



A Multidimensional Poverty Analysis In Madura Island, 2023

Wedi Mustamulari ¹, Rudi Purwono ²

¹*Department of Economics, Faculty of Economics and Business, Airlangga University, Indonesia*

²*Faculty of Economics and Business, Airlangga University, Indonesia*

Email: ¹ wedi.mustamulari-2023@unair.ac.id; ² rudipurwono@feb.unair.ac.id

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ABSTRACT

This quantitative study aims to analyze the determinants that influence the probability of multidimensional poverty among households on Madura Island in 2023. Using SUSENAS data and the Alkire-Foster (AF) Method, this study confirms that the multidimensional poverty rate in this region remains high. Logistic Regression Analysis identified key factors: Non-Cash Food Assistance (BPNT) proved to be significant and negative, confirming its effectiveness as a social safety net. The most crucial finding is the role of access to formal financial services (People's Business Credit and Cooperative Credit), which significantly and negatively affects the probability of multidimensional poverty, making it the most vital determinant in reducing deprivation. In addition, the marital status of the head of household (KRT) has a negative and significant effect, while the number of household members has a positive but insignificant effect. In conclusion, to overcome multidimensional poverty in Madura in the post-pandemic period, policies must focus efforts on massively expanding access to KUR and Cooperative Credit as an effective and sustainable economic empowerment strategy, while maintaining the continuity of social assistance.

INTRODUCTION

Global poverty measurement, according to the World Bank (2023), is defined by setting a monetary threshold that reflects the minimum income at which a person's basic needs cannot be met, while taking into account the specific social and economic context of a country. This standard includes several levels: the standard international poverty line of USD 3.00 per day (reflecting the poorest countries), as well as higher levels of USD 4.20 (lower-middle-income countries) and USD 8.30 per day (upper-middle-income countries). Although the global monetary indicator, which previously often referred to the threshold of USD 1.90 per day, has become a common reference, this approach, which focuses solely on income, has been deeply criticized.

The main criticism of the monetary approach comes from Sen (1999), who argues that poverty should be understood as a deprivation of capabilities, rather than simply a lack of income. His concept of capabilities highlights the importance of individual freedom to choose and the ability to achieve things that are essential for well-being, such as health, education, and social participation. The debate over how to measure poverty continues; while monetary approaches that focus on expenditure are easy to analyze quantitatively, Amartya Sen also emphasizes that income is only one dimension. Therefore, poverty alleviation policies and the understanding of welfare must shift from narrow economic issues to complex and multidimensional phenomena, taking into account other dimensions such as access to social services, freedom of expression, and political participation simultaneously.

The initial argument for understanding poverty beyond its monetary dimension has long been put forward. Townsend (1979) emphasized that poverty should be measured based on an individual's inability to achieve a socially recognized minimum standard of living, which includes limitations on participation in community life, not just material aspects. In line with this view, Alkire & Santos (2014) criticized the monetary approach for oversimplifying and homogenizing consumption patterns, given that not all essential needs can be measured or obtained solely with money. As a solution, multidimensional approaches, such as those developed in the form of the Multidimensional Poverty Index (MPI) or the Alkire-Foster (AF) Method, measure poverty directly through dimensions such as education, health, and quality of life.

Empirical support for the superiority of the multidimensional approach (MPI/AF) is reinforced by a number of studies in Indonesia. Artha & Dartanto (2018) found that the monetary poverty approach, which focuses only on household consumption and income, is unable to comprehensively explain the various forms of deprivation experienced by the community. Furthermore, Artha & Misdawati (2023) explicitly stated that multidimensional poverty measurement is a significant improvement over the limitations of income- and expenditure-based monetary measurement. This view is supported by Beribe & Budyanra (2023), who argue that by measuring poverty multidimensionally, the government can gain a deeper and more comprehensive understanding of the function of providing minimum physical needs for households. Collectively, these findings emphasize the importance of MPI/AF in directly assessing deprivation, providing a more accurate picture of the shortcomings experienced by the community, which is an important basis for formulating targeted policies.

In the case of Indonesia, East Java province occupies a strategic position in the national poverty reduction agenda, given that this province has the second largest population in Indonesia. Although based on the BPS (2024) report, East Java is known as one of the centers of national economic growth with a diverse economic structure (agriculture, industry, tourism). However, the significant growth recorded in recent years has not been matched by a proportional decline in poverty rates (Fauzi, 2023). This fact creates a striking contradiction: East Java is the province with the highest number of poor people on the island of Java, reaching 4.18 million people (BPS East Java, 2025b). The gap between rapid economic growth and uneven distribution of welfare is exacerbated by the concentration of extreme poverty in certain areas. Ironically, Madura Island dominates the top 10 poorest regions in East Java, which shows that the province's wealth is not effectively trickling down to these areas. In addition, weaknesses in governance, such as inefficiency and corruption issues in the distribution of social assistance (especially after the COVID-19 pandemic), have further deepened this poverty gap. Therefore, this structural inequality requires a much more in-depth analysis of poverty, not only limited to monetary dimensions, but also a multidimensional perspective, with Madura Island as the main focus area for policy intervention.

Although East Java (Jatim) has an overall poverty rate of 10.35%, this poverty rate is still relatively high and poses a serious challenge that requires appropriate, targeted, and sustainable policies from the local government. The need for specific interventions is evident from the highly unequal distribution of poverty in East Java, where Madura Island dominates the top ten poorest

regions. Specifically, all districts in Madura are in the top ten: Bangkalan (21.76%), Sampang (19.35%), and Sumenep (18.7%) occupy the top three spots, while Pamekasan (13.85%) is in seventh place (BPS Jatim, 2025). These findings indicate that Madura is the main contributor to East Java's poverty rate, highlighting the urgency to understand and address deprivation in the region in detail.

Given these conditions, poverty reduction strategies must use a more accurate approach, such as the Alkire-Foster (AF) Method. The AF approach is very important because it not only identifies who is poor, but also directly reveals the specific dimensions that cause deprivation (Alkire & Seth, 2015). For example, deprivation in education or health can be addressed by focusing on improving infrastructure and services in the relevant sectors, so that poverty reduction strategies become more targeted and have a broader impact. Although there have been many studies on multidimensional poverty measurement in Indonesia (e.g., Aidha et al (2020) and Artha & Misdawati (2023)), most of these studies are still general in nature or only focus on conditions after the COVID-19 pandemic. This study seeks to fill this gap by focusing specifically on Madura Island, an area that contributes most significantly to poverty rates in East Java but has not been studied in depth, and by conducting a comparative analysis of multidimensional poverty after the pandemic (in 2023), including the role of government interventions such as the Family Welfare Card (KKS), Family Hope Program (PKH), and Non-Cash Food Assistance (BNPT) and the dimension of access to formal financial services such as People's Business Credit (KUR) and cooperative credit.

LITERATURE REVIEW

Research on the determinants of household poverty has been conducted extensively in various countries, often comparing monetary and multidimensional approaches. Studies in Nigeria using the Alkire-Foster Method and logistic regression show that household size consistently has a positive effect on the likelihood of multidimensional poverty, indicating that the larger the number of members, the more vulnerable the household. However, the influence of other micro-level independent variables varies; for example, the gender and education level of the Head of Household (HoH) were found to be significant by Adeoti (2014) and Amao et al. (2017) but not significant in the study by Adepoju & Oyewole (2020). Consistency was found in a comparative study in the Philippines (Bautista, 2017), where HOH education had a negative effect (the higher the education, the lower the probability of poverty) and household size had a positive effect on poverty, both in the multidimensional and monetary approaches. In addition to micro factors, a macro study in Taiwan showed that socioeconomic status and household income have a negative effect on multidimensional poverty (Chen et al., 2019).

Although multidimensional poverty measurements have been widely analyzed in Indonesia (Aidha et al., 2020; Artha & Misdawati, 2023; Beribe & Budyanra, 2023), most studies tend to focus on post-COVID-19 pandemic conditions and often neglect to analyze the role of government interventions such as the Family Hope Program (PKH) and Non-Cash Food Assistance. This study attempts to fill this gap by not only calculating the multidimensional poverty rate, but also explicitly conducting a comprehensive comparison between conditions before and after the COVID-19 pandemic to evaluate the effectiveness of government interventions. In addition, this study expands the framework for analyzing determinants by including important dimensions, namely access to formal financial services (through the People's Business Credit/KUR and cooperative credit indicators), marital status, and number of household members, in order to provide more specific insights into the dynamics of poverty.

METHODS

This study uses a quantitative approach, combining descriptive and inferential analysis. Descriptive quantitative analysis was conducted using the Alkire-Foster (AF) Method to calculate the level and characteristics of multidimensional poverty among households on Madura Island. Meanwhile, inferential quantitative analysis used the Logistic Regression Model (Logit) to identify the determinants that influence the probability of households experiencing multidimensional poverty. Logit regression was chosen because the dependent variable is binary (two categories): multidimensional poor households (valued at 1) and non-multidimensional poor households (valued at 0).

The data used is micro secondary data from the National Socioeconomic Survey (SUSENAS) published by the Central Statistics Agency (BPS) for 2023. This data covers the entire Madura Island region (Bangkalan, Sampang, Pamekasan, and Sumenep districts). Data processing techniques involve filtering microdata at the household level to ensure the completeness and relevance of the required variables. The analysis process begins with calculating the Multidimensional Poverty Index (MPI) using the AF Method, followed by testing the data using the Logit Model.

Calculation of the Multidimensional Poverty Index (MPI)

The calculation of the IKM for households uses 10 indicators spread across three main dimensions: Education, Health, and Quality of Life. Each indicator is a dummy variable with a value of 1 (deprivation) and 0 (no deprivation). Households are categorized as multidimensionally poor if their cumulative deprivation score (multiplied by their respective weights) is greater than or equal to 0.3333 (k threshold).

The Education dimension consists of two indicators, each with a weight of 1/6, namely Length of schooling (below junior high school/equivalent) and School participation (ages 7-18 not attending school). Health consists of the indicators Health insurance (not having) with a weight of 1/6 and Immunization (toddlers not receiving) which also has the same weight. Next is the Quality of Life dimension, which consists of 6 indicators, each with a weight of 1/18, namely Sanitation, Drinking water, Cooking fuel, Roof, Walls, and Flooring (all assessed based on minimum standards/suitability).

Logit Regression Model Variables

The Logit model was used to analyze the determinants of multidimensional poverty, with the dependent variable being Multidimensional Poverty Status (1=Poor, 0=Not Poor). The independent variables included household characteristics and the impact of policy interventions:

Table 1. Logit Regression Model Estimation Results

Independent Variables	Pengukuran (Variabel Dummy, Kecuali Jumlah Anggota)
Government Intervention	Social Assistance KKS (1=Received, 0=Not Received)
	Social Assistance PKH (1=Received, 0=Not Received)
	Social Assistance BPNT (1=Received, 0=Not Received)
Financial Access	People's Business Credit/KUR (1=Receiving, 0=Not receiving)
	Credit from Cooperatives/KOP (1=Receiving, 0=Not receiving)
Demographics & Social	Marital Status of Prosperous Families/SPKRT (1=Married, 0=Other)
	Number of Household Members/JART (Numeric, unit: persons)

The Logit model is used to predict the probability of households becoming multidimensionally poor. The Logit regression model used in this study is:

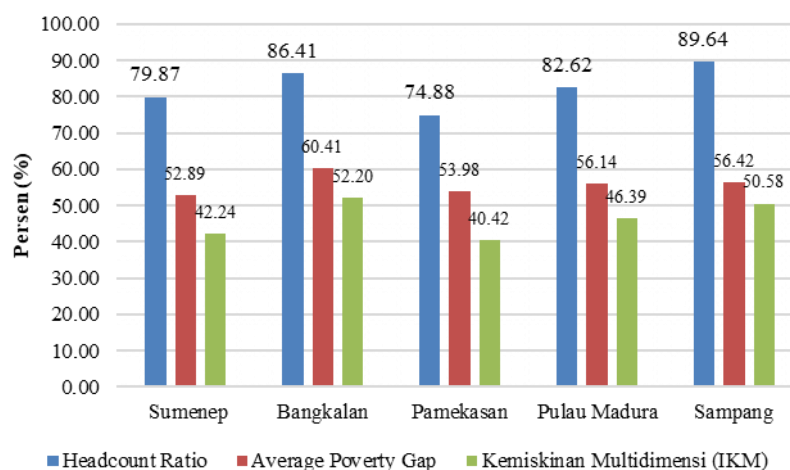
$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = B_1 + B_2 X_i \quad (3)$$

Where P_i is the probability of a poor household, and L_i is the log odds ratio that is linear in the independent variable (X_i) and parameter (β).

RESULTS

This analysis presents a comprehensive overview of the level and dimensions of multidimensional poverty on Madura Island in 2023, based on two main sets of findings: poverty index measurements and the identification of deprivation per indicator. Figure 1 presents the aggregate Multidimensional Poverty Index (MPI) and its components, namely the Headcount Ratio (H) and Average Poverty Gap (A), which are analyzed comparatively across four districts. Furthermore, Figure 2 presents details of the level of deprivation per indicator in three main dimensions-Education, Health, and Quality of Life-which serve as the basis for understanding the root causes of the high MPI.

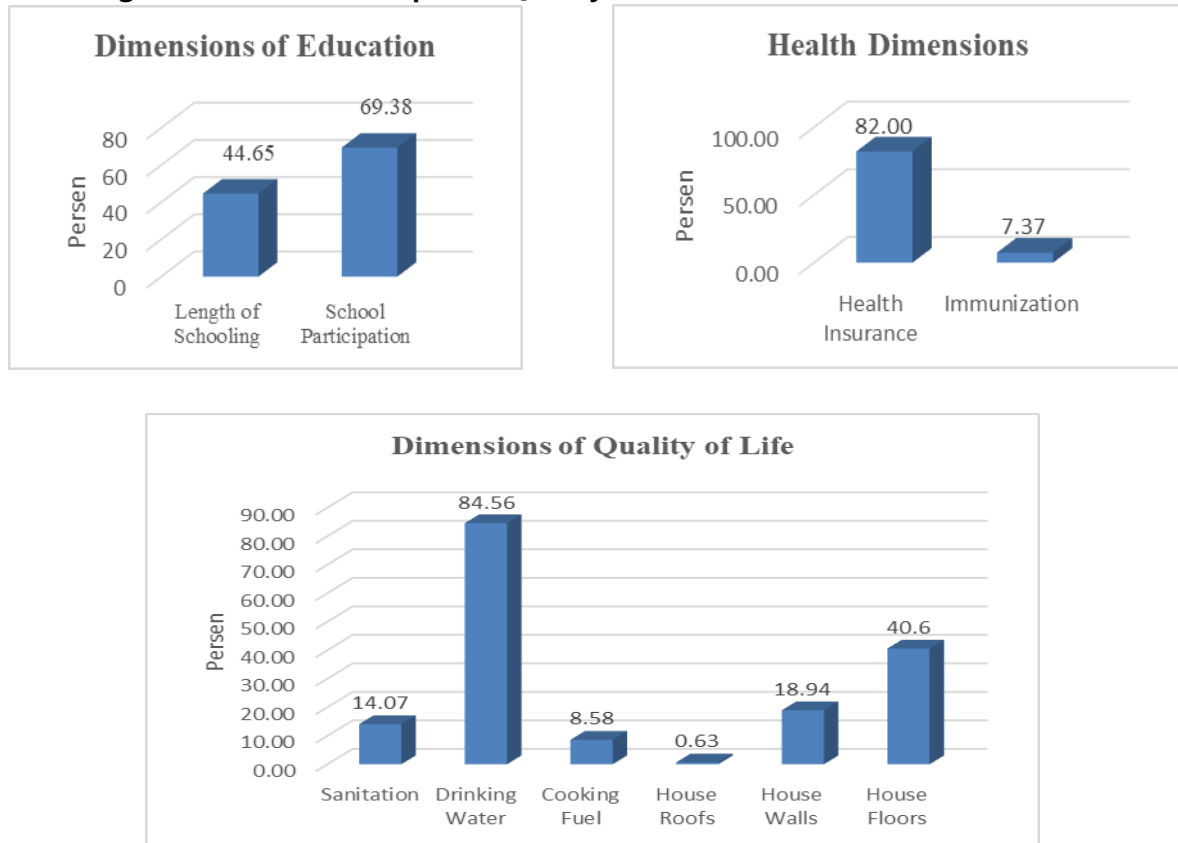
Figure 1. Key indicators in measuring poverty on Madura Island in 2023



Source: Stata 17. Processed

Based on multidimensional poverty measurement data for 2023, it appears that Sampang Regency has the highest poverty vulnerability rate on Madura Island, as indicated by a Headcount Ratio (H) of 89.64%. This figure shows that nearly 90% of the population in Sampang is identified as multidimensionally poor. This high figure, combined with an average deprivation intensity (Average Poverty Gap-A) of 56.42%, results in the second highest Multidimensional Poverty Index (MPI) in Madura, which is 50.58%.

Conversely, despite having a slightly lower Headcount Ratio (86.41%), Bangkalan Regency recorded the highest IKM, namely 52.20%. This is due to the intensity of deprivation experienced by the poor in Bangkalan (Average Poverty Gap A = 60.41%) being much higher than in the other three districts, indicating that the poor in Bangkalan tend to experience more and more severe dimensions of poverty. Overall for Madura Island, 82.62% of the population is identified as multidimensionally poor (Headcount Ratio). With an average poverty intensity of 56.14%, The Multidimensional Poverty Index (MPI) for Madura reached 46.39%. Meanwhile, Pamekasan Regency recorded the lowest MPI (40.42%), supported by the lowest Headcount Ratio (74.88%) and the lowest deprivation intensity (53.98%), indicating that Pamekasan is the region with the lightest level and depth of multidimensional poverty on Madura Island.

Figure 2. Human Development Quality Indicators on Madura Island in 2023

Source: Stata 17. Processed

Analysis of the dimensions that make up human development quality shows significant disparities in deprivation levels on Madura Island in 2023. In general, the Quality of Life dimension shows the highest level of deprivation. Nearly 84.56% of households experience deprivation in access to drinking water, making it the indicator with the highest level of deprivation among all dimensions. High levels of deprivation were also seen in access to adequate flooring (40.6%). In contrast, deprivation for the cooking fuel and roofing indicators was relatively low, at 8.58% and 0.63%, respectively.

In the Health Dimension, the highest deprivation is found in Health Insurance, with 82% of the population lacking health insurance. Meanwhile, deprivation in child immunization is at a very low level, at 7.37%. Furthermore, in the Education Dimension, although the deprivation rate for Length of Schooling reaches 44.65%, indicating that nearly half of the adult population has not completed the minimum required education, the most striking deprivation occurs in School Participation, which reaches 69.38%. This shows that most school-age children do not participate or are not enrolled in the education system. Overall, the main challenges of human development on Madura Island center on basic quality of life (particularly access to drinking water) and educational participation (nearly 70% of school-age children do not attend school), as well as universal access to health insurance (82% are not covered). The extreme difference between deprivation of drinking water (84.56%) and immunization (7.37%) indicates that development interventions must be specifically targeted at providing basic infrastructure and social facilities.

Logit Regression Model Estimation Results

Overall (simultaneous) statistical analysis using the G-test shows that all independent variables in the model have a significant effect on the dependent variable (multidimensional poverty status of households), because the p-value obtained is 0.000 (below $\alpha = 5\%$).

Table 2. Logit Regression Model Estimation Results

Variable	Coefficient	Std. err.
KKS	-0,0933	-0,0933
PKH	-0,4577	-0,4577
BPNT	-0,0913***	-0,0913
KUR	-0,6760***	-0,6760
KOP	-0,7836***	-0,7836
SPKRT	-0,3137***	-0,3137
JART	0,0117	0,0117
Constant	1,6464***	1,6464
LR Chi-Square		
Prob > chi ²		
Pseudo R ²		
Obs.	11.354	

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Stata 17. Processed

Furthermore, partial analysis using the Wald test revealed that not all independent variables had a significant effect. The variables that were proven to have a significant effect on multidimensional poverty status were BPNT, KUR, Credit from Cooperatives, and Number of Household Members (JART), while the Family Hope Program (PKH) was found to be insignificant. In terms of the direction of influence, JART is the only variable that has a positive effect, meaning that it increases the likelihood of multidimensional poverty in households, while KKS, PKH, BPNT, KUR, Credit from Cooperatives, and the marital status of the head of the household all have a negative effect (tending to reduce the likelihood of poverty). It is important to note that the coefficients generated from the logit regression model only indicate the direction of influence; therefore, to interpret the magnitude of the influence of the independent variables, it is necessary to use the values from the marginal effect.

Table 3. Marginal Effect Estimation Results

Variable	dy/dx	Std. err.
KKS	-0,0175	-0,0175
PKH	-0,0941	-0,0941
BPNT	-0,0169***	-0,0029
KUR	-0,1437***	-0,029
KOP	-0,1697***	-0,0346
SPKRT	-0,0583***	-0,0081
JART	0,0022	-0,0028
Obs.	11.354	

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Stata 17. Processed

Based on the results of the Marginal Effect estimation, it was found that the Kartu Keluarga Sejahtera (KKS) social assistance program had a negative effect on multidimensional poverty on Madura Island. Although this effect was not statistically significant, KKS consistently showed a tendency to reduce multidimensional poverty. Quantitatively, in 2023, KKS social assistance is estimated to have reduced the multidimensional poverty rate on Madura Island by 1.75 percent.

DISCUSSION

The results of the analysis show that the government's social assistance program (PKH) has a significant-albeit variable-impact on reducing multidimensional poverty in Madura. It was found that PKH has a negative effect on multidimensional poverty and is not statistically significant, but it substantially reduces the probability of multidimensional poverty by 9.41 percent. This finding is consistent with the literature showing the effectiveness of PKH in improving living standards (Khaliq & Uspri, 2017; Salam et al., 2021). The World Bank (2017) evaluation reported that PKH recipient households experienced an average monthly expenditure increase of 10% and a 3.3 percentage point increase in household spending, mainly allocated to highly nutritious food and health services. Although the program's impact on protein consumption is relatively small, its positive effect on health and living standards confirms its important role as a social safety net.

BPNT had a negative and significant effect on multidimensional poverty status in Madura Island in 2023, with a reduction percentage of 1.69 percent. This significant impact is in line with the findings of Khaliq & Uspri (2017) and Salam et al. (2021), who concluded that food assistance is effective in alleviating deprivation in the standard of living (consumption/food) dimension of poor households. Overall, although PKH provides a substantially greater percentage reduction, the statistical significance of BPNT shows that interventions that provide direct resource transfers (both cash and non-cash) remain key to mitigating multidimensional deprivation.

Two key determinants outside of social assistance—financial access and household characteristics—also show high effectiveness in mitigating poverty. Access to financial services has the strongest influence in reducing poverty. People's Business Credit (KUR) has a negative and significant effect, reducing multidimensional poverty by 14.37 percent in 2023. Similarly, Credit from Cooperatives had a negative and significant effect, with a higher reduction percentage of 16.97 percent. These findings are particularly important because they underscore that economic empowerment mechanisms (not just consumptive transfers) are key determinants of multidimensional poverty exit strategies. The literature supports these results, stating that access to microcredit and working capital empowers households to increase their income, which indirectly addresses deprivation in the dimensions of health, education, and living standards (Artha & Dartanto, 2018; Salam et al., 2021).

SPKRT shows a negative and significant effect on multidimensional poverty, where households with married KRT status have a 5.83 percent lower probability of being multidimensionally poor compared to other statuses in 2023. These results are consistent with studies by Adeoti (2014), Kause & Fithriyah (2024), and Ningaye & Njong (2014), which emphasize that the presence of a spouse provides social support, economic burden sharing, and role synergy that are essential in improving household resilience. Furthermore, Number of Household Members: As consistent with international findings, the number of household members has a positive effect on multidimensional poverty status in Madura. Although the effect is not statistically significant in 2023, this positive trend confirms that an increase in the number of members, which is directly proportional to an increase in needs, inherently increases the vulnerability of households to multidimensional deprivation. This is consistent with the research of Bautista (2017) and Chen et al. (2019).

CONCLUSION

This study confirms the existence of structural contradictions and significant spatial inequalities in East Java Province, where rapid economic growth has not been accompanied by equitable distribution of welfare, as evidenced by the dominance of Madura Island as the epicenter of poverty (all of its districts are among the 10 poorest). These inequalities require an analysis of poverty that goes beyond monetary metrics. Therefore, this study validates the use of

the Alkire-Foster (AF) Multidimensional Approach as a more accurate framework for measuring and understanding deprivation directly in the dimensions of health, education, and living standards. The results of the analysis show that although Social Assistance Programs (PKH and BPNT) function effectively as a safety net, their role is more mitigating than a long-term solution.

The most significant finding identifies access to formal financial services (KUR and Cooperative Credit) as the strongest determinant in reducing the probability of multidimensional poverty in Madura, far exceeding social assistance, which confirms the importance of economic empowerment strategies. In addition, the marital status of the head of household plays a negative role in poverty, while a large number of household members increases vulnerability to deprivation. Based on these findings, policy recommendations should prioritize the massive expansion of access to business capital as a sustainable exit strategy from multidimensional poverty. This aims to shift the focus of poverty alleviation in Madura from consumptive transfers to productive interventions, in order to address deprivation holistically and structurally.

Future research should expand the scope of the study beyond Madura Island (e.g., Sumatra Island), extend the analysis period (10-15 years) to observe long-term trends, and enrich the variables of government interventions (e.g., direct cash assistance for fuel) and financial services (e.g., pawnshops or online loans) to provide a more comprehensive analysis of the determinants of multidimensional poverty.

LIMITATION

The limitations of this study include the fact that the data used is only from one year, namely 2023, and the location used is Madura Island, which consists of four districts, namely Bangkalan, Sampang, Pamekasan, and Sumenep.

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