

DICHTOTOMY OF IMPROVING THE QUALITY OF WOMEN'S HUMAN RESOURCES IN IMPROVING FOOD SECURITY

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Abstract

The food crisis, which is predicted to hit most countries, needs to be anticipated through appropriate policies. This study aims to analyze the dichotomy of the influence of improving the quality of women's human resources, as proxied by the Gender Empowerment Index, poverty, and the Human Development Index (HDI), on food security between cities and regencies in the Special Region of Yogyakarta.

Using a quantitative approach using panel data from five regencies/cities for 2018-2024, it was found that gender empowerment has a significant impact on food security. Poverty and the Human Development Index do not significantly influence food security. This finding is consistent with previous research, allowing for the development of strategies to improve food security in the Special Region of Yogyakarta. Food security policies are evenly distributed, indicating no differences between cities and regencies in food security policies.

Keywords: *human resource, food security, district cities, gender, poverty*

INTRODUCTION

Research on food security emphasizes the importance of women's empowerment to achieving food security (Jaspars & Kuol, 2024). In the context of food systems, a growing body of theoretical literature focuses on how social identities such as gender, class, race, income, education, and others influence power and access to resources (Essilfie et al., 2024).

Like education, gender is also considered an important attribute of food security and can be considered a general variable related to food availability, accessibility, and utilization (Tesafa et al., 2025). This is because women are important economic agents in the global economy and a crucial social factor in household food security (B. Agarwal, 2018). They produce more than half of the food grown in developing countries (Essilfie et al., 2024).

The phenomena of poverty, unequal income distribution, and education levels, as measured by the Human Development Index, have a unique relationship and are strongly influenced by social and community conditions, particularly food security (Dewi & Rachmawatie, 2020) (Essilfie et al., 2024). Agricultural innovation, including technological innovation, will also impact food security in the Special Region of Yogyakarta, with restrictions on land conversion requiring control (Luthra et al., 2024). Strict and coordinated monitoring by relevant parties is necessary to achieve supply and price stability. Although price fluctuations and food supply availability can be monitored using price dashboards, monitoring activities still need to be conducted over a sufficient period of time to obtain results (Wattimena et al., 2021).

Of all the regencies and cities in the Special Region of Yogyakarta, only Yogyakarta City and Sleman Regency have

the highest food security index, while Kulon Progo and Gunung Kidul Regencies still have low levels of food security (Wibisono & Yeni Widowaty, 2023).

In terms of supply dependency, 85% of rice and 60% of vegetables come from other regencies (Yogyakarta Regency Trade Office, 2023) (Pratama dkk., 2022). Food Security Index for the Special Region of Yogyakarta.

Table 1. Food Security Index of Regencies/Cities in the Special Region of Yogyakarta 2023

Number	Regency/City	IKP Value (2023)	IKP Category
1	Yogyakarta City	87,5	Very Resistant
2	Sleman Region	85,2	Very Resistant
3	Bantul Region	81,7	Durable
4	Kulon Progo Region	78,4	Fairly Resistant
5	Gunungkidul Region	73,9	Fairly Resistant

Source: Compiled from various source

THEORETICAL REVIEW

Gender empowerment, which encompasses education and gender participation, is broadly defined as a woman's ability to exert control or influence over choices that affect her and her family within her own context, enhanced by gender equality (Sinclair et al., 2022) (Sharma, 2019). Increasing women's equality in access to education, employment opportunities, political participation, and decent income is known as gender empowerment (Jenderedjian & Bellows, 2021) (Sinclair et al., 2022).

In the context of Indonesia and the Special Region of Yogyakarta, the Human Development Index and Food Security Index are still relatively good, but they also face challenges such as persistent poverty, stunting prevalence, and disparities in food access between regions (Hadani & Selfiani, 2023). Women's participation and education levels will influence how women behave and make decisions, including regarding food security (Pratama et al., 2022). Regional policy innovations, including social protection schemes and strengthening logistics distribution, are

crucial factors in maintaining stable food availability and prices in the Special Region of Yogyakarta. Yogyakarta (Harini et al., 2022) (Jati, 2020). Due to technological developments, female human resources must also be able to adapt to agricultural digitalization to increase economic benefits (Wibowo, 2020).

Food security is also significantly influenced by non-agricultural policies and development, such as the conversion of agricultural land to non-agricultural use. Bantul and Sleman Regencies are vulnerable to agricultural land conversion, necessitating sustainable agricultural land protection (PP2B) (Janti, 2016). Similarly, the mini-integrated farming method implemented in Bantul Regency needs to be continuously implemented to improve family food security (Rosningsih, 2009). Similarly, the mini-integrated farming method implemented in Bantul Regency needs to be continuously implemented to improve family food security (Rosningsih, 2009). A promising food pattern (Pola Pangan Harapan) will improve if food security also improves. Food diversity is

one of the pillars of food security in the Special Region of Yogyakarta (Musta'in & Saputro, 2021).

In terms of gender empowerment and gender inequality, Yogyakarta ranks fourth in Indonesia for gender empowerment, after North Sulawesi,

Central Kalimantan, and North Maluku. For gender inequality, Yogyakarta ranks highest among 34 provinces in Indonesia (four provinces are not included in BPS data).

Table 2. Ranking of Empowerment and Gender Inequality of Provinces in Indonesia

No	Provinces	Woman Empowerment Index (IDG)		Gender Inequality Index (IDG)	
		2022	2023	2022	2023
1	Aceh	63,92	63,56	0,504	0,489
2	Sumatera Utara	69,33	69,18	0,442	0,425
3	Sumatera Barat	65,48	65,34	0,430	0,425
4	Riau	71,16	72,29	0,473	0,458
5	Jambi	67,86	68,07	0,540	0,528
6	Sumatera Selatan	74,89	76,58	0,517	0,496
7	Bengkulu	70,13	70,06	0,478	0,469
8	Lampung	68,24	68,16	0,456	0,437
9	Kep. Bangka Belitung	58,20	58,22	0,497	0,490
10	Kepulauan Riau	59,05	0	0,395	0,348
11	DKI Jakarta	75,30	76,31	0,32	0,256
12	Jawa Barat	71,22	71,74	0,490	0,482
13	Jawa Tengah	73,78	74,18	0,371	0,336
14	DI. Yogyakarta	76,87	78,46	0,240	0,142
15	Jawa Timur	74,42	74,90	0,440	0,423
16	Banten	68,55	69,87	0,478	0,464
17	Bali	72,29	73,77	0,321	0,239
18	Nusa Tenggara Barat	53,47	53,28	0,648	0,650
19	Nusa Tenggara Timur	75,22	75,10	0,436	0,428
Indonesia		76,59	76,9	0,459	0,447

Source: Summarized from the Publication of the Central Statistics Agency of the Republic of Indonesia, 2024.

Several research findings on food security in the Special Region of Yogyakarta highlight the importance of the agricultural sector in improving the well-being of the community, the majority of whom currently live below the poverty line (Hadani & Selfiani, 2023). Furthermore, women's role in the food system in DI Yogyakarta is evident through their involvement in Women Farmers Groups

(KWT), sustainable food yard programs, and local food processing micro-enterprises (Pratama et al., 2022). Women and their education levels can be used as early detection tools for food insecurity (Jati, 2020) (Wibowo, 2020).

This dichotomy between cities and regencies has direct implications for the quality of women's human resources (HR), including education levels, agricultural

technical capacity, financial literacy, and access to government programs. Women in urban areas tend to have greater opportunities to access higher education, digital technology, and business networks, while women in rural areas rely more on land-based income sources and informal work with limited social protection (Kasim & Harikumar, 2024) (Rao, 2006).

This study aims to analyze the dichotomy of the impact of improving the quality of women's human resources, as

RESEARCH METHODS

This study employs a quantitative approach using panel data. Quantitative data are sourced from official government publications (National Food Agency, Central Statistics Agency, National Development Planning Agency) and previous research results related to food security, women's empowerment, and human development indicators in the Special Region of Yogyakarta. Secondary data include the Food Security Index, Gender Empowerment Index, Human Development Index, poverty rates, and indicators of women's participation in farmer groups and local institutions at the district/city level (Wooldridge, 2019). The analysis model used is as follows:

$$\text{FOODSEC} = \alpha + \beta_1 \text{Gendempw} + \beta_2 \text{Poverty} + \beta_3 \text{HDI} + \beta_4 \text{Regency/City} + \epsilon$$

FOODSEC: Food Security Index of the Special Region of Yogyakarta

RESULTS AND DISCUSSION

The panel estimation results show that the model is able to explain 56.9% of the variation in the Food Security Index (Foodsec) in five regencies/cities in the Special Region of Yogyakarta, with an F-

proxied by the Gender Empowerment Index, poverty, and the Human Development Index (HDI), on food security between cities and regencies in the Special Region of Yogyakarta. Using a mixed-methods approach, panel data from five regencies/cities.

The novelty of this study is the use of a dichotomy between districts and cities in analyzing food security. This dichotomy has not been used in previous research, making it a novelty in this article.

Gendempw: Gender Empowerment Index
Poverty: Poverty Level in the Special Region of Yogyakarta

HDI: Human Development Index in the Special Region of Yogyakarta

Regency/City: Differences between regencies and cities in the Special Region of Yogyakarta

€: Error

The analysis was conducted through two main stages. First, a review of literature and policy documents to map the conceptual relationship between the quality of women's human resources and food security, including differences in the characteristics of cities and regencies. Second, a thematic synthesis was conducted to produce substantive findings on dichotomous patterns and relevant interventions for enhancing women's roles in the food system.

test value of 7.373 indicating a significant simultaneous model for analyzing the influence of female human resource quality on food security. Structurally, this finding confirms that the combination of the Gender Empowerment Index (Gendempw), poverty, and Human Development Index

(HDI) variables, as well as the dichotomy of cities and regencies, are relevant determinants in explaining variations in

food security in the region. The following are the results of data processing in the developed model.

Table 3 Results of Food Security Data Processing and Influencing Factors

Variable	Coefficient	t-Statistic	Kesimpulan	Adj-R ²	F-Test
Foodsec	-.026	-2.014	Significant	0,569	7,373
Gendempw	.065	3.191	Significant		
Poverty	-.005	-1.054	Not Significant		
HDI	-.045	-.0720	Not Significant		
Kab/Kota	-.280	-0.068	Not Significant		

Source: Compiled from various sources, 2025

The results of the test for differences in food security between cities and regencies showed no significant differences. This means that food security and the variables influencing it in the Special Region of Yogyakarta do not show any differences between cities and regencies.

The Gendempw coefficient of 0.065, with a significant t-test value, indicates that increased women's empowerment, reflected in access to education, decent work opportunities, and political participation, is positively correlated with increased food security in the Special Region of Yogyakarta. Substantively, when women have a stronger bargaining position, they are better able to access resources, make decisions regarding food production and consumption, and manage household food insecurity risks.

The small, negative poverty coefficient (around -0.005) and insignificant coefficient indicates that statistically, variations in poverty levels between regencies/cities in the Special Region of Yogyakarta are not strong enough to explain differences in the food security index, although poverty is theoretically a major determinant of food insecurity.

The negative and insignificant HDI coefficient is interesting because theoretically, improvements in the quality of human development (education, health, and standard of living) should strengthen food security. A logical explanation is that the HDI in Yogyakarta is relatively high and its variance is small across districts/cities, making its contribution statistically difficult to detect in the model; in other words, the HDI has reached a "saturation level" and is no longer a key differentiator between regions in terms of food security.

The analysis of differences between districts and cities revealed no significant differences in food security between cities and districts, indicating that food security policies in Yogyakarta are relatively equitable.

The model shows that improving food security in the Special Region of Yogyakarta (DIY) is more effective if it focuses on reducing gender inequality and increasing women's empowerment, rather than solely relying on increasing macro indicators such as the already relatively high HDI. The insignificance of poverty and HDI does not imply that these variables are unimportant, but rather indicates that in the current DIY context, these variables operate through other channels (e.g.,

women's empowerment, program access, social networks), thus masking their direct impact on food security.

Theoretically, these results reinforce the importance of incorporating social, gender, and institutional dimensions into food security models, which have traditionally overemphasized production and macroeconomic variables.

The positive and significant Gendempw coefficient indicates that increasing women's empowerment through increased access to education, both formal and informal, as well as participation in politics and economic opportunities, significantly correlates with increased food security. This finding is consistent with previous research literature that places women's empowerment as a key factor in improving household and community food security, as demonstrated by (Essilfie et al., 2024). In that study, they found that increasing women's capacity and autonomy directly contributed to improving household food security. Similarly, (Sinclair et al., 2022) found that women's autonomy in decision-making regarding food and health in indigenous communities is closely associated with improved food security, while (Nwaka et al., 2020) emphasized women's role as key economic actors and household food managers.

The strength of this study lies in the consistency between the results of the quantitative and qualitative approaches. Root cause analysis (RCA) and policy review confirm that factors hindering women's contribution to food security are not only income, but also unequal access to land, limited technical and digital capacity, and minimal female representation in food institutions. This aligns with the findings of Wibowo (2020) regarding the importance

of women's adaptation to agricultural digitalization, as well as Jati (2020) and Harini et al. (2022) who emphasize the role of information, climate adaptation, and local capacity in maintaining food security in the outskirts of Yogyakarta.

Conceptually, the results of this study confirm and extend the findings of (T. Agarwal et al., 2022) and (Essilfie et al., 2024), and (Sharma, 2019) argue that women's empowerment is inseparable from the design of effective food security policies, especially when poverty and human development issues exhibit more complex patterns at the regional level. The model used demonstrates that social and gender dimensions are able to explain variations in food security in regions with relatively good macro indicators, thus strengthening the argument for the importance of integrating a gender perspective in food security analyses, which have tended to be dominated by production and macroeconomic variables.

Regency/city dummy tests indicate no significant differences in the food security index between urban and regency areas in the Special Region of Yogyakarta. This means that food security policies in this province are relatively equitable and do not create sharp structural gaps between urban and rural areas, although at the micro level, there are still variations in household access and strategies. This finding adds to the literature that typically emphasizes urban-rural disparities in food security and demonstrates that cross-regional policy integration in the Special Region of Yogyakarta has been relatively successful in maintaining consistent food security outcomes, even though social determinants such as gender and poverty continue to operate differentially within regions.

CONCLUSION

1. This study shows that improving the quality of women's human resources, as measured by the Gender Empowerment Index, has a positive and significant impact on food security in districts/cities in the Special Region of Yogyakarta (DIY). Therefore, strengthening women's empowerment is proven to be a more effective policy lever than simply relying on improvements in macro indicators such as the already relatively high HDI.
2. The insignificance of poverty and HDI does not imply that these two variables are unimportant, but rather indicates that in the current DIY context, these variables operate through other channels (e.g., women's empowerment, program access, social networks), thus masking their direct impact on Foodsec.
3. Theoretically, these results reinforce the importance of incorporating social, gender, and institutional dimensions into food security models that have traditionally overemphasized production and macroeconomic variables.
4. The lack of significant differences in food security between cities and districts indicates that food security policies in the Special Region of Yogyakarta are relatively equitable, although at the micro level, there are still variations in access and household adaptation strategies. The consistency between quantitative and qualitative findings strengthens the argument that future policies to improve food security must focus on reducing gender inequality, strengthening women's technical, digital, and institutional capacities, and more explicitly integrating women's empowerment programs with the national food security agenda. Thus, this research provides theoretical and practical contributions to the development of a food security model that positions women not merely as beneficiaries but as key actors in the planning and implementation of sustainable food policies.

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