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Gender Development Studies: The Role of Gender Development in Poverty Reduction Efforts in Central Java Province

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ABSTRACT

Inequality in power relations in the context of gender development and empowerment causes women to fall into the category of vulnerable and cannot be empowered to the fullest, which has implications for women's low contribution to economic development and low poverty reduction. On the other hand, the position of gender-based development, especially for women, is often forgotten in the formulation of poverty alleviation policies. Thus, this study seeks to discuss a limited empirical analysis of the impact of the gender index on regional poverty reduction. This research aims to understand the extent to which gender plays a role in poverty reduction efforts in Central Java Province. This research method is conducted using panel data regression analysis and PGCA and presented using GIS to see comparisons between regions. The best estimation model formulation in this study is the FEM model because it has a more stable estimate by taking into account regional heterogeneity and is able to accommodate correlation between time. The findings of this study show that the growth of 0.70 GDI, 0.035 GEI and 0.91WCI has an effect on a 1% reduction in poverty in Central Java Province as shown through the FEM model POOR = 132.8929 - 0.707551GDI - 0.035017GEI - 0.917119WIC - 0.465785WDR + 0.050154WAGEG. Furthermore, this study also shows that there are still inequalities in the GDI, GEI and WCI variables which indicate that development efforts, empowerment and income generation for women in Central Java are not yet optimal. These findings suggest that regional economic policies should consider gender development-related programmes in the form of wage equity, improving the quality of women's education in the economic sector and actively empowering women in industrial activities..

Keywords: *Gender Development, Poverty Reduction, Women's Income Contribution*

ABSTRAK

Ketimpangan relasi kuasa dalam konteks pembangunan dan pemberdayaan gender menyebabkan perempuan masuk dalam kategori rentan dan tidak dapat diberdayakan dengan maksimal sehingga berimplikasi pada rendahnya kontribusi perempuan dalam pembangunan ekonomi dan rendahnya penurunan kemiskinan. Di sisi lain, kedudukan pembangunan berbasis gender khususnya perempuan kerap dilupakan dalam penyusunan kebijakan pengentasan kemiskinan. Dengan demikian, penelitian ini berupaya membahas analisis empiris terbatas tentang dampak indeks gender terhadap pengurangan kemiskinan regional. Penelitian ini bertujuan untuk memahami sejauh apa peran gender dalam upaya penurunan kemiskinan di Provinsi Jawa Tengah. Metode penelitian ini dilakukan dengan menggunakan analisis regresi data panel dan PGCA serta disajikan menggunakan GIS untuk melihat komparasi antar wilayah. Formulasi model estimasi terbaik pada penelitian ini merupakan model FEM karena memiliki estimasi yang lebih stabil dengan memperhitungkan heterogenitas regional serta mampu mengakomodasi korelasi antar waktu. Temuan penelitian ini menunjukkan bahwa pertumbuhan 0,70 GDI, 0,035 GEI dan 0,91WCI berpengaruh terhadap penurunan 1% angka kemiskinan di Provinsi Jawa Tengah yang ditunjukkan melalui model FEM POOR = 132.8929 - 0.707551GDI - 0.035017GEI - 0.917119WIC - 0.465785WDR + 0.050154WAGEG. Lebih lanjut, penelitian ini juga menunjukkan bahwa masih terdapat ketimpangan dalam variabel GDI, GEI dan WCI yang mengindikasikan belum optimalnya upaya pembangunan, pemberdayaan dan peningkatan pendapatan perempuan di Jawa Tengah sehingga temuan tersebut menunjukkan bahwa kebijakan ekonomi regional harus mempertimbangkan program terkait pembangunan gender berupa pemerataan upah, peningkatan kualitas pendidikan perempuan pada sektor ekonomi serta pemberdayaan aktif perempuan pada kegiatan industri.

Kata Kunci: Pembangunan Gender, Penurunan Kemiskinan, Sumbangan Pendapatan Perempuan

1. INTRODUCTION

Gender involvement in national development efforts has been signalled since 2020 through the issuance of Presidential Instruction (Inpres) of the Republic of Indonesia Number 9 of 2020 concerning Gender Mainstreaming in National Development. However, inclusive development by actively involving gender has not been well implemented in Indonesia (Rahmadani & Agustina, 2024). The issue of gender involvement, especially women in the development agenda, has a biased context and is even neglected in its implementation. Sarif & Rajab (2023) in their study stated that women are constructed so strongly in patriarchal domination that causes them to be in the view of the second sex and not get their full rights as human beings. This inequality of power relations in the context of gender causes women to fall into the category of vulnerable classes in both social and economic contexts (Dabdoub, 2024). A more radical view even illustrates that women contribute less to economic development and place their position in domestic or household work (Dankwa, 2018). A study by Lubis & Suradistira (2000) illustrates women's barriers in economic endeavours, especially livestock farming, caused by authority in the family, making it difficult for women to obtain employment and status in employment, resulting in a small contribution to the household economy by this gender. Therefore, this marginalisation indirectly causes the limitation of women in various activities including economic activities.

The relationship between gender development and economic development has developed in recent decades. Sen's (1989) view, later referred to as the feminist economic paradigm, outlines that women still experience various limitations in supporting development. According to Sen (1989), women are vulnerable to economic discrimination and have limited access to fundamental access such as education, health and even safety. In fact, in his follow up study on Sen's ability principle, economic development can be accelerated properly if women's ability to participate in the economy, access to education and health, economic resources and participate in the decision-making process is achieved (Sen, 2000). Therefore, Sen's (2000) view suggests that economic development and poverty reduction efforts must consider women's equal access to basic needs and equal rights to political and economic activities.

Economic development practices in the context of poverty alleviation are often only carried out statistically and experimentally, which Kabeer (2020) calls "Randomista" because it does not consider social aspects such as gender as an important variable. Kabeer et al (2021) elaborate that this inequality in gender access has even worse risks in times of crisis. In fact, gender development can encourage increased consumption, investment, development of innovation and creativity in the economic sector (Kabeer, 2020). The existence of gender

development inequality can indirectly cause slow economic growth due to the non-absorption of female labour in economic activities, especially industry (Bertay et al, 2025). Not only that, gender involvement in the economic sector also contributes to efforts to significantly increase household income (Makka et al, 2024) which can also indirectly contribute to efforts to improve quality of life and reduce poverty.

The correlation of gender development in poverty reduction efforts is directly proportional to women's involvement in various sectors, especially the economy. Women's involvement in economic activities can improve income distribution in the community, which can indirectly encourage efforts to reduce regional poverty (Susilo et al, 2024). Research by Duflo (2012) also explained that women's involvement in economic activities by destroying the view of social construction is one of the efforts that can be made to reduce poverty in a country. Thus, gender involvement in economic development is one of the strategies that can be pursued in order to reduce poverty.

Table 1. Comparison of Economic Conditions, Poverty and Gender of 5 Provinces in Java Island in 2024

No	**Indicators**	**Province**				
		DIY	**West Java**	**Central Java**	**Banten**	**East Java**
1	Economic Growth	5.07%	5.00%	4.98%	4.81%	4.95%
2	Poverty Rate	11.04%	7.62%	10.77%	10.35%	6.17%
3	Sex Ratio	98.02	102.72	101.5	103.6	99.5
4	Gender Development Index	94.93	90.23	92.87	92.48	92.15

Source*: Central Bureau of Statistics (2025)*

The data presented in Table 1 shows that the sex ratio of Central Java Province > 100. This means that the population of Central Java Province is dominated by male population along with Banten and West Java Provinces. On the other hand, in contrast to the two male-dominated provinces, the economic growth ratio and poverty rate of Central Java Province are the second lowest. In fact, provinces with predominantly female populations, such as East Java, have lower poverty rates than Central Java. This condition, in line with Sen (2000), certainly indicates the role of gender in supporting economic growth and poverty in these provinces, especially Central Java. Therefore, the gender gap and the position of Central Java Province as the second poorest province in Java Island make it an important area to examine the gender development gap in it.

The above background certainly raises the question of how the influence of gender development on poverty reduction and how efforts to equalise gender-based development in Central Java Province. Therefore, this study aims to investigate the extent of the influence of gender development in poverty reduction efforts in Central Java Province. The inverse

comparison relationship described in Table 1 is certainly a different phenomenon when linked to previous empirical studies. Thus, this study will be completed by deepening the analysis through a comparative approach regarding the relationship between female population growth and gender development and empowerment efforts in Central Java Province.

2. METHOD

This research uses a quantitative approach through numerical data processing. The results of the analysis in this study produce a model of the influence of gender development in efforts to reduce poverty in Central Java Province studied through statistical tools (Eviews 13). Furthermore, the gender variables analysed will be detailed through the calculation of Population - Gender Comparison Output Analysis (PGCA).*)*.

2.1 Research Data

The data in this study used secondary data sourced from the Central Bureau of Statistics. The selection of research data is based on Sen's (2000) view that economic development for women must consider equal access to education and health, equal rights in the economic sector and the inclusion of women in the political process. Therefore, the data used in this study are the Gender Development Index (GDI), Gender Empowerment Index (GEI). Women's Income Contribution (WIC), Women's Population Distribution (WDR) and Minimum Wage Growth (WAGEG). The selection of these data as the analysis variables is because they represent the aspects of women's development by Sen (2000). In detail, each of these data represents aspects of women's development by Sen (2000) as follows:

1. The GDI is a comparison of women's HDI to men's, so it already contains aspects of education, health and economic well-being in it;
2. GEI is an index compiled from the ratio of women's involvement in parliament, professional labour and women's income contribution. Thus this variable has shown the contribution of women in politics, professional labour and the economy;
3. WIC is the percentage of women's contribution to the household and can therefore indicate the wage gap in the economic sector;
4. The WDR shows how women are distributed in each district and is therefore able to show better relationships in regression analyses;
5. WAGEG is a minimum wage growth ratio that can represent economic development in a region so that it can be a complementary variable in the gender analysis that has been carried out.

2.2 Research Analysis

This research analysis uses a panel data regression model mechanism. Panel data regression is a regression model performed using the Ordinary Least Square (OLS) method and has a data structure consisting of time series data and cross section data (Alamsyah et al, 2022). The use of panel data regression can describe the phenomenon of balance or imbalance of the variables tested in a certain period of time, so that the model produced in this mechanism tends to be more stable. In general, panel data regression is formulated through the following model:

$$Y_{it} = \alpha_{it} + \sum_{k=1}^{n} \beta_k X_{it} + e_{it} \quad \text{.....1}$$

Description: Y_{it} : The dependent variable at time period t

α : Intercept

β_k : Slope Coefficient

X_{it} : Independent variable of the i-th crossection unit at time period t

e_{it} : Coefficient of error at crossection i at time period t

i : Crossection unit

t : Time series unit

k : Number of independent variables/predictors

Furthermore, the variables tested in this study consist of five predictor variables and one proximate variable. The predictor variables used in this study are Gender Development Index (GDI), Gender Empowerment Index (GEI), Women's Income Contribution (WIC), Woman Distribution Ratio (WDR) and Regional Minimum Wage Growth Ratio (WAGEG) which are then analysed to predict the dependent variable, namely poverty rate (POOR). Thus, the formulation of the panel data model used will briefly change into.

$$POOR_{it} = \alpha + GDI_{it}\beta_1 + GEI_{it}\beta_2 + WCI_{it}\beta_3 + WDR_{it}\beta_4 + WAGEG_{it}\beta_5 + e_{it} \quad \text{.....2}$$

The process of preparing panel data regression models has a mechanism that is quite different from multiple linear regression in general. The preparation of panel data regression initially begins with the formation of a regression model consisting of three models, namely the Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM) (Putria et al, 2023). The difference between the three models lies in the model prediction method. CEM is the simplest model that is compiled by combining time series data and crossection data through the Ordinary Least Square (OLS) method. FEM is a modelling technique by adding dummy variables with the assumption of differences in the characteristics

of each variable in a certain period of time using the Least Square Dummy Variable (LSDV) technique. Meanwhile, the REM model is prepared by accommodating the margin of error through the assumption that there are differences between individuals and time reflected through the intercept value. The preparation of the REM model is carried out using the Generalised Least Square method.

The selection of the panel data regression model is further determined through the p value with the Chow Test and Hausman Test. If in the Chow test, the p-value < 0.05 then H_0 is rejected which means that the selected model is the FEM model. If the FEM model is selected, then the model testing is continued in the Hausman test. Similar to the rules in the Chow test, if the p-value of the Hausman test is < 0,05 then H_0 is rejected, which means that the FEM model is the best model that can be used in the analysis and the CEM or REM model is rejected in the analysis.

After the selection of the regression model, it is necessary to test the classical assumptions to ensure the robustness and validity of the estimated model before it is compiled. The panel data regression method has a different data structure than other types of regression. So according to Ghozali (2017), panel data regression does not require an autocorrelation test because of the time series nature of the data. Furthermore, the regression assumption tests used in the preparation of this research model are:

1. Normality

The normality test aims to ensure that the residuals of the panel data regression model are normally distributed. This condition is a prerequisite before the preparation of the regression model. The normality test in this study uses the Jarque-Bera test with the provisions of the p-values indicator > alpha (0.05) (Jarque & Bera, 1980). Furthermore, the calculation of the Jarque-Bera test is carried out through the following formulation:

$$\sum JB = \left(\left(\frac{n}{6}\right) * \left(S^2 + \frac{K^2}{4}\right)\right) \quad \text{.....3}$$

Description: JB : Jarque-Bera value
S : Skewness Residual
K : Kurtosis Residual
n : Number of Data

2. Multicoilinearity

The multicollinearity test serves to see the high correlation between variables. In panel data regression, the independent variable data should not have a correlation with each other, so that the independent variables are not correlated with each other which is characterised by pearson correlation > alpha (0.05). The multicollinearity test in this study is carried out with a correlation approach that is structured with the following formulation:

$$r = \sum \frac{(xi-\mu)(yi-\vartheta)}{\left(\sqrt{\sum(xi-\mu)^2 * \sqrt{\sum(yi-\vartheta)^2}}\right)} \quad \text{.....4}$$

Description: r : Correlation Coefficient
xi : Value of the i-th X variable
yi : Value of the i-th Y variable
μ : Mean of X Variable
ϑ : Mean of Y Variabel

3. Heteroscedasticity

One of the requirements for panel data regression is the absence of heteroscedasticity. Heteroscedasticity is a condition where variables have variants that are not constant. Furthermore, the heteroscedasticity test in this study uses the Glejser test technique, R comparison and residual graph. The following is the formulation of the heteroscedasticity test used:

$$t = \sum \left(\frac{\sqrt{\left(\frac{RSS1}{RSS2}\right)-1}}{\sqrt{\left(\frac{2}{(n-k-1)}\right)}} \right) \quad \text{.....5}$$

Description: t : The t statistic
RSS1 : Residual Sum of Squares of the Regression Model
RSS2 : Residual Sum of Squares of the X Variable Regression Model
n : Number of Data
k : Number of Independent Variables

The study in this research is continued by comparing the female gender ratio with gender development efforts in Central Java Province. The approach taken in this sub-analysis is to use a comparative study with the formulation of Population - Gender Comparison Output Analysis (PGCA). PGCA is an analytical tool by comparing the gender ratio of women to men with

gender indices consisting of GDI, GEI and WCI. The choice of this method is because PGCA is able to provide equal standardisation of comparisons. This equality is generated by comparing gender indices to the ratio of women's distribution that varies from district to district, allowing regional comparisons to be made despite having different variations and data values. The results of this analysis show the dominance of gender development in Central Java Province and its correlation with poverty reduction efforts. When the PGCA ratio is closer to one (1.00), there is a balance of development and gender contribution for both men and women. If PGCA>1.00, then there is a dominance of women in gender development efforts and gender contributions in the context of the economy and poverty reduction. However, if PGCA < 1.00, then there is male dominance in terms of gender-based development and the contribution of economic output in the context of poverty reduction in Central Java Province. The PGCA formulation consists of:

$$\boldsymbol{PGCA_{in}} = \sum_{k=t}^{n} \frac{{}^{Wn_i}/_{Mn_i} \Big/ {}^{GI_i}/_{100} + \cdots\cdots\cdots + {}^{Wn_n}/_{Mn_n} \Big/ {}^{GI_n}/_{100}}{n-i} \quad \text{.....6}$$

Description:
Wn : Total Female Population
Mn : Total Male Population
GI : Gender Indexes (GDI, GEI and WCI)
PGCA : Comparison of Sex Ratio with Gender Indexes
i : Initial Year of Analysis
n : Year n/end of analysis

3. RESULTS

3.1 Gender Development and Poverty in Central Java Province

Since the issuance of Presidential Instruction (Inpres) of the Republic of Indonesia Number 9 of 2020, gender-based development efforts have been strengthened in Indonesia. This argument is also supported by the compilation of various indices that involve gender measures in it. At least, there are currently two major indices as a measure of gender development and empowerment in Indonesia, namely the Gender Development Index (GDI) and the Gender Empowerment Index (GEI). Meanwhile, this study also includes the ratio of women's income contribution in the household as an additional measure considering that this study specifically refers to poverty indicators, including the poverty line. With the inclusion of WCI as a supporting variable, the analysis related to the contribution of women in poverty reduction efforts in Central Java will certainly be stronger.

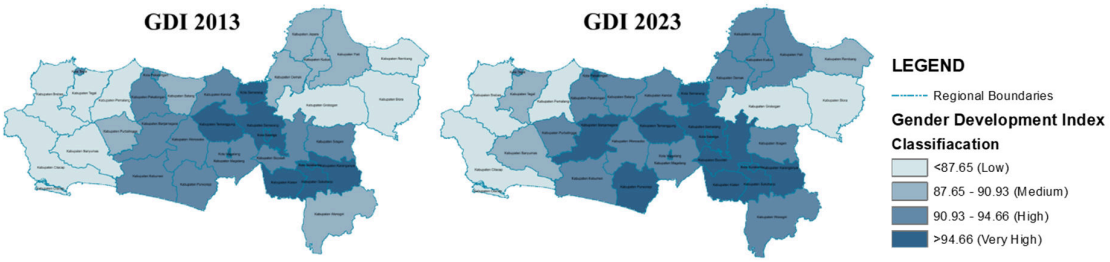

Figure 1. Gender Development Index (GDI) of Central Jawa 2013-2023
Source*: Central Bureau of Statistics of Central Jawa (Data Processed), 2025*

The Gender Development Index is a measure that shows the extent of human development inequality between the female and male genders. The GDI is based on a comparison of the Human Development Index (HDI) of women and men. This means that the further the GDI is from 100, the more unequal the development of women in Central Java Province.

The map in Figure 1 illustrates the classification of GDI-based gender development inequality processed using spatial analysis. The classification refers to Cahyati et al (2019) which distinguishes the GDI measure into classes, namely low (GDI < 87.65), medium (GDI: 87.65-90.93), high (GDI: =90.93-94.66) and very high (GDI>94.66). Over the past decade, districts in Central Java Province have experienced good GDI growth. Districts with a GDI that moved from high to very high consisted of Purworejo, Boyolali and Banjarnegara. Meanwhile, the number of districts in the high GDI classification increased to 14 with the inclusion of Batang, Purbalingga, Demak, Kudus, Pati and Jepara from the medium GDI class to the high class. Thus, although there is still stagnation in gender development efforts in five districts (Brebes, Cilacap, Pemalang, Blora and Grobogan) efforts to prevent gender development inequality have been quite good in these areas.

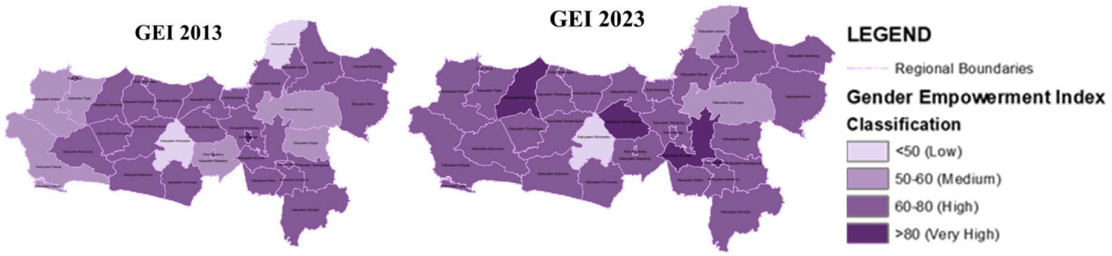

Figure 2. Gender Empowerment Index (GEI) of Central Jawa 2013-2023
Source*: Central Bureau of Statistics of Central Jawa (Data Processed), 2025*

The Gender Empowerment Index (GEI) consists of four classes, namely low (GEI80) (Rusli & Magna, 2023). GEI is an index that aims to measure the extent of women's involvement in socioeconomic activities. There are at least three main indicators, namely women's involvement in parliament (1), women's involvement in expertise (2) and Women's

Income Contribution (3). Ironically, Indonesia's GEI position is currently at the bottom compared to countries in Asean (Lorenza, 2022). However, when viewed in a micro level in the Central Java region, only Wonosobo Regency has a low GEI classification. Meanwhile, the three regions with the highest efforts to empower women do not come from urban areas. These are Boyolali, Temanggung and Pemalang districts. Thus, although there are still areas with medium to low GEI, efforts to empower women in Central Java Province have been very good in the past decade. These efforts have successfully brought the GEI of 32 out of 35 districts/cities in Central Java into the high to very high class.

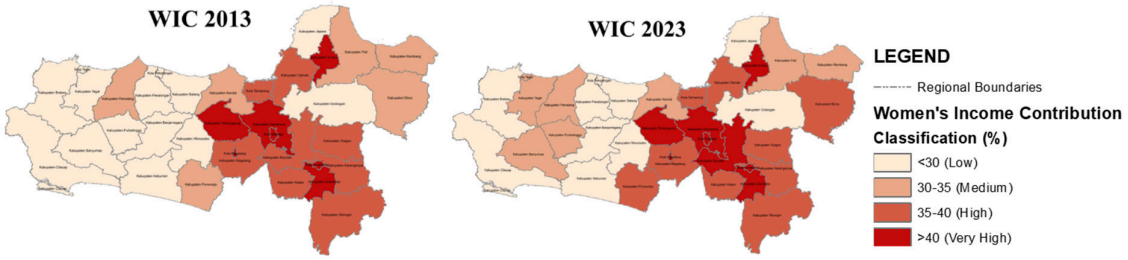

Figure 3. Women's Income Contribution (WIC) of Central Jawa 2013-2023
Source*: Central Bureau of Statistics of Central Jawa (Data Processed), 2025*

If the GDI and GEI have grown very well in the last decade. WIC in Central Java Province is still in a stagnant position. WIC shows the extent of women's contribution in supporting household income. Figure 3 shows that more than 50% of districts/cities in Central Java Province have a very small WIC ratio (<30%). This means that although the development and empowerment of women has been quite good, the respect for women's rights in Indonesia has not been well implemented. This condition indirectly becomes a vulnerability for gender development, especially for women, because there is injustice in economic matters related to the control of productive assets, which causes low income and bargaining power for women in the household (Nisak & Sugiharti, 2020). Therefore, efforts to increase WIC by increasing inclusive and equitable economic enterprises must certainly be a separate target in efforts to develop women in Indonesia.

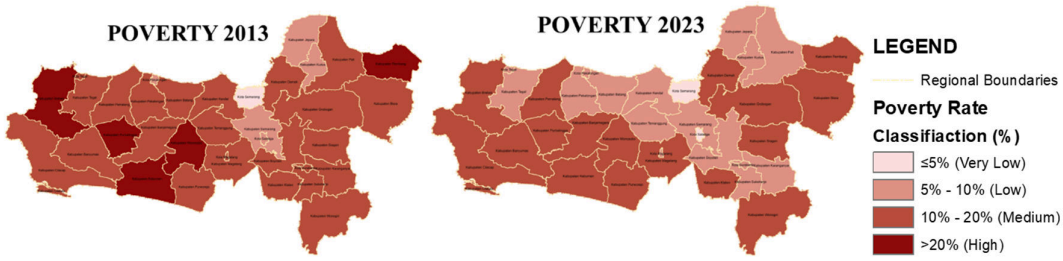

Figure 4. Poverty Rate by City/Regency of Central Java 2013-2023
Source*: Central Bureau of Statistics of Central Jawa (Data Processed), 2025*

Regional poverty levels are divided into four classifications based on the poverty ratio or poverty rate (Mohamoud et al, 2019). Thus, the picture of efforts to reduce poverty in Central Java Province shown in Figure 4 is at least fairly well developed. In the past decade, Central Java Province has successfully removed five districts from the high poverty classification. Nevertheless, the dominant region in Central Java Province is still at the medium poverty level with a poverty ratio in the dozens of per cent. This condition also causes Central Java Province to be the second poorest province in Java.

Poverty reduction efforts in Central Java Province have generally been slow when reflecting on the poverty class by Kirby et al (2019). This condition is also indicated by the poor efforts of gender-based economic management as one of the indicators. If correlated with the gender index, especially WIC, of course the contribution of women in the household is at a very small ratio. At the end of 2023, the average WIC of Central Java Province was only 34% and almost 50% of regions had a WIC ratio < 30% (low). This condition also indicates a deep income inequality between women and men.

3.2 The Impact of Gender Development in Poverty Reduction Efforts in Central Java

The relationship between gender development and poverty reduction has been firmly established as two indisputable sub-analyses in recent decades. Women's empowerment and quality improvement interventions face both monetary and non-monetary contributions. Women's empowerment in the economic context has better performance in increasing income, savings and wealth so that more efforts are invested in improving education and health (Balasubramanian et al, 2024). Thus, efforts to improve the quality of women and reduce gender inequality are indirectly able to break the chain of unworthy lives and efforts to reduce poverty.

In line with this argument, this study also shows the same thing through examining gender indices in poverty reduction efforts. The findings further show that the decline in the poverty ratio in Central Java Province is also stimulated by the improvement of gender quality through gender development (GDI) and gender empowerment (GEI). The results of this study also show the estimated regression model of the tested variables on the poverty ratio in Central Java Province.

1. Test Results Using Three Models (CEM, FEM and REM)

The preparation of panel data estimation models has a mechanism that is quite different from linear regression in general. The panel data concept uses the Ordinary Least Square (OLS) mechanism and produces three main models, namely the Common Effects Model, Fixed Effects Model and Random Effects Models (Sofilda et al, 2013) which must then be tested again for

feasibility using the Chow and Hausmann tests. The results of testing the three panel data models are then shown in Table 2 below.

Table 2. Panel Data Regression Test Results Using CEM, FEM and REM

Variable	Coefficient	t-Statistic	Prob(F-statistic)	R-squared	Prob.	Result
Common Effect Model						
GDI	-0.309947	-5.241839	0.0000	0.290254	0.0000	*Siginificanct*
GEI	-0.045821	-1.464056			0.1442	Not Significant
WIC	-0.08069	-1.739684			0.0829	Not Significant
WDR	-1.160828	-2.979746			0.0031	Siginificanct
WAGEG	0.06647	3.551029			0.0004	Siginificanct
C	103.4376	5.184838			0.0000	
Fixed Effect Model						
GDI	-0.707551	-7.242805	0.0000	0.961963	0.0000	*Siginificanct*
GEI	-0.035017	-2.616469			0.0094	Significant
WIC	-0.917119	-8.670061			0.0000	Significant
WDR	-0.465785	-2.882554			0.0043	Siginificanct
WAGEG	0.050154	10.03298			0.0000	Siginificanct
C	132.8929	9.808076			0.0000	
Random Effect Model						
GDI	-0.691526	-8.250144	0.0000	0.568231	0.0000	*Siginificanct*
GEI	-0.046782	-3.546125			0.0005	Significant
WIC	-0.42125	-5.905044			0.0000	Significant
WDR	-0.167551	-1.085044			0.2786	Not Siginificanct
WAGEG	0.04791	9.629784			0.0000	Siginificanct
C	100.5422	8.272912			0.0000	

Source*: Analysis Results Using E-Views, 2025*

The results of testing the three regression models of gender indices on the poverty ratio in Central Java Province show mixed results. When viewed through the coefficient of determination, the FEM model is superior with an R Square value of 96.19%. The FEM model also shows that all variables used have p-values <0.05 so that all variables are eligible to be included in the panel data regression estimation model.

2. Determination of the Best Panel Data Regression Model

Determining the best panel data regression model in this study is done through two stages of testing, namely the Chow Test and the Hausman Test. This model feasibility test aims to test the model feasibility hypothesis through the p-values of each test. The output of this feasibility test is the best model that has been compared and then selected to compile regression estimates of the effect of gender indices on poverty reduction efforts in Central Java Province.

The results of the estimation of model feasibility through the Chow and Hausman tests are described in Table 3 below.

Table 3. Chow Test in Panel Data Regression

Effects Test	Statistic	d.f.	Prob.
Cross-section F	142.8338	-34,275	0.0000
Cross-section Chi-square	921.8011	34	0.0000

Source*: Analysis Result using E-Views, 2025*

The Chow test presented in table.3 shows that the p-values are at 0.00 both in the Fisher Snedecor (F) and Chi-Square indicators. The hypotheses in the following Chow test are:

H0 : The best model is the CEM model indicated by a p-value > 0.05.

H1 : The best model is the FEM model indicated by a p-value < 0.05

Meanwhile, referring back to table 3, both indicators used in the Chow test show a p-value/prob. smaller than the significance level (α=0.05). Thus, H0 is rejected and the best model based on the above comparison is the Fixed Effects Model.

Table 4. Hausman Test in Panel Data Regression

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	67.430664	5	0.00000

Source: *Analysis Result using E-Views, 2025*

The Hausman test describes the best regression model by comparing the FEM model and the REM model. The Hausman test uses the p-values of chi Square indicator with the conditions:

H0 : The best model is the FEM model indicated by the p-value < 0.05

H1 : The best model is the REM model indicated by a p-value > 0.05

Meanwhile, when referring to table 4, it can be seen that the p-value of the comparison of the two regression models is at 0.0000. Thus, H0 is accepted and the model chosen in the following analysis is FEM.

3. Classic Assumption Test

The classic assumption test is a prerequisite for the formation of a regression model because it must fulfil several statistical requirements. According to Ghozali (2017), the regression model must fulfil four classic assumption tests, namely normality, multicollinearity, autocorrelation and heteroscedasticity. However, specifically for panel data, the autocorrelation test does not need to be done because the nature of the data is in the form of time series so that

the test will automatically experience autocorrelation problems. Furthermore, the tests in this analysis only use normality, multicollinearity and heteroscedasticity tests.

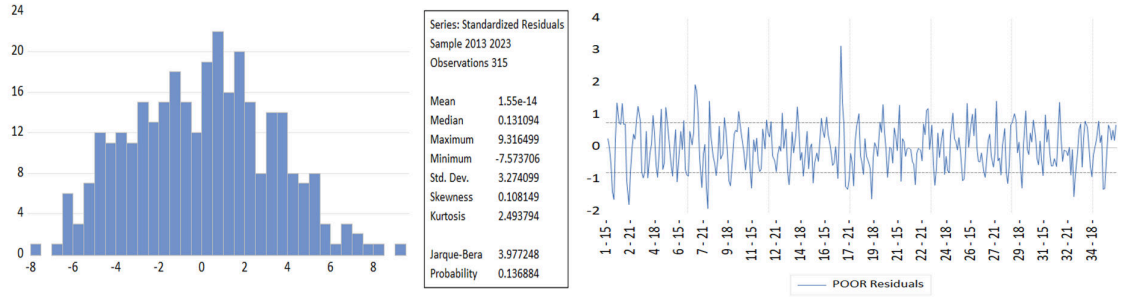

Figure 5. Normality Histogram and Heteroskedastisity Residual Graph
Source*: Analysis Result using E-Views, 2025*

The normality test shows the condition of the residual distribution is normally distributed or not. Normality tests on panel data regression generally use the *jarque-bera p values* indicator with the provision that the *p-values* > *alpha* (0.05). While the mother, when referring to Figure 5 above, it can be concluded that the p-values (JB) are at 0.136884 /> α (0.05) so it can be concluded that the data in the FEM model is normally distributed.

The next classic assumption test is the heteroscedasticity test which aims to review whether the residuals used in the analysis have a homogeneous or heterogeneous tendency. The prerequisites for panel data regression using the OLS model require that the residuals in the analysis are homogeneous or pass heteroscedasticity testing. Heteroscedasticity testing in this analysis uses the Glejser test, residual graph and Compare Weighted and Unweighted R Square approaches. When viewed through Figure 5, it can be concluded that the residuals in the analysis are homogeneous because they have passed the prerequisites (-500 < Residual Graph < 500).

Table 5. Classic Assumtion Test Summary

No.	Classic Assumtion	Tools	Standard	Analysis Results		Categories
1	**Normality**	Jarque Bera	*p-values > 0.05*	3.977248		Normally Distributed Data
		P-values (JB)		0.136884		
2	**Multicolinearity**	Coefficient Correlation Pearson	Pearson Correlation < 0.8	GDI.POOR	-0.438282	Passed
				GDI.GEI	0.389257	Passed
				GDI.WIC	0.504982	Passed
				GDI.WDR	0.187699	Passed
				GDI.WAGEG	-0.057273	Passed
				GEI.POOR	-0.342103	Passed
				GEI.WIC	0.63869	Passed
				GEI.POOR	0.187699	Passed
				GEI.WAGEG	-0.095957	Passed
				WIC.POOR	-0.427941	Passed
				WIC.WDR	0.475421	Passed

No.	Classic Assumtion	Tools	Standard	Analysis Results		Categories
				WIC.WAGEG	-0.025321	Passed
				WDR.POOR	-0.252818	Passed
				WDR.WAGEG	0.309188	Passed
				WAGEG.POOR	0.157602	Passed
3	**Heteroskedasticity**	Glejser Test	*p-values > 0.05*	0.101004		Passed
		Compare Weighted and Unweighted R Square	The R square comparison value is not much different	R Square (Weighted)	0.964345	Passed
				R Square (Unweighted)	0.961742	
		Residual Graph	-500<Residual Graph<500	-4<Residual Graph<4		Passed

Source*: Analysis Result using E-Views, 2025*

The classic assumption test that must also be carried out before forming the model is the multicollinearity test. The multicollinearity test aims to show whether there is a correlation between independent variables. The prerequisite of Panel Data Regression requires that the independent variables analysed are not correlated with each other. Table 5 above, which compiles all the results of the classical assumption test, shows that all independent variables are not correlated with each other as indicated by the pearson correlation > alpha (0.05). Thus, the FEM model selected in this analysis passes the three classical assumption tests and can proceed with model interpretation.

4. Fit Test and Model Interpretation

The feasibility test and model interpretation are the final stages to see how far the independent variables affect the dependent variable. Furthermore, before modelling, it is necessary to review the coefficient of determination and the coefficient of significance represented by the *R-Squared* indicator and *Fisher Snedecor's P-Values (Prob(F-Statistic)).*

Table 6. Panel Data Regression Model

Variable	Coefficient	t-Statistic	Prob.	Feasibility Model Indicators	Results
GDI	-0.707551	-7.242805	0.00000	R-squared	0.961963
GEI	-0.035017	-2.616469	0.00940	Adjusted R-squared	0.956569
WIC	-0.917119	-8.670061	0.00000	S.E. of regression	0.809918
WDR	-0.465785	-2.882554	0.00430	Sum squared resid	180.3908
WAGEG	0.050154	10.03298	0.00000	Log likelihood	-359.1678
C	132.8929	9.808076	0.00000	F-statistic	178.3291
				Prob(F-statistic)	0.00000

Source: *Analysis Result using E-Views, 2025*

Table 6 shows the feasibility test and the FEM model that is ready to be compiled to see the influence between variables. Referring to Ghozali (2017), at least in the feasibility test, the regression model is recommended to have a coefficient of determination> 60% and a coefficient

of significance of 95%. So the R-Square value must be >0.60 and the p-values < alpha. The coefficient of determination shows how the independent variables affect the dependent variable while the significance coefficient shows whether the model significantly affects the dependent variable or not. Table 6 further shows that the R-Square value is 0.961963 which means that 96.19% of the poverty rate is influenced by GDI, GEI, WIC, WDR and WAGEG while the other 3.81% is influenced by other variables outside the model. In addition, the p-values also show a result of 0.000, which means that the model has a significance level of up to 99.9%. Thus, the FEM model was formed into:

POOR* = 132.8929 - *0.707551GDI - 0.035017GEI - 0.917119WIC - 0.465785WDR + 0.050154WAGEG

The model above shows that GDI, GEI, WIC and WDR have an inverse relationship with the poverty rate while WAGEG has a directly proportional relationship with the poverty rate. The model shows that if there is a one per cent decrease in the poverty rate, this phenomenon is driven by the growth of the Gender Development Index by 0.70 points, the growth of the Gender Empowerment Index by 0.035 points, the growth of the Women's Income Contriburion by 0.917%, the growth of 0.46% of the female population and a 0.05% decrease in the regional minimum wage.

The model compiled through panel data regression shows a simultaneous condition with the development of women's quality in poverty reduction efforts. This condition is in line with Bertay et al (2025) and Makka et al (2024) which state that gender is a variable that can encourage economic growth and simultaneously reduce poverty in a region. Thus, to encourage a decrease in the poverty ratio in Central Java, a gender-based development programme is needed in an effort to prevent gender vulnerability, especially women and encourage inclusiveness, especially in the economic sector so that human resources in Central Java Province can grow and be empowered fairly.

The positive influence of the variables tested in the regression model strongly supports Sen (2000) argument regarding the role of women in economic development and efforts to promote welfare. When examined in detail, the phenomenon of poverty in Central Java Province and the economic growth rate that is in the third position is one form of women's contribution to economic development. Therefore, efforts to reduce the poverty rate must be in line with the indicators in the gender index that have been tested. The indicators that should be encouraged in increasing economic growth and reducing poverty in accordance with the results of the regression test are:

1. Promoting women's education level and quality;

2. Improving equitable health services;
3. Promote policies on equality and anti-discrimination of rights for women in industrial activities;
4. Increasing professional employment of women;
5. Actively promote women's empowerment programmes.

3.3 Gender-based Social and Economic Development Dominance

The dominance of social and economic development in the following sub-discussions is analysed using the PGCA approach, resulting in a ratio that shows the inequality between the gender indices analysed. PGCA analysis on GEI and WCI variables uses a tolerance coefficient of 10%. Thus, the situation is said to be balanced or fair if the PGCA value is in the ratio of 0.9 1.1. Meanwhile, for the GDI variable with a value that tends to grow continuously, a tolerance coefficient of 5% (0.05) is used, so that the GDI condition is said to be balanced or unequal if the classification value is at 0.95 - 1.05. As for the GDI and GEI variables, the analysis preparation uses four classes. Meanwhile, for the WIC variable, five classes were used in the preparation of the PGCA analysis. This is due to the phenomenon of WIC in Central Java province, which has an aggressive PGCA ratio, so the inequality analysis group is divided into five classes. Furthermore, the detailed PGCA analysis is shown in Figure 6 below

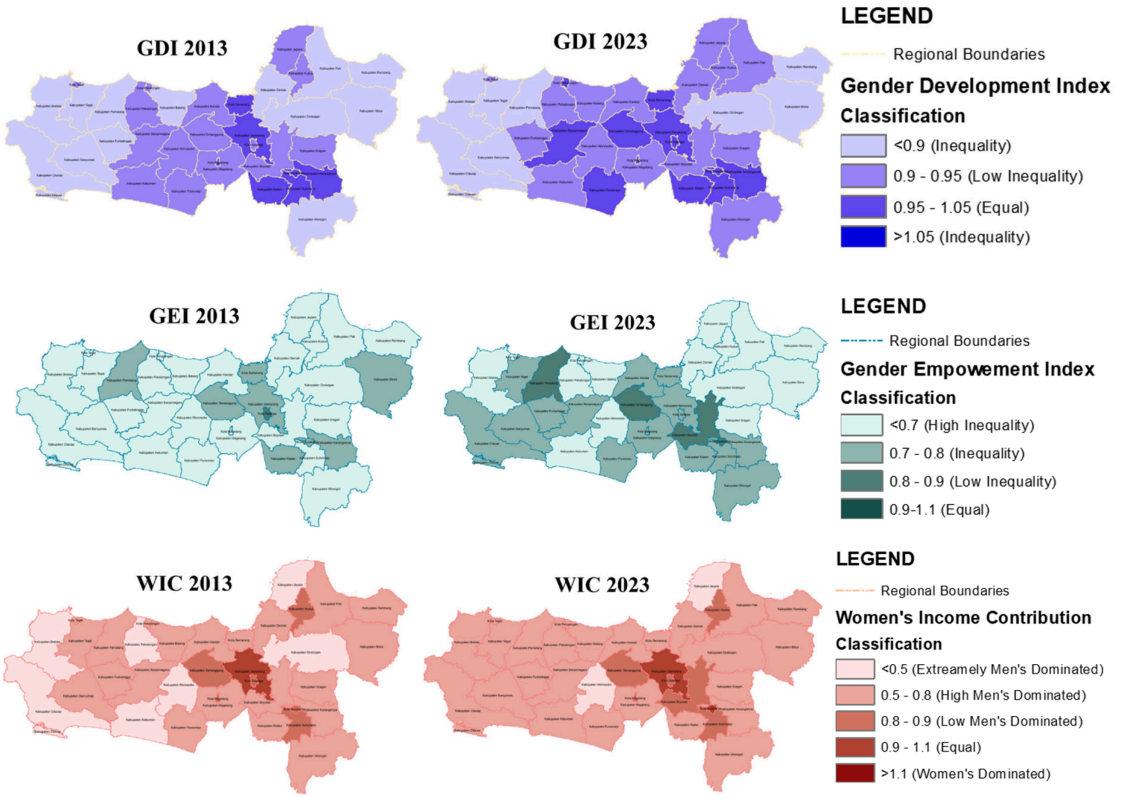

Figure 6. Gender Inequality Conditions by Gender Indexes (GDI, GEI and WIC)
Source: *Analysis Results Using Geographic Information System, 2025*

Based on this figure, it can be seen that there has indeed been a shift in gender development, especially for women, for the better in the past decade. However, when reviewed in detail, these developments have not been able to bring socio-economic development for women to equality, especially in the context of development, empowerment and economic output. The GDI variable presented in the figure above shows the development of six districts and cities into districts with equal gender development efforts between women and men. However, there are still areas that are quite unequal in gender development efforts with a breakdown of 8 districts/municipalities included in the unequal gender development area and 15 districts/municipalities included in the gender development area in the low inequality class.

In the GEI variable, gender-based empowerment at a tolerance coefficient of 10% does not yet indicate areas with equal empowerment efforts between women and men. The GEI variable shown in Figure 5 is in a fairly unequal position for all regions in efforts to empower women compared to men. This means that when referring to the standard of GEI preparation in Indonesia, only a small proportion of women are part of members of parliament, work in the skilled sector and have a large WIC.

The last variable, which shows women's income contribution, also suffers from a tragic irony. In the last decade, only Semarang Regency and Surakarta City have shown a balance in household income contribution. Meanwhile, 33 other regencies/cities are dominated by men as the largest contributor to household income, with four regencies/cities in the low male dominance class, 27 regencies/cities in the high male income dominance class and two regencies in the extreme male income dominance class compared to women. This condition indirectly shows that women are not yet independent in economic matters, especially income. This condition is certainly caused by various factors. Popova (2002) explains that women's low income is caused by gender marginalisation, which causes household businesses to be very dependent on men as a result of women's vulnerability and gender discrimination in economic and other productive businesses in the community. Thus, concrete programmes and regulations are needed to encourage women's involvement, development and business in various dimensions of development

3.4 Gender-based Development Policy in Central Java Province

The simultaneous effect of gender on poverty reduction efforts that have been tested previously is certainly in line with empirical studies in previous decades. The very strong influence relationship shows that in the last decade, Sen's (2000) view still exists in the effort of equitable development in the context of gender. In line with Sen (2000), gender mainstreaming in Central Java Province has actually been implemented for a long time. Efforts to alleviate gender inequality in order to promote equitable welfare are one of the main development targets when referred to the Central Java Province Long-Term Regional Development Plan (*RPJPD*) document 2005-2025. Furthermore, the results of the analysis from of the gender index data a decade ago (2013-2023) are of course also determined by the priorities of development programmes in Central Java Province. Gender mainstreaming programmes in Central Java Province can be reviewed through the Medium-Term Development Plan (RPJMD) document, especially in the last period (2018-2023) which made the programme to improve the quality of life of women and children as a regional development programme and Schools without barriers; training on democracy and elections, gender, anti-corruption and governor's apprenticeship for high school / vocational high school students as the flagship programme of the governor and deputy governor for the 2018-2023 period. Furthermore, gender development efforts in the context of improving welfare have also been encouraged through the Governor Regulation of Central Java Province No. 71 of 2017. Therefore, gender based development efforts have actually become a special concern by the Central Java

Provincial government so that it is able to determine this variable as one of the core variables that mutually influence the poverty rate based on the statistical test in point 3.2 above.

Table 7. Regencies and Cities' Gender Policy Regulations in Central Java Province

No	Regencies/Cities	Local Regulation (Perda)	Regional Head Regulation (Perkada)	Regional Action Plan (RAD-PUG)
1	Banjarnegara	-	-	Available
2	Banyumas	-	No. 35 Year 2018	-
3	Batang	No. 2 Year 2024	-	On Process
4	Blora	No. 6 Year 2022	No 5 Year 2014	On Process
5	Boyolali	No. 4 Year 2022	-	-
6	Brebes	-	No. 94 Year 2024	Available
7	Cilacap	No. 6 Year 2024	No. 20 Year 2020	Available
8	Demak	No. 6 Year 2021	No. 7 Year 2012	-
9	Grobogan	No. 10 Year 2022	No. 50 Year 2020	On Process
10	Jepara	No. 1 Year 2015	No. 39 Year 2018	-
11	Karanganyar	-	No. 61 Year 2016	Available
12	Kebumen	No. 1 Year 2015	No. 43 Year 2015	-
13	Kendal	No. 5 Year 2020	-	Available
14	Klaten	No. 4 Year 2022	No. 8 Year 2020	-
15	Kudus	-	-	Available
16	Magelang	No. 1 Year 2024	No. 14 Year 2013	-
17	Pati	-	No. 82 Year 2020	On Process
18	Pekalongan	-	-	-
19	Pemalang	No. 10 Year 2022	-	Available
20	Purbalingga	No. 4 Year 2023	-	On Process
21	Purworejo	No. 3 Year 2023	No. 53 Year 2013	-
22	Rembang	No. 5 Year 2022	No. 50 Year 2020	Available
23	Semarang	-	No. 84 Year 2013	-
24	Sragen	No. 9 Year 2019	-	-
25	Sukoharjo	No. 8 Year 2022	No. 64 Year 2023	-
26	Tegal	No. 10 Year 2020	No. 49 Year 2018	-
27	Temanggung	-	No. 25 Year 2018	-
28	Wonogiri	No. 2 Year 2021	-	-
29	Wonosobo	-	-	-
30	Magelang City	No. 10 Year 2012	No. 35 Year 2018	-

No	Regencies/Cities	Local Regulation (Perda)	Regional Head Regulation (Perkada)	Regional Action Plan (RAD-PUG)
31	Pekalongan City	No. 13 Year 2014	-	Available
32	Salatiga City	No. 8 Year 2023	No. 5 Year 2021	Available
33	Semarang City	No. 11 Year 2021	No. 27 Year 2023	On Process
34	Surakarta City	No. 2 Year 2022	No. 28.2 Year 2023	-
35	Tegal City	No. 4 Year 2022	No. 67 Year 2023	-

Source*: Provincial Audit Board (BPK) of Central Java, 2025*

However, in its implementation at the sub-regional (district/city) level, gender development efforts have not been fully equitable. Table 7 above explains that not all districts and cities in Central Java Province have regulations and complete gender mainstreaming planning. This condition is one of the factors that cause differences in the level of success of gender development at the sub-regional level. The conditions of gender development and empowerment shown in Figure 1, Figure 2 and Figure 3 cannot be separated from the influence of governance. For example, the six cities in Central Java Province generally have complete regulations and more mature gender development planning in other district areas. This condition is certainly one of the factors that cause these six cities to have GDI, GEI and WIC in the middle to high class. Another example presented in figures 1,2,3 and 4 above is Semarang Regency and Temanggung Regency, which have far implemented gender mainstreaming policies since 2013 (Semarang Regency) and 2018 (Temanggung Regency) so that they are able to trigger GDI, GEI and WIC to be classified as high. Furthermore, when looking at poverty rates, areas with high GDI, GEI and WIC such as Semarang Regency and Temanggung Regency actually have lower poverty rates than other districts. Thus, governance, especially in regulation and development planning, is able to encourage an increase in gender equality, which of course has implications for poverty reduction.

The influence of gender in the regression analysis above is clarified again on the dominance of gender-based development through PGCA analysis in sub 3.3, finding that Semarang Regency is one of the regencies with a better PGCA ratio than other regencies. Empirical studies also show that the effectiveness of Semarang Regency's gender mainstreaming general objectives is very good, especially in the aspect of government commitment and policy, which reached 70% (Syarif, 2020). Meanwhile, in urban areas, Semarang City shows low inequality in both GDI, GEI and WIC variables. Other empirical studies show that gender-based empowerment programmes are massively implemented in this region. A study by Saragih et al (2021) on a thematic village programme based on gender

mainstreaming in Kampung Sutra Bandeng shows that access, participation, benefits and control have been implemented quite well. Another study by Triatmoko & Esariti (2019), which examined the Thematic Village Programme in the context of gender-based poverty alleviation, found that gender empowerment in the programme was good enough to help reduce poverty in Semarang City. Thus, gender-based poverty alleviation efforts must certainly be carried out not only at the planning level, but also by intensifying technical programmes to programme evaluation to achieve gender development goals in order to reduce poverty in Central Java Province.

4. CONCLUSION

Development efforts and gender empowerment, especially for women, are vital issues in efforts to improve the economy and reduce poverty. This condition is caused by marginalisation and power relations that cause women's vulnerability in various dimensions of development, especially socio-economic. Although in the past decade gender-based development has been massively carried out, the output of development and empowerment of women is still at a vulnerable level and is influenced by power relations that result in the glorification of the male gender and the growing issue of patriarchy.

The findings of this study show that there is a highly significant and simultaneous influence between gender-based development, especially for women, in poverty reduction efforts in Central Java Province. The results of this analysis show that GDI, GEI, WIC and WDR have an inverse effect on the poverty rate. This means that efforts to reduce poverty are highly dependent on gender productivity in the form of gender development and empowerment, especially women.

This finding also shows that gender development in the past decade has not been able to solve the problem of unequal power relations between the female gender and the male gender. The results of the PGCA analysis show that only a small proportion of regions do not experience gender inequality in gender development (GDI) and empowerment (GEI) efforts. Furthermore, the findings of this study also show that gender, especially women, have not actively contributed to household income efforts so that the dominance of gender income is still controlled by men.

The findings of this study indicate the need to improve the quality of gender-based development, especially for women. The results illustrate inequality in terms of empowerment, human development and access to economic resources. Thus, by referring to the indicators of each index, this study produces the following policy recommendations, Improving the quality

of gender-based education by paying attention to equal rights, equal access and creating inclusive education to promote GDI growth; Ensure equitable access to health without discrimination through strengthening health access policies; Develop a non-discriminatory policy for women in professional industry sectors across a range of variables including wages, workload and access to employment; Encourage women's empowerment through microeconomic and creative economic activities through production to distribution; Providing gender education to the public as an effort to promote knowledge of equal rights in economic activities.

Finally, this research certainly does not stop at these analyses. The arguments tested in this study are limited to gender indicators without considering other external factors that have a direct relationship with the phenomenon of poverty such as economic growth, industrialisation, migration, sector composition, employment and environmental factors. Meanwhile, the discussion in the context of gender is also limited to secondary data that is very general in nature. As a result, this study has not fully captured the contribution of women in informal economic activities. Therefore, this study also recommends further research in the future. A comprehensive study that includes macroeconomic variables in support of other factors causing poverty; Primary study on women's contribution to household income through formal and informal economic activities; Inter-regional comparative study on the impact of industrial sector composition on female labour absorption; and Factors causing rights discrimination and unequal access to women are examined through economic analysis and social analysis.

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