

THE CONTRIBUTION OF GIS IN INCREASING THE RESILIENCE OF BUMDES-BASED CREATIVE INDUSTRIES DURING THE COVID-19 PANDEMIC

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Abstract: Village Owned Enterprises (BUMDES) is legal entities formed by and for villages to manage enterprises and engage in various types of business for the best possible welfare of the village community. According to evaluations, most BUMDES were assumed to has declined in profit due to COVID-19 pandemic, and more than 45% of BUMDes having difficulties to survive. The purpose of this research is to investigate the state of BUMDES during and before the pandemic, this includes the issue of vulnerabilities for support recovery, as well as strategies on recovery both for the short and medium term. The research constructed on a literature review followed by initial investigation. The results of the questionnaire-based survey reflected the state of BUMDES and were presented in spatial distribution. The data analysis revealed that the COVID-19 outbreak had no major impact on BUMDES overall performance. Furthermore, finding based on BUMDES interview data, more than 75% respondent indicating that the pandemic had no influence on BUMDES performance. The findings also demonstrate that BUMDES could be labelled as small firm with great resilience (tangguh) in the presence of external conditions.

Keywords: *BUMDES, COVID, GIS, resilience*

1. Introduction

Village Owned Enterprises (BUMDES) are legal entities established by villages and with villages to manage businesses, utilize assets, develop investment and productivity, provide services, and provide other types of businesses for the most excellent welfare of the community village. The existence of BUMDES has had a positive impact on village communities and is recognized by various parties as being able to provide new business opportunities and educators. BUMDES also contribute to the village's original income opinion/PAD. Moreover, BUMDES also increases people's productivity and reduces consumption levels, it becomes a village economic institution that can contribute to improving the local and regional economy within the scope of the national economy and there are many more benefits from BUMDES businesses.

However, currently, as a result of the COVID-19 pandemic, the performance of most BUMDES has decreased, and more than 45% of BUM Des are experiencing business difficulties. The pandemic has impacted internal management and the supply chain supporting BUMDES. One of them is the tourism sector which has experienced a very

significant decline in performance. Of course, this cannot be ignored, a solution is needed to overcome it, determine recovery methods, both in the short, medium and long term. However, the food crops and plantations sub-sector was not significantly affected during the Covid-19 pandemic, as evidenced by the relatively controlled inflation rate of food product prices. In addition to looking at individual BUMDES performance, the spatial performance also needs to be considered to be able to see development potential based on regional and demographic structure around BUMDES. Regional analysis requires assistance in the form of a Geographic Information System (GIS). This research aims to map the condition of BUMDES during and before the pandemic and map opportunities for recovery support.

2. Literature Riview

2.1 BUMDES in the Village Economic Framework

2.1.1 BUMDES in Contribution to Village Progress

Village-Owned Enterprises, referred to as BUMDES, are legal entities established by villages and with villages to manage the business, utilize assets, develop investment and productivity, provide services, and provide other types of businesses for the most excellent possible welfare of the village community. The main objectives of establishing BUMDES are: (1) Improving the village economy; (2) Optimizing village assets so that they are helpful for village welfare; (3) Increasing community businesses in managing village economic potential; (4) Developing business cooperation plans between villages and third parties; (5) Creating market opportunities and networks that support the general needs and services of citizens; (6) Creating employment opportunities; (7) Improving people's welfare through improving public services; growth, and equal distribution of the village economy; and (8) Increasing village community income and original village income.

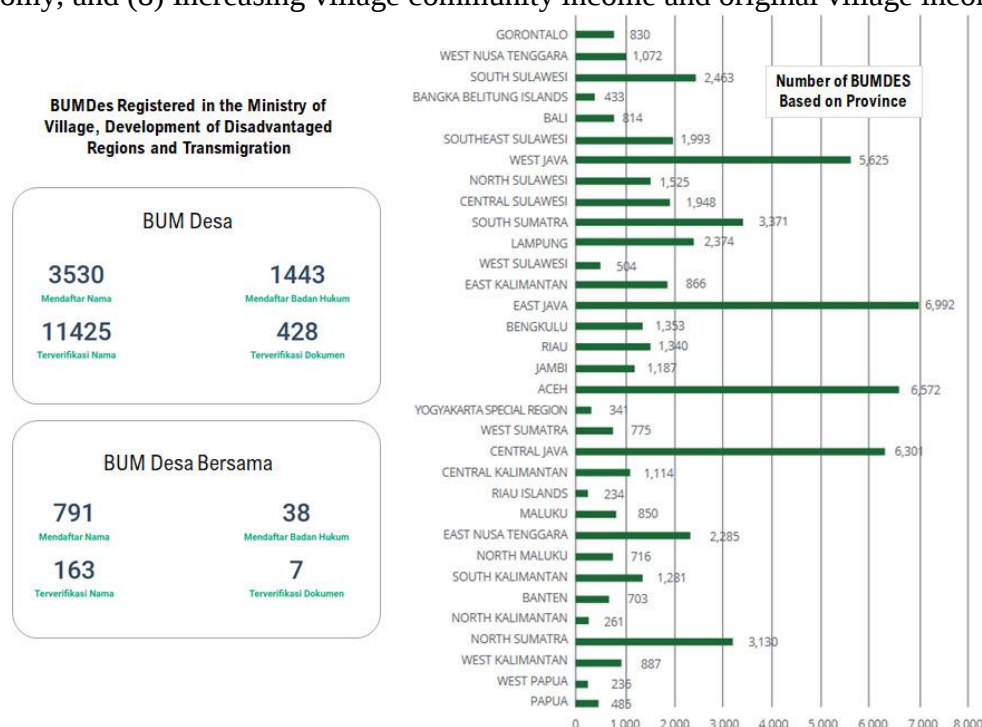


Figure 1 Development of the number of BUMDES and Joint BUMDES

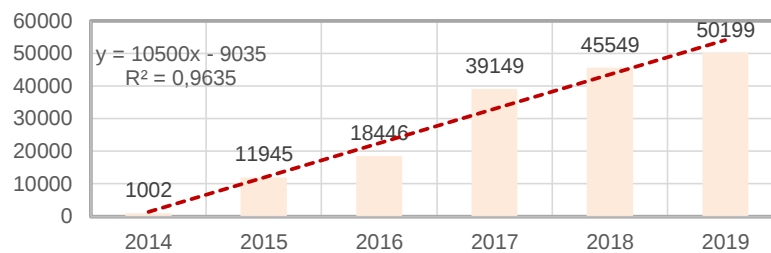


Figure 2 Growth in the number of BUMDES per year

There are 11,425 BUMDES and 163 Joint BUMDES (Figure 1) whose names have been verified by the Ministry of Villages, PDT and Transmigration. Some are still being established, so more than 17% of villages in Indonesia have BUMDES (a ratio of 66,088 villages in Indonesia). With a growth of 2.57% per year (as depicted in Figure 2), 43% of their business is running well and can benefit the village. Of the 43% of BUMDES that have been operating, they generally provide benefits and increase the welfare of the village community. However, not significantly and have received a positive response from the community. The existence of BUMDES within the framework of village progress will make a positive contribution in the form of as a source of village income, meeting community needs, and developing an independent village.

2.1.2 Development of BUMDES During the COVID-19 Pandemic

All countries, including Indonesia, felt the economic impact of the COVID-19 pandemic. Economic conditions (GDP data) in the fourth quarter of 2020 for all countries fell (Figure 3); the worst conditions experienced by Peru fell by -30.2%, and Indonesia fell by -5.4%. This impact affects all business sectors, including the business sector in rural areas including BUMDES. However, the agricultural sector is still experiencing a positive trend in the second quarter during the Covid-19 pandemic. It has the opportunity to become a mainstay sector to lift Indonesia's economy, which has fallen into a period of economic recession due to the Covid-19 pandemic.

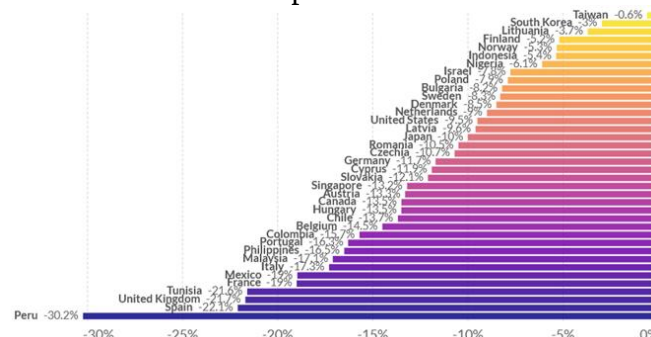


Figure 3 Economic decline in the fourth quarter of 2020

2.2 Public Value as a Measuring Tool for BUMDES Health

Many factors, of course, influence the success of BUMDES in overcoming crises. Four dimensions need to be considered by BUMDES to develop correctly and be resilient in facing various crises: legitimacy/support factors, operational capacity, governance, and administration.

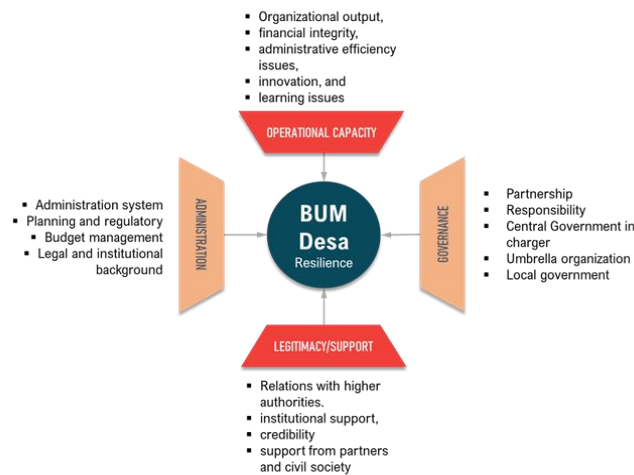


Figure 4 Public value for BUMDES resilience

This concept is called public value. Based on this view of governance and administration, several things need attention are :

1. Governance: partnerships and responsibilities of each village company, responsible ministries, umbrella organizations, and regional and local governments.
2. Administration: The entire administrative system, including planning policies and regulations, budget management, and legal and institutional background.

Meanwhile, from the point of legitimacy/support and operational capacity, several things must be considered are:

1. Legitimacy/support: Relations with higher authorities, institutional support, credibility with community business actors and umbrella organizations, and support from partners and civil society.
2. Operational capacity: organizational output, financial integrity, administrative efficiency issues, innovation, and learning issues.

The assessment of the resilience of BUMDES with a public value approach is then compiled in a matrix framework as shown in Figure 5.



Figure 5 BUMDES resilience assessment conceptual framework

3. Research Method

3.1 Research Location Characteristic

The BUMDES, the object of research, is the BUMDES engaged in agriculture in Indonesia. The distribution of BUMDES based on the number and type of agricultural businesses can be seen in Figure 6 and Figure 7.

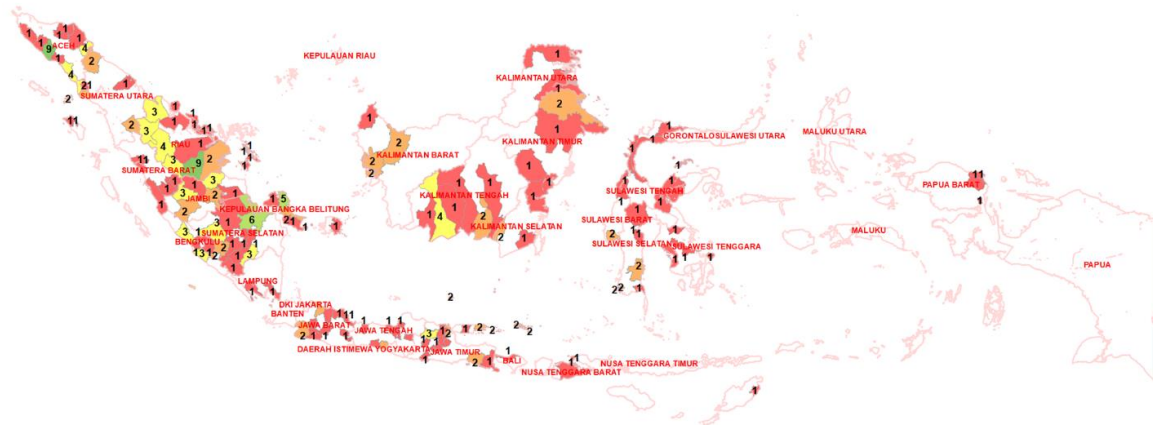


Figure 6 Thematic Map of the Distribution of the Number of Agricultural BUMDES by District



Figure 7 Thematic Map of Agricultural BUMDES Locations by Type of Business

3.2 Research Flow

Research begins with an in-depth study of the material through literature reviews (GIS, BUMDES, and supply chain) and an initial analysis of secondary data (BUMDES data, distribution, and characteristics). From the literature review results, a questionnaire will be designed to further explore the performance of BUMDES both before and during the pandemic. The questionnaire results are then processed to photograph the condition of BUMDES along with its spatial distribution. Finally, it will examine the spatial relationship between the pandemic and the performance of BUMDES and provide recommendations for resilience recovery. The research flow is described in the form of a flowchart, as shown in Figure 8.

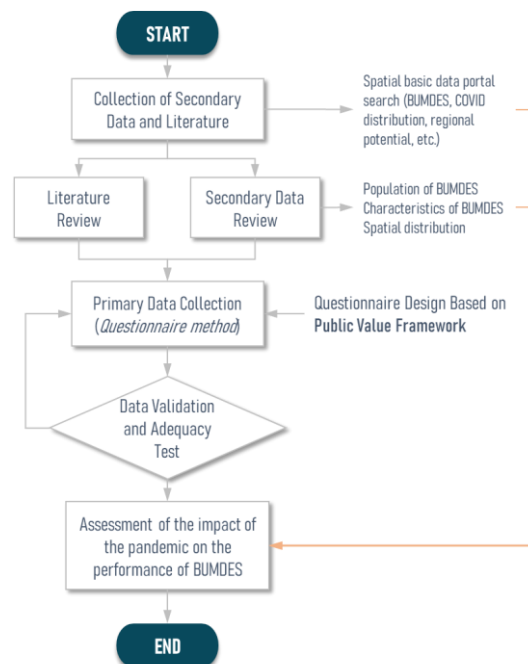


Figure 8 Flow chart of Research Implementation

3.2.1 Data Collection Method

a) Literature Data

Search Data Library based on the roadmap of research members. Library keywords are Geographic Information System (GIS), BUMDES (village enterprise), supply chain, and the COVID-19 pandemic. Some of the relevant literature is then reviewed by the researcher. Libraries are collected from trusted sources, journals and proceedings with good reputations. Secondary data from regulations and the results of government studies also become input material in the analysis.

b) Secondary Data

Data Initial data on BUMDES characteristics will be traced from various sources such as the website/portal of the Ministry of Villages, PDT and Transmigration (<https://bumdes.kemendesa.go.id/>); Bumdes. Id (<https://bumdes.id/id/>), One Data Indonesia (<https://data.go.id/>), and other related portals. The technique of obtaining data utilizing data crawl. Other secondary data is spatial data in the form of Indonesian Topographical Map data (RBI) as primary data for BUMDES mapping. This data was obtained through the Indonesia Geoportal website (<https://tanahair.indonesia.go.id/portal-web>), Indonesian village potential data (source from the Central Bureau of Statistics), and several related spatial data provider sites such as OpenStreetMap (<https://www.openstreetmap.org>), google map, etc. Secondary data on the distribution level of COVID-19 cases per region is used for correlation analysis with the resilience of BUMDES. This data comes from various sources by way of data crawling [10] and data digitization.

c) Primary Data

Primary data was obtained from the data collection results with the questionnaire method. The questionnaire design refers to the public value. Questions in the questionnaire will concern the detailed characteristics of BUMDES, governance and

administration, legitimacy and support, and operational capacity. Primary data collection will be carried out electronically by utilizing the Google form; the questionnaire link will be distributed to all BUMDES, which are recorded on bumdes.id.method of determining the number of samples Slovin with a minimum margin of error of 5%.

3.2.2 BUMDES toughness analysis

In the activities to measure the resilience of BUMDES during a pandemic, an in-depth interview method was used based on public value. Public value variables are used as material in in-depth interviews with sample BUMDES. The resilience of BUMDES to a pandemic is also measured by the correlating approach between the growth of the Gross Regional Domestic Product (GRDP) in the BUMDES sector and COVID cases in the BUMDES district, assuming that COVID cases correlate to the GRDP of the BUMDES sector.

4. Results and Discussion

Data collected from primary data are interviews with BUMDES engaged in the agricultural sector through online forms and in-depth interviews. In-depth interviews were conducted with a sample of BUMDES Binangun Jati Unggul Jatirejo, a village-owned enterprise in the Jatirejo Village Hall Complex, Lendah District, Kulon Progo Regency. Currently, BUMDES Binangun Jati Unggul Jatirejo has two business units: the Financial Services Unit and the Agricultural Trade and Production Unit. The types of activities of the Financial Services Unit include Savings and Loans Services. In contrast, products produced by the Agricultural Trade and Production Unit include the Production of Superior Teak Rice, sold through stalls/shops and Tomira, planting of productive crops (ginger and bananas), selling parcel packages, and other MSME products. The results of in-depth interviews can be summarized in Table 1.

Table 1 Results *In-depth Interview*

PARTNERSHIP BUMDES			
PARTNERSHIP CRITERIA	JUSTIFICATION		
	YES	NO	DOUBTFUL
Partnership with Kemendesa	☒		
Partnership with bumdes.id	☒		
Support from the provincial government	☒		
Support from the districts government	☒		
Support from the village government	☒		
Digital platform ownership	☒		

MANAGEMENT AND SUPPORT					
MANAGEMENT AND SUPPORT CRITERIA	JUSTIFICATION				
	SA	A	N	DA	SD
Use of technology in financial management		☒			
The existence of a BUMDES management planning policy		☒			
Budget management properly	☒				
Risk management	☒				
Regular tax payments	☒				
Get support from the government	☒				
Get funding support from financial institutions			☒		

Pemdes acceptance of the existence of BUMDES	☒				
Village government creates a good environment for BUMDES ?	☒				
Local community support	☒				
Regularity in product development	☒				
Improvement in the last 5 years	☒				
Good Financial capabilities		☒			
System administration with IT		☒			
Reputation as an innovator			☒		
BUMDES activity	☒				
Employee carry out business operations well	☒				
The financial capability of BUMDES is good	☒				

PRODUCT AND PANDEMIC RESISTANCE			
CRITERIA PRODUCT AND PANDEMIC RESISTANCE	JUSTIFICATION		
	Easier	Just The Same	Harder
Acquisition of raw materials during a pandemic		☒	
Productivity during a pandemic		☒	
Marketing during a pandemic		☒	

The results of the in-depth review also have similar results to the results of online filled out by several BUMDES in the agricultural sector. The questionnaire results are mainly related to the effect of the pandemic on the acquisition of raw materials and products, which can be seen in Figure 9. BUMDES in the agricultural sector did not experience a significant influence during the pandemic in terms of obtaining raw materials and their productivity. This condition indicates that the agricultural sector (food crops) has relatively good resilience during the pandemic.

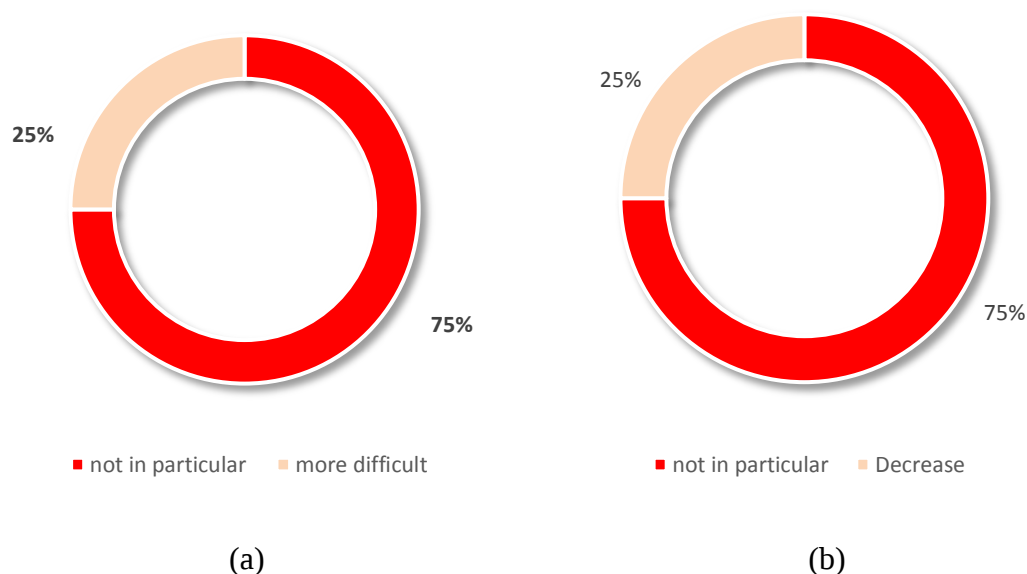


Figure 1 BUMDES Questionnaire Results on Pandemic Resilience
 (a) Difficulties in Obtaining Raw Materials (b) BUMDES Productivity

The analytical approach used to determine whether a pandemic affects BUMDES productivity is to analyze the effect of the number of pandemic cases on GRDP growth on the type of BUMDES business. The data obtained for analysis is several 200 BUMDES with a distribution of locations throughout Indonesia with various types of agricultural commodities. Data amount of exposure to COVID-19 is crawled from the official website of each district government location of BUMDES as a variable for the influence of COVID. GRDP data is GRDP data for 2015 to 2021 from BPS for the regency government in the BUMDES location. The initial analysis results can be seen in Figure 10, and a scatter plot between the number of COVID-19 and GRDP growth over the last five years for the BUMDES business type.

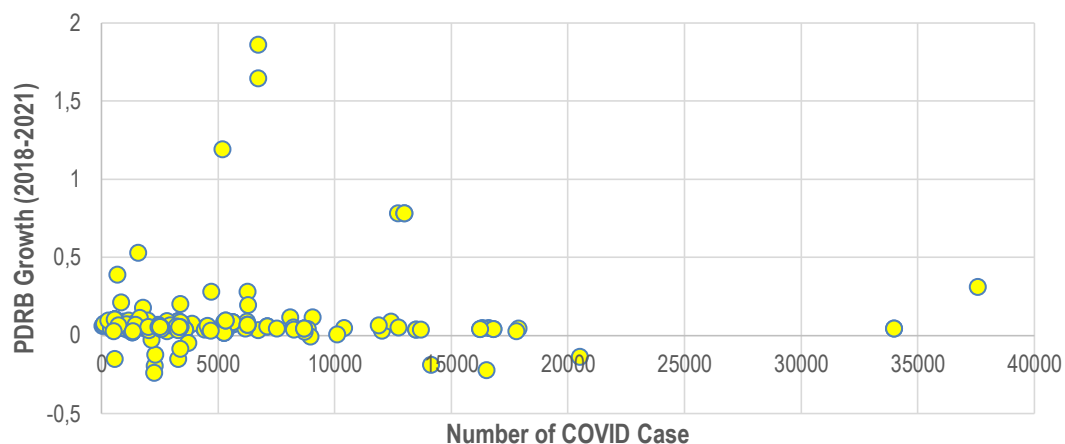


Figure 2 Scatter Results Between the Number of COVID Cases Location of BUMDES and GRDP Growth Based on Type of BUMDES Business

From the plotting results, the number of COVID cases has no correlation to GRDP growth in the BUMDES business type. This fact is indicated by the R-value of only 0.075, meaning that the number of cases exposed to COVID is also not correlated with GRDP. It is close to zero.

5. Conclusion

The results showed that BUMDes engaged in the agricultural sector were not affected by the COVID-19 pandemic. They were proven by the absence of a decrease in income, BUMDES productivity or difficulties in supplying raw materials during the Covid-19 pandemic. It is just that there are constraints in the distribution of processed products from BUMDES due to social restrictions on a national scale, so product distribution is limited to small regional units and not can reach distribution between Provinces. The results of the correlation between COVID cases in the BUMDES district also did not significantly affect GRDP in the BUMDES sector.

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