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# Governance and Sustainable Pathways to Food Security: The Critical Role of Fiscal Capacity and Logistical Infrastructure

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**ABSTRACT**

Food security is a national strategic issue that requires the coordination of fiscal policy, local government performance, and efficient logistics. West Sulawesi Province has substantial agricultural, plantation, and fisheries potential, yet food self-sufficiency remains suboptimal due to low fiscal independence, limited regional budget effectiveness, and inadequate distribution infrastructure. This study examines the impact of fiscal accountability, regional budget performance, and logistics on food self-sufficiency and projects outcomes to 2029. A Quantitative-Qualitative Hybrid Model with an explanatory sequential design was applied. Quantitative analysis used Structural Equation Modeling (WarpPLS), while qualitative data were collected through interviews, focus group discussions, and SOAR analysis. ARIMA was employed for projections of food self-sufficiency. Results show fiscal accountability negatively affects food self-sufficiency (coefficient -0.220; $p = 0.032$), regional budget performance has a positive effect (coefficient 0.335; $p = 0.002$), and logistics negatively influences outcomes (coefficient -0.780; $p < 0.001$). Projections indicate improvements in fiscal independence, local revenue effectiveness, and spending efficiency, alongside reductions in logistical constraints, raising the Food Security Index from 75.72 in 2026 to 78.77 in 2029. These findings suggest that strengthening fiscal capacity, optimizing regional budgets, and developing integrated logistics infrastructure are essential strategies to accelerate West Sulawesi's achievement of its 2029 food sovereignty target.

## 1. INTRODUCTION

According to Law Number 18 of 2012, food security is defined as the condition of ensuring that all people have access to food that is available, safe, nutritious, equitable, and affordable on a sustainable basis. Food security is measured using the Food Security Index, which comprises the Availability Index, the Affordability Index, and the Utilization Index [1-3]. This policy framework aligns with President Prabowo Subianto's Asta Cita (Government Goals) outlined in the 2025-2029 National Medium-Term Development Plan (RPJMN), specifically Asta Cita 2 on food self-sufficiency and Asta Cita 3 on the Development of Infrastructure, Logistics, and the Agro-Maritime Industry. Achieving food self-sufficiency requires effective coordination and synchronization between central and regional governments [4].

West Sulawesi Province possesses significant potential in agriculture, plantations, fisheries, and livestock. According to 2024 BPS data, agricultural land covers 1,429.29 km², plantations 3,969.32 km², and marine areas approximately 20,342 km², with the potential to produce 929,700 tons of capture fisheries annually, while cultivated land reaches 74,300 hectares [5]. However, this potential has not yet been fully leveraged to achieve food self-sufficiency [6]. Key challenges include fluctuations in rice and corn production due to land conversion and climate change, low utilization of capture fisheries (only 10%), and a decline in the West Sulawesi Food Security Index by 1.37 points in 2024, shifting its status from "Very Resilient" to "Resilient" [7, 8]. Food vulnerability has increased in Majene and Pasangkayu due to urbanization and land conversion, while food availability decreased by 7.10 points in 2024. Socioeconomic factors further exacerbate the situation, including a poverty rate of 14.31% and a stunting prevalence of 37.6% in Mamasa. Overall, West Sulawesi has the fifth-highest stunting prevalence in Indonesia at 30.3%. Dependence on food from outside the region is evident in high household food

expenditures: Polewali Mandar (32.06%), Mamasa (25.18%), and Majene (26.36%). Additional threats include illegal mining activities and disaster risks, reflected in an Integrated Risk-Based Index (IRBI) of 160.09 [7, 8].

From an economic perspective, West Sulawesi's growth was only 4.76%, below the national average of 5.03%. The Fishermen's Exchange Rate of 95.83 also lagged behind the national average of 102.35, while the Human Development Index (HDI) of 70.46 remained lower than the national average of 75.02 [7, 8]. Fiscal performance was weak, reflected in low tax ratios in the regional budget (0.84%) and national budget (1.82%), far below the national target of 9.95-10.20%. Regional revenues relied heavily on central transfers (86.17%), with local revenue (PAD) contributing only 12.89%. Food security budget realization reached IDR 432.67 billion, only 58.27% of the IDR 742.48 billion ceiling, indicating potential underspending and suboptimal implementation [7, 8].

From a logistical perspective, basic infrastructure remains limited. Clean water availability is only 70.51% in Mamasa and 30.23% in Polewali Mandar, constraining food production and distribution. The agriculture, forestry, and fisheries sector contributes 47.32% of regional GRDP, yet fiscal and logistical support remains insufficient. Central transfers dominate at 92.27%, while PAD contributes only 7.73%. Despite a regional budget surplus of IDR 262.72 billion in the first quarter of 2025, spending realization was just 11.79% of the ceiling, indicating underutilization of resources. Distribution challenges persist, as programs like low-cost markets, market operations, and the Food and Agriculture Supervisory Agency (CBP) have not curbed inflation in commodities such as fish, chilies, and tomatoes. Innovations, including the Red and White Village Cooperative and agricultural digitalization, remain pilot initiatives and are not yet fully integrated. These conditions suggest that the success of food sovereignty in West Sulawesi heavily depends on harmonized fiscal policy, effective regional budgeting, and efficient logistics.

Based on data from 2017-2025, fiscal accountability in West Sulawesi and its six regencies remained low. Nearly all regencies recorded a fiscal independence ratio below 7%, with Mamasa and Central Mamuju frequently below 3%. The average tax ratio was generally below 0.7, reaching as low as 0.2 in Mamasa, while the fiscal dependency ratio exceeded 93%, even reaching 98% in 2017, with little improvement over time [7]. Fiscal accountability is a crucial principle in transparent, efficient, and responsible public budget management to optimize regional food potential [9-13]. Although regional budget performance from 2017–2025 showed relatively high local own-source revenue effectiveness (> 85%) and spending efficiency (> 80%), these gains have not translated into greater regional independence. Fluctuations in budget realization highlight deviations due to administrative challenges and procurement delays.

In the food sector, regional budget performance reflects the effectiveness of budget management and allocation in supporting food security and public welfare [14-16]. Logistics plays a complementary role by ensuring efficient supply chains and infrastructure to optimize food production, distribution, and consumption [17, 18]. The underlying phenomenon motivating this research is the structural imbalance between West Sulawesi's significant economic potential and its weak fiscal capacity and logistics system supporting food security. This situation necessitates a comprehensive analysis with measurable projections of fiscal accountability, regional budget performance, and logistics management as strategic factors for regional food independence. Accordingly, this study seeks to answer: What are the impacts and projections of fiscal accountability, regional budget performance, and logistics in supporting sustainable food self-sufficiency in West Sulawesi, and how do they relate to achieving food sovereignty by 2029?

## 2. LITERATURE REVIEW AND HYPOTHESIS

### 2.1 Fiscal accountability and food security

Fiscal accountability underscores the government's responsibility to manage public budgets transparently, efficiently, and responsibly to achieve development objectives. A strong accountability system contributes to a healthy and sustainable food environment [9]. In developing countries, accountability in agricultural governance is closely linked to food security, with weak budget transparency potentially hindering food self-sufficiency [10]. Further evidence shows that accountable fiscal policies positively affect public welfare and the fulfillment of food needs [11, 12]. In the Chinese context, strengthening political and fiscal accountability significantly improved food security outcomes [13]. Nevertheless, even high fiscal accountability does not automatically ensure food self-sufficiency; it must be paired with effective and targeted budget allocation to yield positive impacts on food security [19].

**Hypothesis 1:** Fiscal accountability has a significant effect on the achievement of food self-sufficiency.

### 2.2 Regional budget performance in supporting food self-sufficiency

Regional budget performance is a critical instrument for supporting food security through effective revenue generation and efficient regional spending. Successful regional budget management is largely determined by government programs that foster fiscal independence [14]. Adequate fiscal capacity enables local governments to enhance development governance, including in the food sector [15]. In the Indonesian context, the effectiveness of local revenue (PAD) and efficiency of regional spending directly influence economic growth, forming the basis for food security policies [20, 21]. Effective budget allocation in the agricultural sector accelerates the achievement of food self-sufficiency [22, 23], while rural fiscal independence strengthens local food security [16]. Studies from the European Alps indicate that regional food self-sufficiency is largely determined by local governments' capacity to manage budgets and resources effectively [24]. Similarly, research in Indonesia confirms that food self-sufficiency positively impacts economic growth when supported by efficient regional budget management [25].

**Hypothesis 2:** Regional budget performance has a significant positive effect on the achievement of food self-sufficiency.

### 2.3 Logistics and infrastructure in food security

In addition to fiscal and regional budget factors, logistics plays a strategic role in ensuring food distribution and access. Food self-sufficiency depends not only on production

availability but also on efficient distribution through a well-functioning logistics system [17]. Effective supply chain management, particularly for staple foods such as rice, is essential to achieve national food self-sufficiency [18]. In the Indonesian context, limited logistics infrastructure, including access to electricity and clean water, significantly affects the Food Security Index [26, 27]. Water resource infrastructure also supports sustainable food self-sufficiency by enabling consistent agricultural production [28]. Globally, a region's food self-sufficiency is strongly influenced by distribution capacity and inter-regional logistics connectivity [29, 30]. Adequate logistics infrastructure development is therefore a critical factor in achieving long-term sustainable food security [31].

**Hypothesis 3:** Logistics and infrastructure have a significant effect on the achievement of food self-sufficiency.

## 3. RESEARCH METHOD

This study employed a Quantitative-Qualitative Hybrid Model approach with an explanatory sequential design [32]. The quantitative method served as the primary analytical approach, while the qualitative method functioned as a complementary component to clarify and contextualize the statistical results. The study used secondary data sourced from the Central Statistics Agency (BPS), the National Food Agency (Bapanas), the Directorate General of the Treasury, and regional financial data from provincial and regency-level agencies responsible for food governance and budget management in West Sulawesi.

The empirical analysis covered the 2017-2025 period, selected based on two methodological considerations. First, although Law Number 18 of 2012 on Food has provided the national regulatory framework for food security, the standardized publication of the Food Security Index (Availability, Affordability, and Utilization) and the harmonization of regional fiscal indicators, such as fiscal independence ratio, tax ratio, fiscal dependency, PAD effectiveness, and spending efficiency, only became consistently available across all West Sulawesi regencies beginning in 2017, following the integration of regional reporting systems (SIMDA, SIPD, and Ministry of Finance KFR datasets). Second, extending the dataset before 2017 would introduce inconsistencies due to changes in administrative classifications and the restructuring of food and agricultural governance under Law 23/2014. The 2017-2025 window also avoids distortions arising from the 2015-2016 regional authority restructuring in the food and agricultural sectors and the nationwide transition to SIPD, which reshaped how PAD, fiscal ratios, and spending efficiency were recorded. Given these changes, extending the dataset back to 2012 would weaken the comparability of fiscal indicators and risk producing biased estimates. Therefore, the 2017-2025 range ensures complete, comparable, and methodologically reliable data for assessing the impact of fiscal accountability, regional budget performance, and logistics on food self-sufficiency. The following are the procedures and stages of this research:

In the first stage, this research began with the collection of secondary data related to fiscal matters, regional budgets, logistics, and food security for the period 2022-2024, utilizing the aforementioned secondary data sources. In the second stage, the researchers processed and grouped the secondary data, then analyzed it with the WarpPLS statistical tool. This stage employed SEM to examine the relationships between fiscal accountability, regional budget performance, and logistics in achieving food self-sufficiency.

In this study, the fiscal accountability variable (X1) is measured using the fiscal independence ratio, the Tax Ratio to the Regional Budget, and the fiscal dependence ratio [33]. The regional budget performance variable (X2) is measured using the regional original revenue effectiveness ratio, the regional independence ratio, the expenditure variance analysis ratio, the regional financial efficiency analysis ratio, and the revenue variance analysis ratio [20, 21]. The Logistics variable (X3) is measured using indicators for food-supporting logistics, such as the percentage of households without access to electricity and the percentage without access to clean water [26]. The food self-sufficiency variable (Y) is measured using the regional Food Security Index, which includes the Availability Index, Affordability Index, and Utilization Index [27].

$$Y = \alpha + \beta X1 + \beta X2 + \beta X3 + \varepsilon \quad (1)$$

Information:
$Y$ = Food self-sufficiency variable;
$X1$ = Fiscal accountability;
$X2$ = Regional budget performance;
$X3$ = Logistic;
$\epsilon$ = Error term.

The third phase integrates the results of the second phase into a qualitative analysis by examining non-quantitative factors influencing food self-sufficiency in West Sulawesi and gathering insights on the future of the province's self-sufficiency program. Based on this integration, researchers will conduct focus group discussions (FGDs) and direct interviews with experts and officials involved in the financial, planning, public works, and food security sectors in Majene, Polewali Mandar, Mamuju, North Mamuju, Central Mamuju, and across West Sulawesi Province.

To strengthen the methodology, triangulation analysis will be employed to validate the data and ensure the reliability of information used in formulating conclusions. Researchers will also use SOAR analysis, which can be integrated with data collected from interviews and FGDs. This approach enables an assessment of both the current and projected conditions of the food self-sufficiency process in West Sulawesi, providing a comprehensive understanding of ongoing challenges and future opportunities.

The final stage of the research involves conducting projections for the next four years (2026–2029) to mathematically describe future conditions for achieving food self-sufficiency and supporting the realization of food sovereignty in West Sulawesi Province by 2029. The analysis uses the ARIMA model to project regional fiscal performance, regional budget performance, and food security outcomes during this period. ARIMA testing was performed with EViews software on time series data for food self-sufficiency (Y), fiscal accountability (X1), regional budget performance (X2), and logistics (X3).

The analysis process includes stationarity testing using the Augmented Dickey-Fuller (ADF) method, applying differencing if the data are non-stationary, identifying model orders (p, d, q) through ACF and PACF pattern analysis, estimating parameters using the ARIMA (p, d, q) or ARIMAX command (when incorporating X1, X2, X3), and conducting residual diagnostic tests to confirm white noise and normality

properties. The optimal model is selected based on the lowest AIC and SC values, statistically significant coefficients, and adequate $R^2$ values. The forecasting results are subsequently used to project food self-sufficiency trends and inform policy formulation based on historical data [34, 35].

## 4. RESULTS AND DISCUSSION

Based on the WarpPLS output, the outer model analysis indicated that all reflective construct indicators had significant loadings ($p < 0.001$), satisfying the criteria for convergent validity. The Average Variance Extracted (AVE) values exceeded the 0.50 threshold for all constructs: X1 (fiscal accountability) = 0.814, X2 (regional budget performance) = 0.788, X3 (logistics) = 0.798, and Y (food self-sufficiency) = 0.753, indicating that each construct explained more than 50% of the variance in its indicators. Regarding reliability, both Composite Reliability (CR) and Cronbach's Alpha values were adequate for all constructs (CR: 0.738-0.988; Alpha: 0.701-0.988), demonstrating strong internal consistency among indicators. Discriminant validity was also confirmed, as the square root of the AVE for each construct (diagonal values: X1 = 0.902; X2 = 0.623; X3 = 0.893; Y = 0.808) exceeded the correlations between constructs, empirically distinguishing each construct [36, 37]. The outer weight results in Table 1 show that all indicators had p-values < 0.001, below the 0.05 threshold. Additionally, the Variance Inflation Factor (VIF) values were 4.409, below the critical limit of 5, indicating that the model satisfies the outer model criteria.

**Table 1.** Inner model test output

| Testing | Results | Criteria | Conclusion |
|---|---|---|---|
| Average path coefficient (APC) | P < 0.001 | 0.05 | Meet the criteria |
| Average R-squared (ARS) | P < 0.001 | 0.05 | Meet the criteria |
| Average adjusted R-squared (AARS) | P < 0.001 | 0.05 | Meet the criteria |
| Average block VIF (AVIF) | 4.520 | < 5 | Meet the criteria |
| Average full collinearity VIF (AFVIF) | 4.816 | < 5 | Meet the criteria |
| Tenenhaus GoF (GoF) | 0.695 | Large | Meet the criteria |
| Simpson's paradox ratio (SPR) | 1 | ideally = 1 | Meet the criteria |
| R-squared contribution ratio (RSCR) | 1 | ideally = 1 | Meet the criteria |
| Statistical suppression ratio (SSR) | 1 | ideally = 0.7 | Meet the criteria |
| Nonlinear bivariate causality direction ratio (NLBCDR) | 1 | ideally = 0.7 | Meet the criteria |

The inner model evaluation using WarpPLS 8.0 yielded the following results. The APC, ARS, and AARS values were all below 0.05, indicating that the model met the required criteria. The AVIF value was 4.520 and the AFVIF value was 4.816, both below the threshold of 5, suggesting that multicollinearity was not present. The Tenenhaus Goodness-of-Fit (GoF) value was 0.295, indicating that the research model is considered strong (large). The adjusted R-square value was 0.714, meaning that the variables in this study explained 71.4% of the variance, while the remaining 28.6% was influenced by factors outside the study. These results confirm that the research model satisfies the criteria for both outer and inner model evaluation [36, 37].

**Table 2.** Summary of research hypothesis

| Hypothesis | Coefficient | P Value | Results | Conclusion |
|---|---|---|---|---|
| Fiscal accountability for achieving food self-sufficiency | -0.220 | 0.032 | Negative and Significant Impact | Hypothesis accepted |
| Regional budget performance in achieving food self-sufficiency | 0.335 | 0.002 | Positive and Significant Impact | |
| Logistics towards achieving food self-sufficiency | -0.780 | < 0.001 | Negative and Significant Impact | |

Table 2 shows that the fiscal accountability variable, represented by the fiscal independence ratio, tax ratio, and fiscal dependency ratio, has a negative and significant effect on the achievement of food self-sufficiency, with a coefficient of -0.220 and a p-value of 0.032. The negative coefficient for fiscal accountability indicates that improvements in fiscal transparency and reporting do not automatically translate into better food self-sufficiency outcomes. In this study, fiscal accountability is measured through ratios such as fiscal independence, tax ratio, and fiscal dependency, which primarily capture the structure of regional revenue, not the quality of budget prioritization. Regions with higher fiscal accountability ratios in West Sulawesi tend to have limited fiscal space, high dependency on central transfers, and competing mandatory spending obligations (education, health, infrastructure). As a result, even when accountability mechanisms improve, budget allocations to agriculture and food systems remain low, producing a negative relationship. This means fiscal accountability reflects how well money is reported, not where money is directed. Therefore, the negative sign reflects a structural mismatch: strong reporting systems coexist with underinvestment in the food sector, a pattern also noted in previous research [10, 16, 19].

Moreover, the finding of a significant negative effect of higher fiscal accountability on food self-sufficiency suggests that budget allocations toward strategic sectors, such as agriculture, remain suboptimal, limiting the ability of fiscal accountability to enhance food self-sufficiency. These results empirically support Hetling et al.'s caution that accountability must be paired with effective, targeted budget allocation to positively impact food security [19].

This is in accordance with the findings that financial management offices across all districts and the province reported that the regional fiscal independence ratio ranged from 2.00 to 7.07 during 2017–2025, the tax ratio ranged from 0.20 to 0.80, and the fiscal dependency ratio consistently

exceeded 90%. Although regional financial management has been implemented transparently and in accordance with regulations, budget allocations remain divided across various priority sectors, such as public infrastructure and basic services (education and health), resulting in suboptimal funding for the food sector.

The results in Figure 1 indicate that regional budget performance has a positive and significant effect on food self-sufficiency (coefficient = 0.335; p = 0.002), while logistics exhibits a strong negative impact (coefficient = -0.780; p < 0.001). This suggests that good budget execution can partially buffer against logistics constraints, but cannot completely overcome them. Efficient budget management allows local governments to allocate funds toward storage, local distribution, and small infrastructure projects, which can alleviate some logistical bottlenecks and improve access to food. For example, districts with higher PAD effectiveness and spending efficiency, such as Polewali Mandar, are better able to fund transport subsidies or warehouse facilities, slightly mitigating the negative effects of poor logistics [9, 17, 18].

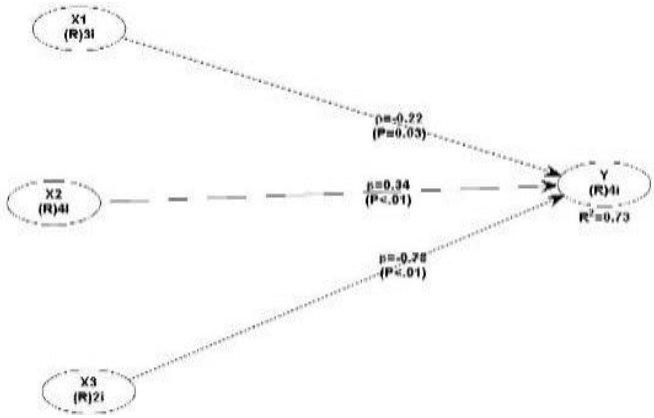


**Figure 1.** WarpPLS 8.0 output results

However, in areas with significant infrastructure limitations, such as Mamasa and Central Mamuju, even well-executed budgets cannot fully resolve delays or high distribution costs. This demonstrates that budget execution is necessary but not sufficient: improving fiscal management alone does not guarantee food self-sufficiency if logistical and infrastructure constraints persist. These findings are consistent with previous studies showing that fiscal capacity enhances the potential to address distribution challenges but must be complemented by targeted investments in logistics and infrastructure to achieve sustainable food security [10, 16, 26].

From a food security perspective, higher fiscal accountability does not automatically enhance food production. For example, in Polewali Mandar, a fiscal independence ratio of 7.06 and a tax ratio of 0.80 in 2023 still left a 92.94% dependency on central transfers, with food self-sufficiency unmet. Similar patterns were observed in Mamasa Regency (2025), with fiscal independence of only 2.71 and continued reliance on central food programs, limiting local initiatives. Even regions with stronger fiscal capacity often fail to prioritize agriculture in their budgets. Interviews revealed additional challenges, including climate change, land productivity, limited farmer access, and price volatility. Thus, fiscal accountability alone is insufficient; effective budget allocation, policy priorities, and external conditions are decisive, supporting prior findings [10, 16, 19].

SOAR analysis indicates that regional financial management demonstrates strong accountability and transparency, supported by higher fiscal independence in some regencies. While regional budget performance significantly influences food self-sufficiency (coefficient 0.335; p = 0.002), allocations to food, agriculture, maritime, and fisheries remain only 2–3% of total spending, limiting direct impact. Nonetheless, effective fiscal management—reflected in high revenue effectiveness (≥ 90%) and spending efficiency (> 85%)—has enabled improvements such as reservoir construction, land expansion, and input distribution, boosting yields and reducing reliance on external supplies. Interviews confirm that high-budget performance accelerates food programs despite limited allocations. These findings align with prior research linking regional budget performance with food self-sufficiency [14, 22-24].

Based on statistical testing, the logistics variable demonstrated a negative and significant effect on achieving food self-sufficiency, with a coefficient of -0.780 and a p-value < 0.001. This indicates that greater logistical challenges are associated with lower food self-sufficiency in West Sulawesi Province. Distribution constraints, high transportation costs, and limited basic infrastructure remain significant obstacles, even when overall production is sufficient. Secondary data from 2017-2025 highlight areas with limited access to basic infrastructure. For instance, in 2025, Mamasa Regency had 6.38% of households without electricity and 19.7% without access to clean water, relatively high compared to other regencies. In contrast, Polewali Mandar Regency recorded only 0.95% without electricity and 4.25% without clean water, reflecting comparatively better logistical conditions.

Interviews with Public Works Department officials confirmed that logistics remain a critical barrier to food security. Poor road conditions and limited transportation in Mamasa and Central Mamuju increase distribution costs and delivery times, raising food prices and reducing supply efficiency despite sufficient stocks. Capital expenditure for agricultural and fisheries infrastructure remains low, further limiting sectoral support. Infrastructure data reveal disparities in electricity and clean water access, with Mamasa and Central Mamuju exceeding 3% without electricity and over 9% without clean water by 2025. These inequities hinder food self-sufficiency and welfare improvement. The Food Security Agency also confirmed unequal distribution: in 2023, Central Mamuju had 4.17% of homes without electricity and 10.08% without clean water, while Majene's hilly terrain continues to restrict transport efficiency.

Such barriers reflect broader structural challenges. As noted in previous studies, food security depends not only on production but also on distribution and accessibility through roads, transport, and utilities [25, 28-31]. These findings are consistent with Presidential Regulation No. 59/2017 on SDGs (Zero Hunger) and Minister of Agriculture Regulation No. 43/2019, which emphasize the importance of strengthening logistics and infrastructure.

SOAR analysis confirms that regions with stronger infrastructure, such as Polewali Mandar, achieve more efficient food distribution. Improved access enables storage optimization and logistics innovation, while future aspirations focus on integrating infrastructure with supply chains. Conversely, weak infrastructure in Mamasa and Central Mamuju continues to increase costs, reduce product quality, and delay food self-sufficiency.

Based on forecasting results using the ARIMA method—after ensuring data stationarity post-differencing, identifying the appropriate model order (p, d, q) through Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) analyses, estimating statistically significant parameters, verifying white noise and normally distributed residuals, and selecting the best model using the lowest Akaike Information Criterion (AIC) and Schwarz Criterion (SC)–projections for fiscal performance, regional budget performance, logistics infrastructure, and the Food Security Index of West Sulawesi Province for 2026–2029 were obtained. Figures 2–5 show projected trends for 2026–2029, with Figure 2 presenting all variables, Figure 3 detailing regional budget performance, Figure 4 illustrating logistics and infrastructure, and Figure 5 depicting the Food Security Index and its sub-indices.

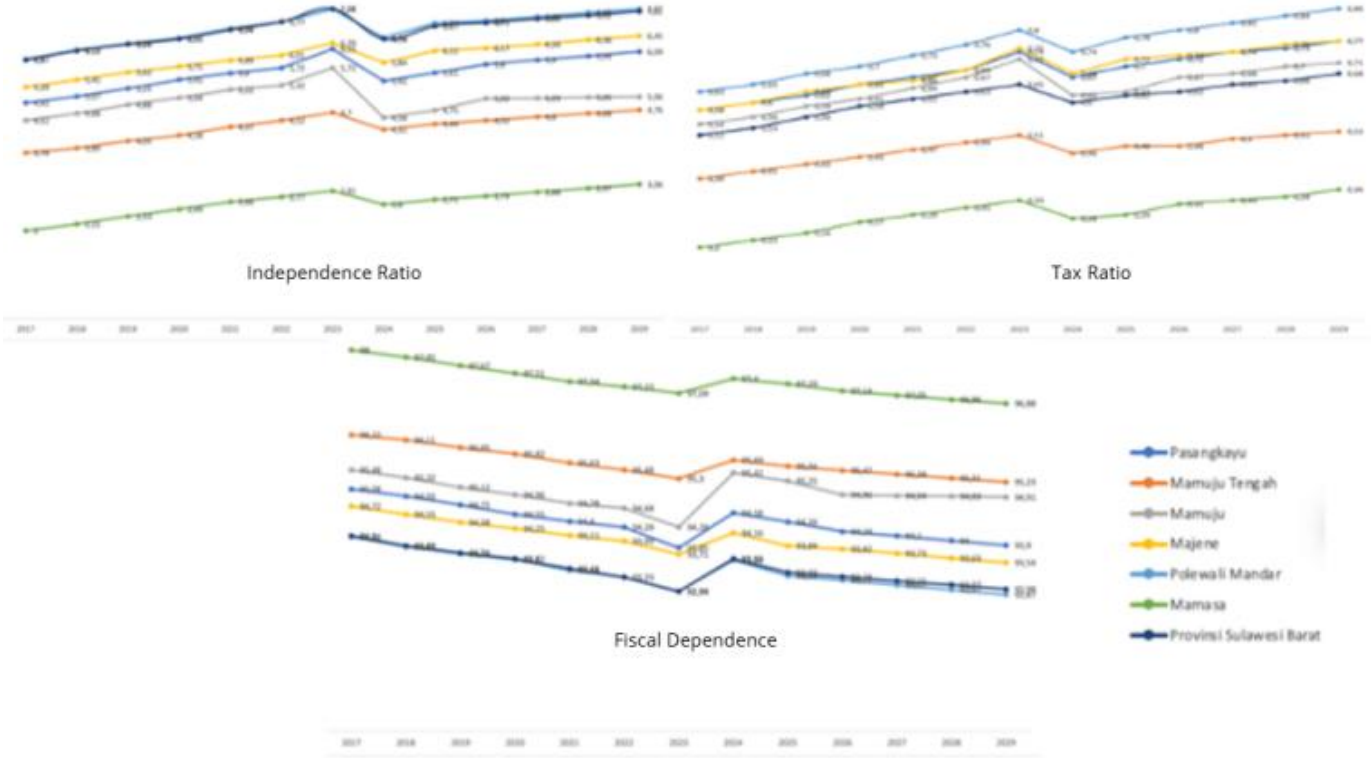


**Figure 2.** Projections for fiscal accountability indicators

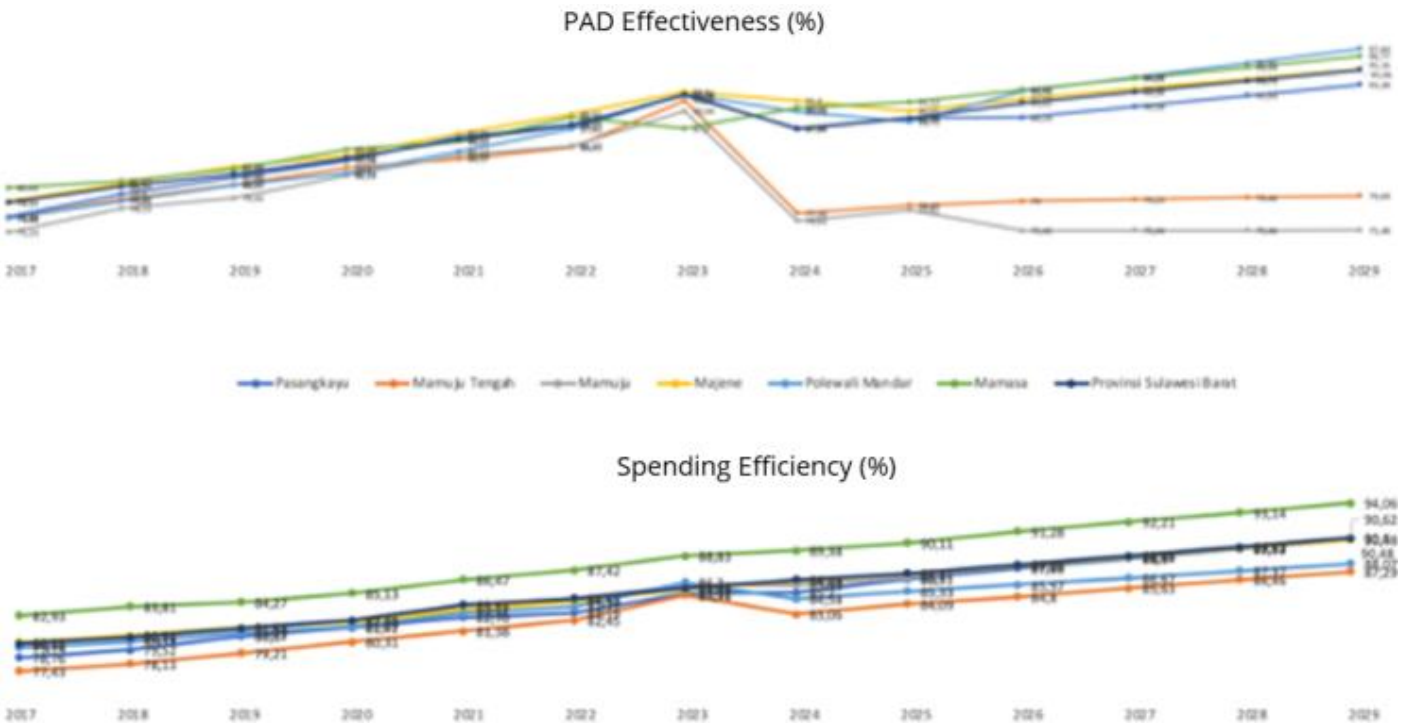


**Figure 3.** Projections for regional budget performance indicators

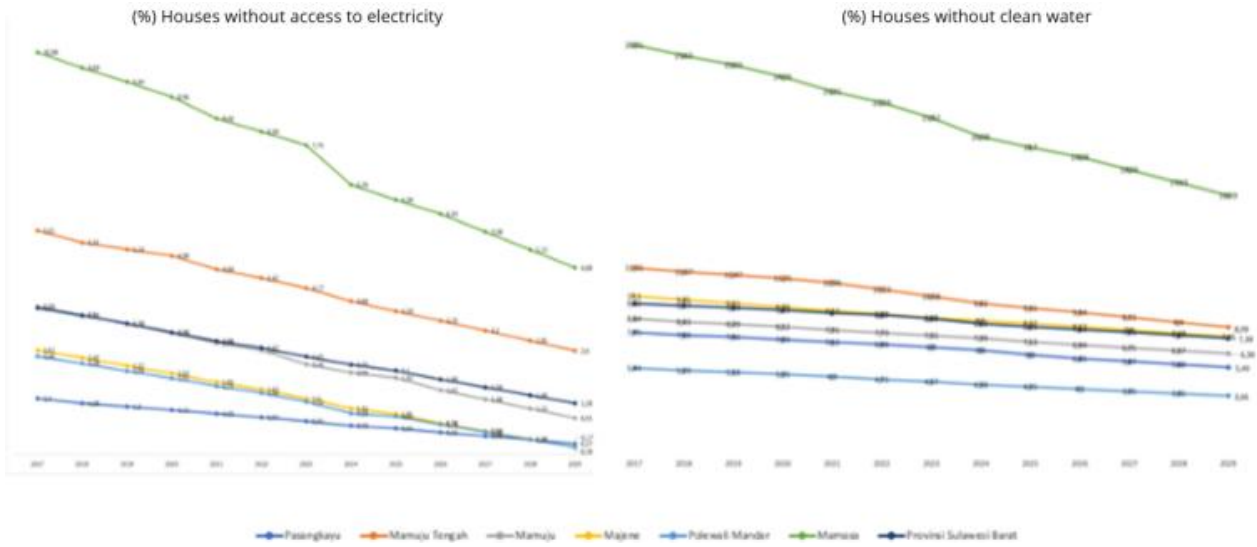


**Figure 4.** Projections for logistics/infrastructure indicators

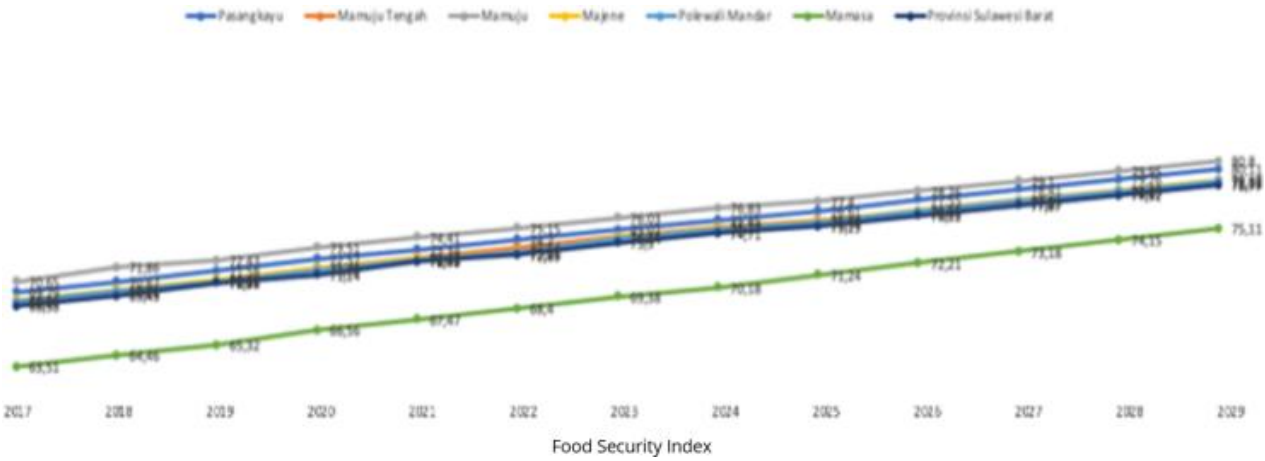


**Figure 5.** Projections for food security indicators

Forecasting results using the best model show an increasing trend in most provincial fiscal and food security performance indicators. The fiscal independence ratio is projected to rise from 6.75 in 2026 to 7.01 in 2029. Local revenue effectiveness is expected to reach 95.06% in 2029, while spending efficiency increases from 87.95% in 2026 to 90.62% in 2029. Logistics indicators also improve, with households without electricity projected to decrease to 1.28% and those without access to clean water to 7.38% by 2029. Meanwhile, the Food Security Index is projected to rise from 75.72 in 2026 to 78.77 in 2029. These trends suggest that continued fiscal strengthening, optimized regional budget performance, and improved logistics infrastructure can further enhance food self-sufficiency in West Sulawesi.

The projected improvements align with national and regional policies prioritizing food self-sufficiency, including Law No. 18 of 2012 on Food, Presidential Regulation No. 59 of 2017 on the SDGs (SDG 2 Zero Hunger), the 2025-2029 National Medium-Term Development Plan (Asta Cita 2 and 3), and Minister of Agriculture Regulation No. 43/2019 on Agricultural Area Development. Regionally, the 2022-2026 West Sulawesi Provincial Medium-Term Development Plan and regional budget regulations provide guidelines for the food sector and supporting infrastructure. This legal framework underpins strategies to strengthen fiscal capacity, optimize budget performance, and enhance logistics to achieve the 2029 food sovereignty target. This legal aspect is in accordance with previous findings that regions with stronger infrastructure, such as Polewali Mandar, achieve more efficient distribution, aligning with previous arguments that governance effectiveness and coordinated policy implementation enhance service delivery and resource management [38, 39].

Likewise, studies confirm that infrastructure strength and land governance drive regional productivity, supporting the finding that weak infrastructure increases distribution costs and lowers product quality [40, 41]. These conclusions are reinforced by broader literature on fiscal accountability, which consistently shows that transparent and accountable budgeting improves food environments, agricultural governance, and welfare outcomes (9–13). However, accountability alone is insufficient without targeted budget allocation, a point emphasized by earlier research and consistent with this study's emphasis on aligning fiscal strengthening with food self-sufficiency goals [19].

The ARIMA forecasting process supports projections of rising fiscal independence, revenue effectiveness, spending efficiency, and logistics improvements from 2026-2029, reflecting institutional impacts. The findings also alligned with previous studies on regional budgeting and logistics capacity showing that regional fiscal independence and adequate budget capacity enable better development governance,

echoing the projected strengthening of West Sulawesi's PAD effectiveness and spending efficiency [14, 15, 42, 43]. Indonesian studies also confirm that effective regional revenue and expenditure management stimulate economic growth and underpin food security strategies [20, 21].

## 5. CONCLUSIONS

Based on the research results, the achievement of food self-sufficiency in West Sulawesi Province for the 2017-2025 period is influenced by three main factors: fiscal accountability, regional budget performance, and logistics, each with different directions of influence. Fiscal accountability has a significant negative effect (coefficient –0.220; $p = 0.032$), indicating that although regional financial management is transparent and accountable, budget allocation is not optimized for strategic sectors supporting food self-sufficiency due to low fiscal independence, high dependence on central transfers, and shifting development priorities. Regional budget performance has a significant positive effect (coefficient 0.335; $p = 0.002$), showing that effective budget planning and execution can enhance food self-sufficiency, even though the proportion of spending dedicated to the food sector remains limited. Conversely, logistics has a significant negative effect (coefficient –0.780; $p < 0.001$), demonstrating that distribution constraints, limited infrastructure, and high transportation costs remain major obstacles despite available production. ARIMA projections for 2026-2029 indicate potential improvements in fiscal independence, local revenue (PAD) effectiveness, spending efficiency, reduced logistical barriers, and an increase in the Food Security Index from 75.72 to 78.77. These trends suggest that with strengthened fiscal capacity, optimized regional budget performance, and consistent logistics improvements, West Sulawesi's 2029 food sovereignty target is achievable.

In light of these findings, it is recommended that the provincial government increase budget allocations for the agriculture and food sectors, expand fiscal capacity, and accelerate logistics infrastructure development in areas with distribution constraints. Development planning should integrate fiscal policy, budget performance, and logistics improvements in a coordinated manner, supported by partnerships with BUMDes, cooperatives, the private sector, and local communities. A digital technology-based monitoring and evaluation system is also suggested to provide real-time insights into food self-sufficiency achievements. Although this study focuses on fiscal, budgetary, and logistics factors, future research should consider additional agricultural fundamentals, such as rainfall, land availability, farmer credit access, extension services, and crop yield trends, to capture a more comprehensive understanding of food self-sufficiency determinants and to further strengthen evidence-based policy formulation.

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