that make the economy or welfare more evenly distributed in the village.

It is hoped that the grouping and concentration of spatial patterns of Poverty in Brebes Regency can be used as a basis for making policies that are right on target according to priorities in villages that have high Poverty. Village development should have a strong development plan for assessing the village's potential so that implementation can be measured according to the results expected by policy recipients and village development policy makers.

Spatial Diversity Analysis of the Effects of Implementing the Use of Village Funds and Factors in the Number of MSMEs on Poverty in Brebes Regency

Based on the Geographically Weighted Regression (GWR) analysis results, a different R^2 distribution value was obtained for each village. local R^2 values range from 0.062262 – 0.659036 (figure 3). This value indicates that 6.2-65.9 percent of the diversity of poverty rates in Brebes Regency can be explained by the independent variables used in the model, while other variables outside the model explain the rest. The value of the coefficient of determination (R^2) is a description of the suitability of a model. The higher the coefficient of determination (R^2) value, the better the model (Musahara *et al*., 2014).

Furthermore, the results of the GWR analysis on the variables that are thought to have an influence on Poverty in Brebes Regency show a varying effect on each observed location. The variation in the coefficient values varies in the significance test (significant test) at the 0.05 level. In Table 3 each variable has a 3-way influence, namely some areas have a negative coefficient value and some others have a positive coefficient value. Negative coefficient values can be interpreted as influences that can reduce Poverty, while positive coefficient values indicate influences that can increase Poverty. The minimum and maximum coefficient values and the distribution of the significance level of each variable resulting from the GWR estimation can be seen in Table 3.

Table 3. Coefficient Value and Distribution of Significance Levels of Variable GWR Estimation Results

Parameter	GWR Parameter Coefficient		Significant Number of Villages (Real Test 0.05)	
	Minimum	Maximum	Positive coefficient	Negative coefficient
Intersep	0,06226243	0,659038262		
BPPHi	-0,0322441*	0,016804564	142	156
BPPNi	-0,003328*	0,004192762	238	60
BPKMSi	-0,0165688*	0,024823423	142	156
BPMKTi	-0,004121*	0,016848818	274	24
BPBKDi	-0,0094725*	0,002157281	217	81
UMKMi	-0,0185775*	0,124183018	227	71

Description *= Following the research hypothesis

In the significance test with a significant level of 0.05 in each GWR parameter coefficient, all of them are in accordance with the research hypothesis with a negative value. This means that the greater the variable value, the smaller the poverty rate. Based on Table 3, it can be seen specifically that the influence of the variables with the largest area coverage in reducing Poverty are the variables BPPPHi (spent for village government administration) and BPKMSi (spent for village community development) with a total of 156 village. While the smallest area coverage is the BPMKTi variable (village community empowerment expenditure) of 24 villages. Among the variables that can reduce Poverty, the variable that has the most significant effect on reducing Poverty in Brebes Regency can be seen from the highest minimum coefficient value. The minimum coefficient is the largest negative coefficient value, meaning it has the greatest negative influence or influence that can reduce Poverty. The distribution map of the variable coefficient values can be seen in Figure 4.

Based on these results, the Village Government Administration Expenditure variable (BPPHi) has a coefficient value of -0.032244. This shows that each additional unit of the BPPPhi ratio will reduce Poverty by 0.032244 percent assuming all variables are ceteris paribus. Likewise with other variables, the effect on reducing the poverty rate is in accordance with the value of each coefficient. Furthermore, let's look at the distribution of villages that have negative coefficient values or in the sense that they can reduce the poverty rate in each variable. They have a different distribution (Lewis, 2014). This means that each variable has a different level of effectiveness in each village. From these results we can also obtain which variable is more suitable to increase or add value to each village.

The results of the GWR analysis can also be concluded that the effect of each variable on Poverty varies in each village area depending on the coefficient value and the affected village area. Therefore poverty alleviation policies through managing village funds should also be adapted to the needs of each region. These results can be used as evaluation material by the Brebes Regency government or used as a basis for policy making in the distribution of amounts for each village fund expenditure according to the specific characteristics of the village.
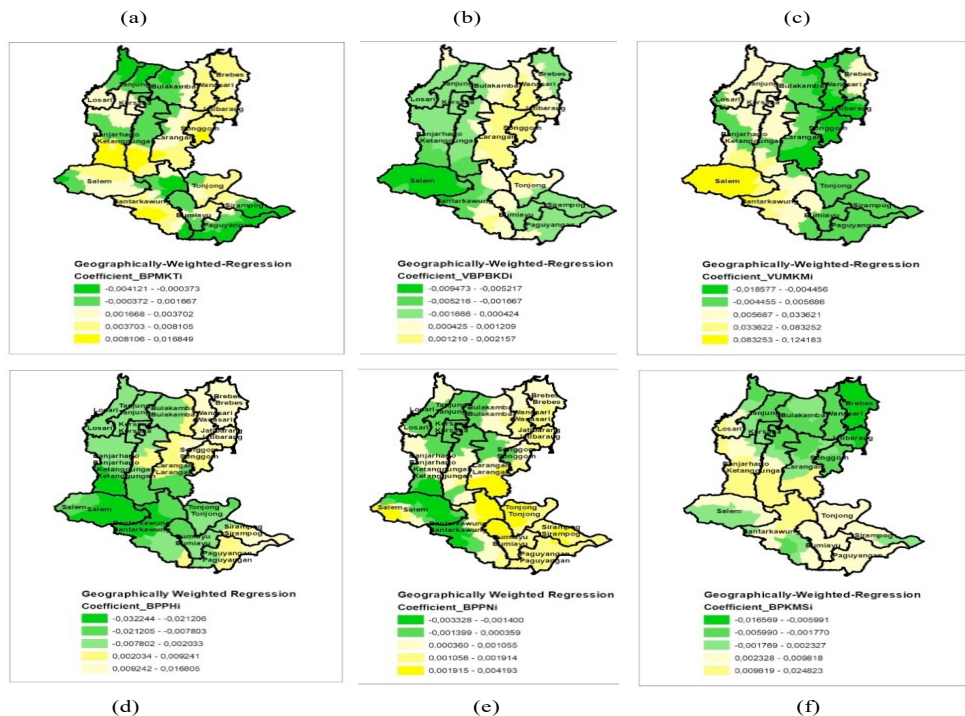
Figure 4. Map of Distribution of Variable Coefficient Va

4. Conclusion

The study's results illustrate a relationship between villages as indicated by the Moran Index value of 0.509409 which indicates a positive autocorrelation or clusters. This value indicates that adjacent villages have relatively the same characteristics. The Lisa test illustrates the spatial pattern of Poverty that is clustered into four poverty criteria, namely 40 villages with high-high criteria, 69 villages with low-low criteria. A total of 6 villages are low-high and 3 are high-low criteria. Based on the results of the GWR analysis, it was also found that all the variables tested, namely spending on village funds and the number of MSMEs in each village, significantly reduced Poverty at a significant level of 0.05 in several villages.

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