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Original Research Article

Macroeconomic Determinants of Food Security in Ghana

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Abstract
Hunger remains a persistent development challenge in sub-Saharan Africa, and Ghana is no exception, despite decades of policy interventions and economic growth. This study examines the macroeconomic factors influencing food security in Ghana from 2001 to 2022, focusing on public agricultural employment, agricultural expenditure, and food inflation. Using ordinary least squares regression with robust standard errors, the analysis accounts for potential heteroskedasticity and autocorrelation. The results show that greater government spending on agriculture significantly lowers hunger rates, emphasizing the importance of targeted rural investment. Conversely, a higher share of agricultural employment is linked with greater hunger, reflecting the low productivity of subsistence farming and the need for structural transformation. Rising food inflation worsens food insecurity by eroding household purchasing power. The findings support the Structural Transformation Theory and recent evidence. The study recommends expanding rural investments, modernizing the agricultural sector, and strengthening food price stabilization to advance progress toward Zero Hunger in Ghana.

Introduction
Food insecurity remains among the most persistent development challenges confronting sub-Saharan Africa, despite decades of targeted policy interventions, economic growth, and international development assistance. Ghana is no exception. Although the country has made notable progress in poverty reduction and agricultural modernization- for instance, the *Planting for Food and Jobs (PFJ)* program launched in 2017 aims to boost agricultural production and create jobs through subsidized inputs such as seeds and fertilizers- millions of households continue to face chronic or seasonal food insecurity.

The rural parts of Ghana are mostly tied to food insecurity where livelihoods depend heavily on agriculture (Abubakari & Abubakari, 2015; Kolog et al., 2023). Regionally, analyses consistently highlight the Upper East Region as the area most severely affected. For example, Nkegbe et al. (2017; Kolog et al., 2023) report that up to 28 percent of the population in the Upper East Region faces food insecurity challenges, the highest incidence nationally. Earlier research by Abubakari and Abubakari (2015) identified the Upper East

Region as the most food-insecure among the then three regions of Northern Ghana. Corroborating this, the World Food Programme (2012) found that three of the five districts with the highest food insecurity in Northern Ghana are located within the Upper East Region. A relatively more recent work by Asare-Nuamah (2021) confirms that the region continues to face severe food security constraints. Together, this evidence paints a worrying picture of persistent rural food insecurity that demands urgent and well-targeted policy interventions to safeguard livelihoods and improve household food access.

Achieving Sustainable Development Goal 2, which seeks to end hunger by 2030, therefore requires not only expanding interventions but also understanding the macroeconomic factors that systematically shape household access to sufficient, safe, and nutritious food. Among these macro-level factors, three stand out for their enduring influence on hunger outcomes: public agricultural expenditure, agricultural employment, and food price inflation. Historically, agriculture has been the backbone of Ghana's rural economy, yet government spending on the sector has often fallen short of regional commitments such as the *Comprehensive Africa Agriculture Development Programme (CAADP)* target of dedicating at least 10% of public expenditure to agriculture. Insufficient investment limits improvements in farm productivity, market access, and rural infrastructure, all vital for raising food supply and reducing hunger (Fan et al. 2008). The Structural Transformation Theory suggests that such underinvestment can stall the transition from traditional, low-output farming to more modern and efficient agricultural systems, prolonging structural barriers to food security.

This structural challenge is compounded by the nature of Ghana's agricultural employment. About 52% of the Ghanaian workforce remains in agriculture. While high agricultural employment may seem beneficial for rural livelihoods, the predominance of low-productivity, subsistence farming means that a large share of the labor force remains trapped in vulnerable work with limited income potential. According to McMillan et al. (2014), when structural transformation is slow, large rural populations remain locked in activities that generate too little value to sustainably lift households above hunger thresholds. Thus, an overreliance on low-productivity farming can paradoxically sustain food insecurity instead of alleviating it.

Adding further complexity, food inflation continues to erode household food security, particularly for low-income groups that spend a substantial portion of their income on staple foods. Episodes of sharp food price increases, often driven by macroeconomic instability or supply chain inefficiencies, reduce purchasing power and push more households toward inadequate diets (Headey et al., 2023). This vulnerability underscores the need for resilient policies that stabilize food prices and protect household access to affordable nutrition.

Although these factors are widely recognized, few empirical studies have simultaneously explored how agricultural expenditure, agricultural employment, and food inflation jointly affect hunger at the macroeconomic level in Ghana. This study addresses this gap by examining the combined and individual effects of these drivers using annual time series data from 2001 to 2022. Grounded in the Structural Transformation Theory, the findings aim to inform policy makers on how to better align investments, employment structures, and price management to make meaningful progress toward achieving Zero Hunger.

Problem Statement

Despite decades of policy interventions and the recent PFJ aimed at improving food security, hunger remains a persistent challenge in some parts of Ghana. While the drivers of hunger are multifaceted, three critical macroeconomic factors stand out for their direct and sustained impact on household food security outcomes: public agricultural expenditure, the share of the workforce employed in agriculture, and food price inflation. Although agriculture employs a large portion of Ghana's population (although conflicting the WFP puts the figure at 52% as of 2024), public investment in the sector remains relatively low and inconsistent.

Inadequate funding limits improvements in productivity, rural infrastructure, and extension services, all of which are vital for boosting domestic food supply and lowering hunger rates The structure of Ghana's labor market means that a significant share of employment remains in low-productivity subsistence agriculture. While agriculture is a key source of rural livelihoods, overdependence on low-productivity farming can trap households in poverty, limiting income growth and access to adequate and nutritious food (McMillan et al. 2014). Food

inflation has emerged as a major threat to household food access in Ghana. Frequent spikes in food prices, driven by market inefficiencies and macroeconomic instability, erode the real incomes of poor households, pushing more people into undernourishment (Headey et al., 2023). Rising food prices disproportionately affect the most vulnerable, who spend a large share of their income on food.

While these variables have been studied separately, few empirical studies in Ghana have assessed simultaneously how agricultural expenditure, agricultural employment, and food inflation collectively shape hunger dynamics at the macroeconomic level. This study addresses this gap by examining the individual and combined effects of these key macroeconomic indicators on hunger, providing evidence to inform targeted and effective policy responses to achieve the goal of Zero Hunger.

Litrature Review

Some Definitions of Food Security

Food security refers to a situation where every individual, at all times, can obtain enough nutritious, safe, and preferred food through reliable physical, social, and economic means. It ensures that people have access to the right kinds of food necessary for a healthy and active life, while also tackling issues such as long-term hunger and deficiencies in essential vitamins and minerals (World Food Summit, 1996).

Economic Research Service of the U.S. Department of Agriculture, food security exists along a spectrum ranging from high food security to very low food security, based on household experiences with food access and consumption. High food security refers to situations where households report no issues related to food access. In cases of marginal food security, there may be occasional concerns or anxiety about food sufficiency, but these rarely result in changes to diet or food intake. On the other hand, low food security involves a reduction in the quality, variety, or desirability of diet, even though food intake remains largely unaffected. The most severe condition, very low food security, is marked by repeated disruptions in eating patterns and a clear decrease in food consumption due to lack of resources. This classification provides a nuanced understanding of household food experiences and is valuable for shaping targeted food assistance programs and research efforts.

Theoretical Framework: Structural Transformation Theory

This study is grounded in the Structural Transformation Theory, which provides a foundational lens for understanding how economies transition from traditional, agriculture-dominated structures to more diversified, productive, and resilient systems capable of sustaining improved living standards and food security.

The roots of structural transformation thinking can be traced back to early development economists argued that economic development involves the gradual reallocation of labor and resources from low-productivity traditional sectors, especially agriculture, to higher-productivity sectors like manufacturing and services. This view has since been elaborated by scholars such as Mellor (1976), Lipton (1977), and McMillan et al. (2014), who have emphasized that structural transformation remains the central pathway through which developing countries achieve sustained economic growth and poverty reduction.

A key insight of this theory is that the mere expansion of employment in agriculture does not guarantee economic prosperity or food security if the sector remains technologically stagnant and low in productivity. In fact, large shares of labor trapped in subsistence farming can perpetuate rural poverty and hunger, especially where public investments and technological upgrades are lacking (McMillan et al., 2014). This directly informs the first two macroeconomic variables in this study. Public agricultural expenditure plays a critical role by providing the financial resources needed to boost productivity through improved infrastructure, research and development, access to modern inputs, and efficient extension services (Fan et al. 2008). Without adequate and well-targeted spending, the agricultural sector often fails to generate surplus production or surplus income needed for broader economic transformation.

Agricultural employment, the second key variable, is thus a double-edged sword in this framework. While agriculture remains the primary livelihood source for rural households in Ghana, the Structural Transformation Theory emphasizes that sustainable food security depends on shifting surplus labor from low-yield farming into

more productive sectors or into more modern, market-oriented agribusiness activities. Where this transformation is slow, high rural employment in agriculture can signal structural stagnation rather than progress.

Food inflation, also connects directly to structural transformation. Efficient and modernized agricultural systems, supported by public investment and technological adoption, tend to stabilize food prices by boosting supply, reducing waste, and improving market integration (Timmer, 2009). Where structural transformation lags, food production remains vulnerable to climate shocks, post-harvest losses, and market bottlenecks, all of which contribute to persistent food price volatility. Rising food prices erode household purchasing power, particularly for the rural poor, and thereby exacerbate hunger and food insecurity (Headey et al., 2023).

Together, the Structural Transformation Theory highlights that ending hunger in Ghana requires more than incremental productivity improvements. It demands strategic investment to modernize agriculture, policies to guide labor reallocation or productivity upgrades within the sector, and sound macroeconomic management to keep food prices stable. By situating public agricultural expenditure, agricultural employment, and food inflation within this theoretical lens, the study tests whether progress in structural transformation can be observed through their combined effects on hunger rates in Ghana.

Empirical Literature Review

Several empirical studies have investigated how employment in agriculture, agricultural expenditure, and food inflation jointly shape food security, especially in developing economies where these factors are deeply intertwined. Gollin et al. (2014) show that higher employment in agriculture contributes significantly to household income stability, which directly improves food access for rural populations. They argue that in contexts where agriculture remains the primary source of livelihood, expanding employment opportunities within the sector serves as a vital pathway to enhanced food security. Supporting this perspective, Pauw and Thurlow (2010), focusing on Sub-Saharan Africa, finds that agricultural employment plays a crucial role in enabling households to meet their food needs either through self-production or by earning income to purchase food.

Beyond employment, empirical evidence also emphasizes the importance of targeted agricultural expenditure in addressing food insecurity. For instance, Fan et al. (2008) demonstrate in their study on rural India that increased public investment in agriculture, particularly in infrastructure, irrigation, and technology, has a substantial positive effect on agricultural productivity, which translates into greater food availability and improved rural livelihoods. Alston et al. (2009) expand this view by showing that agricultural expenditure, especially when directed toward research and development, is critical for raising agricultural output and stabilizing food supply over the long term. In the African context, Otsuka and Yamano (2006) argue that well-directed government spending on rural infrastructure and agricultural extension services enhances the capacity of smallholder farmers to produce more efficiently, thereby strengthening food security at both household and national levels. Collectively, these studies suggest that agricultural expenditure, if well-targeted, serves as a catalyst for pro-poor growth and food security.

However, the benefits of increased agricultural employment and expenditure can be undermined by persistent food inflation, which remains a critical threat to food security. Ahmed et al. (2009) illustrate how climate-induced volatility exacerbates food price inflation, disproportionately affecting low-income households that allocate a large share of their income to food. Headey et al. (2013) further stress that rising food prices erode real incomes, pushing vulnerable populations deeper into food insecurity as they are forced to reduce food consumption or shift to less nutritious alternatives. Tadesse et al. (2014) add that food price spikes, common in many developing countries, significantly increase the cost of food imports and place additional strain on household budgets, especially in food-deficit regions like East Africa. These studies collectively underline the necessity of policy measures that stabilize food prices to safeguard the gains made through employment and expenditure interventions.

Taken together, the empirical evidence suggests that improving food security in developing economies requires a balanced approach that simultaneously expands productive agricultural employment, increases well-targeted agricultural expenditure, and manages food inflation to protect households from adverse price shocks. This multidimensional understanding provides a foundation for policy frameworks that aim to reduce hunger

sustainably

Methodology

This study employed a quantitative research approach along with a multiple linear regression model to examine the influence of selected macroeconomic and sector-specific variables on hunger rates in Ghana from 2001 to 2022. The dependent variable, *hunger rate*, was measured as the prevalence of undernourishment, while the independent variables included *public expenditure on agriculture* (as a percentage of total government expenditure), *employment in agriculture* (as a percentage of total employment), and *food inflation* (annual percentage). GDP per capita was excluded from the final model (eqn. 2) due to multicollinearity and statistical insignificance.

Main Regression Model Specification

To explore the impact of the selected variables on hunger rates, the study employs a linear regression model. Given the time-series nature of the data and potential issues of autocorrelation and heteroskedasticity, the model is estimated using Ordinary Least Squares (OLS) with Newey-West standard errors. The general model is specified as:

$$HunRate_t = \beta_0 + \beta_1(PerCap_t) + \beta_2(AgricEx_t) + \beta_3(AgricEm_t) + \beta_4(FoodInf_t) + \beta_5(Year_t) + \varepsilon_t \quad (1)$$

(The researchers envisage a trend over time of hunger declining or rising due to time-related factors and therefore included a time variable [Year: 2001…2022]).

Where:

HunRate = Hunger Rate (Dependent Variable)
PerCap= GDP Per Capita
AgricEx= Expenditure on Agriculture
AgricEm= Employment in Agriculture
FoodInf= Food Inflation
β_0= *Intercept*
β_1, β_2 β_3 β_4, β_5 = *Coefficients of respective explanatory variable*
εt= *Error term*

Parsimonious Model

A parsimonious model was re-estimated to exclude GDP per Capita due to multicollinearity and statistical insignificance.

$$HunRate_t = \beta_0 + \beta_1(AgricEx_t) + \beta_2(AgricEm_t) + \beta_3(FoodInf_t) + \beta_4(Year_t) + \varepsilon_t \quad (2)$$

Reduced Model Form

$$Food\_Inflation_t = \alpha_0 + \alpha_1 Z_{1(t)} + \alpha_2 Z_{2(t)} + u \quad (3)$$

Where $Z_{1(t)}$, $Z_{2(t)}$ represent Money Supply (M_2) and Exchange Rate respectively.

$$Food\_Inflation_{(t)} = \alpha_0 + \alpha_1 M_{2(t)} + \alpha_2 Exchange\_Rate_{(t)} + u \quad (4)$$

The original structural equation will then be of the form:

$$HunRate_{(t)} = \beta_0 + \beta_1(AgriEx)_{(t)} + \beta_2(AgriEm)_{(t)} + \beta_3(M_2 + Exchange\_Rate)_{(t)} + \varepsilon_{(t)} \quad (5)$$

$$HunRate_{(t)} = \beta_0 + \beta_1(AgriEx)_{(t)} + \beta_2(AgriEm)_{(t)} + \beta_3(Food\_Inflation)_{(t)} + \varepsilon_{(t)} \quad (6)$$

Data Source and Variables

The analysis is based on annual secondary data covering the period from 2001 to 2022. Data were obtained from credible sources including the World Bank, the Food and Agriculture Organization (FAO), and the Ghana Statistical Service. The dependent variable is the hunger rate, operationalized as the prevalence of undernourishment (% of

the population), a standard measure of food insecurity.

The independent variables include:

Public Expenditure on Agriculture (% of total government spending)

The selection of agricultural public expenditure as a key independent variable is grounded in empirical evidence that public investment in agriculture contributes significantly to hunger reduction through improved productivity, access to inputs, infrastructure, and research (Fan et al., 2008). In low-income economies like Ghana, public support to the agricultural sector remains a central mechanism for addressing both poverty and food insecurity (Adzawla et al., 2022).

Employment in Agriculture (% of total employment)

Agricultural employment was included to assess the structural role of agriculture in absorbing labor. In Ghana and much of sub-Saharan Africa, a large proportion of the population is employed in agriculture, yet the sector is often characterized by low productivity, limited mechanization, and poor income returns (McMillan et al., 2014). Including this variable allows the study to examine whether employment in agriculture is translating into improved food access and nutrition or whether it reflects deeper structural inefficiencies.

Food Inflation (% annual)

Food inflation is a critical variable because fluctuations in food prices directly impact household purchasing power and access to sufficient and nutritious food. Numerous studies have shown that rising food prices exacerbate hunger, especially among the poor and those in rural areas who spend a significant share of their income on food (Timmer 2009; Headey et al., 2023). Given recent global and local inflationary pressures, this variable is essential in explaining short-term variations in hunger outcomes. Collectively, these variables reflect both structural (long-term) and market-based (short-term) factors affecting hunger and offer a balanced macroeconomic lens through which to evaluate food security outcomes in Ghana.

Ethical Considerations and Limitations

The study is based exclusively on secondary data obtained from reputable public databases. As such, no ethical clearance was required. However, the study acknowledges limitations including potential data gaps, the exclusion of non-economic variables such as climatic factors and conflict, and the challenges inherent in capturing the complexity of hunger using only macroeconomic indicators.

Data Analysis and Discussion

Confirming the absence of multicollinearity through a variance inflation factor (VIF) test, all variables were tested at a 5% significance level. The analysis was conducted using STATA 14 statistical software.

Table 1: *Descriptive Statistics*

Variable	Obs	Mean	Std. Dev	Min	Max
Hun Rate (%)	22	9.068	2.498	5.900	14.900
Agric Employ (%)	22	45.188	6.874	35.178	54.178
Agric Expend (% of GDP)	22	0.853	0.346	0.440	1.510
FoodInf	22	15.597	8.547	7.144	41.509

Table 1 presents the descriptive statistics for the study variables covering the period 2001–2022. The average hunger rate was approximately 9.07 percent, with a minimum of 5.9 percent and a maximum of 14.9 percent, suggesting substantial variation in food security outcomes over the years. Agricultural employment accounted for an average of 45.2 percent of total employment, ranging from about 35 to 54 percent, indicating that

agriculture remains the primary source of livelihood for a large share of the population. Government expenditure on agriculture as a percentage of GDP averaged 0.85 percent, with a relatively low minimum of 0.44 percent and a maximum of 1.51 percent, reflecting modest public investment in the sector. Finally, food inflation averaged 15.6 percent but showed considerable volatility, reaching as high as 41.5 percent during periods of macroeconomic instability. Together, these descriptive results highlight the continued relevance of agriculture to the Ghanaian economy and the persistent macroeconomic challenges that affect household food security.

Table 2: *Correlation Analysis*

Variable	HunRate	AgricEmp	AgricExp	FoodInf
HunRate	1			
AgricEmp	0.7443	1		
AgricExp	-0.1621	-0.039	1	
FoodInf	0.4847	0.2287	-0.4066	1

Table 2 shows the pairwise correlation coefficients among the study variables. The results indicate a strong positive correlation between agricultural employment and hunger rate (r = 0.7443), suggesting that economies with a higher share of labor in agriculture tend to experience greater food insecurity, likely due to the dominance of low-productivity subsistence farming. There i s also a moderate positive correlation between food inflation and hunger rate (r = 0.4847), confirming that rising food prices erode household purchasing power and increase the risk of hunger. The correlation between agricultural expenditure and hunger rate is negative but weak (r = –0.1621), implying that higher spending on agriculture is associated with slightly lower hunger rates. The correlations among the independent variables are generally low, which indicates that multicollinearity is unlikely to bias the regression estimates, a point further confirmed by acceptable VIF results.

Table 3: *Variance Inflation Factor*

Variable	VIF	1/VIF	Collinearity Status
Agri_Employ	5.22	0.191703	Moderate Multicollinearity
Agri_expend	1.24	0.808350	Low Multicollinearity
Food_inflation	1.43	0.697060	Low Multicollinearity
Mean VIF	2.63		Acceptable Overall

Table 3 presents the Variance Inflation Factor (VIF) results for the independent variables. Agricultural employment has a VIF of 5.22, indicating moderate multicollinearity, while agricultural expenditure and food inflation have low VIF values of 1.24 and 1.43, respectively. The mean VIF for the model is 2.63, which falls well below the commonly used threshold of 10 (Porter & Gujarati, 2009). These results suggest that multicollinearity is not severe enough to bias the coefficient estimates or standard errors in the regression analysis**.**

Table 4: *Regression Analysis*

Variable	Coef.	Std. Err.	t-statistic	P|>|
Agric Employ	0.2430	0.07191	3.38	0.003
Agric Expend	-0.0024	0.00048	-5.05	0.000
FoodInf	0.0968	0.03777	2.56	0.020
_Cons	-3.4061	3.389665	-0.87	0.394

Number of Obs = 22
Mag lag = 1
F (3, 18) = 19.97

Prob>F = 0.0000
R-squared = 0.658
Adjusted R^2 = 0.601
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
(H_0): The variance of the residuals is constant (i.e., homoskedasticity).
(H_1): The variance of the residuals is not constant (i.e., heteroskedasticity is present).

Since the p-value (0.9289) is far greater than 0.05**,** you fail to reject the null hypothesis**.** This means there is no evidence of heteroskedasticity in your regression model. The residuals have constant variance, satisfying one of the key assumptions of the classical linear regression model.

Variables: fitted values of hunger_rate

$Chi^2(1) = 0.01$

$\Pr o > Chi^2 = 0.9289$

Table 5: *Robust Regression Model*

Variable	**Coef.**	**Robust Std. Err.**	**t-statistic**	**P>|t|**
agri_employ	0.2430	0.06207	3.91	0.0001
agri_expend	-0.0024	0.00053	-4.53	0.0001
food_inflation	0.0968	0.04332	2.23	0.0260
_cons	-3.4061	3.22363	-1.06	0.2950

The robust regression analysis using Newey–West standard errors confirms that all three macroeconomic variables-public agricultural expenditure, agricultural employment, and food inflation- have statistically significant effects on hunger rates in Ghana from 2001 to 2022. The adjusted model explains about 66% of the variation in hunger, indicating a strong fit.

The negative and highly significant coefficient for agricultural expenditure (Coef. = –0.0024, $p < 0.001$) demonstrates that increased public investment in agriculture effectively reduces hunger rates. This finding is consistent with Fan et al. (2008), who argue that targeted spending on rural infrastructure, extension services, and agricultural R&D can raise productivity, stabilize food supply, and lower undernourishment. The result also supports the perspective of Alston et al. (2009) and Otsuka and Yamano (2006), who emphasize that well-directed government spending in agriculture has a long-term payoff for national food security. Within the Ghanaian context, this underscores the need to strengthen initiatives such as the Planting for Food and Jobs program, ensuring that allocated funds translate into real on-farm productivity gains.

Second**,** the positive and significant effect of agricultural employment (Coef. = 0.2430, $p < 0.001$) indicates that a higher share of employment in agriculture is paradoxically linked to greater hunger. This counterintuitive relationship aligns with the Structural Transformation Theory (Timmer 2009; McMillan et al. 2014), which holds that when large shares of the labor force remain in low-productivity agriculture instead of transitioning to higher-value industry or services, overall income growth and food security stagnate. The finding also echoes the concerns of the WFP (2012) who note that subsistence farming and underemployment in rural Ghana limit the poverty-reduction potential of the sector. Thus, while agriculture remains the backbone of rural livelihoods, transforming it into a more productive, market-oriented sector is critical.

It is important to note that although some studies (e.g., Gollin, Lagakos & Waugh, 2014; Pauw and Thurlow 2008) argue that increasing agricultural employment can enhance rural household food security, the present study shows that in Ghana, high agricultural employment is instead associated with greater hunger. This supports the Structural Transformation Theory, which argues that without productivity improvements, simply retaining large shares of the workforce in agriculture can trap households in subsistence-level poverty and food insecurity.

The robust model shows that food inflation (Coef. = 0.0968, $p = 0.026$) significantly increases hunger.

This supports evidence by Headey et al. (2023) who highlight that food price spikes erode household purchasing power, forcing poor households to reduce food quantity or quality. Ahmed et al. (2009) similarly show that food inflation magnifies vulnerability, especially when compounded by climate shocks or supply chain disruptions.

Taken together, these findings reinforce the argument that achieving Zero Hunger is not solely about raising agricultural spending or expanding employment, but about modernizing rural production systems**,** promoting higher-value activities, and stabilizing food prices**.** Consistent with the Structural Transformation Theory, Ghana must accelerate its shift from traditional, labor-intensive agriculture to more mechanized, efficient, and market-integrated systems while protecting households from inflationary shocks through robust food price management policies.

Conclusion

This study examined the macroeconomic determinants of hunger in Ghana from 2001 to 2022 using robust Newey–West standard error estimates to account for heteroskedasticity and autocorrelation. The results confirm that public expenditure on agriculture significantly reduces hunger rates, while high agricultural employment and rising food inflation both increase the risk of food insecurity. These findings align with the Structural Transformation Theory, which emphasizes that a shift away from traditional, low-productivity farming toward modernized, high-value agricultural systems is critical for sustained improvements in food security.

The evidence suggests that Ghana's progress toward Sustainable Development Goal 2 (Zero Hunger) depends not only on the quantity of resources invested in agriculture but also on the efficiency and strategic targeting of such investments. Without transforming the structure of rural employment and stabilizing food prices, increased spending alone will not be sufficient to eradicate hunger sustainably. The study contributes to the literature by providing empirical support for the importance of macroeconomic management, rural transformation, and food price stability in the fight against hunger.

Policy Recommendations

Based on the study's findings, several policy actions are necessary to strengthen Ghana's progress toward achieving Zero Hunger. First, the significant negative relationship between agricultural expenditure and hunger underscores the need to protect and expand public investment in the agricultural sector. However, spending alone is not enough; it must be carefully targeted at interventions that directly raise productivity and food availability. Priority should be given to investments in rural infrastructure, irrigation, modern extension services, and the development of post-harvest storage facilities. Such investments should focus especially on smallholder farmers, who form the backbone of Ghana's food production system but often lack access to critical inputs and technologies.

The positive link between agricultural employment and hunger highlights a structural weakness in the economy. It suggests that while many Ghanaians depend on agriculture for their livelihoods, a large share remain trapped in low-productivity subsistence farming. To address this, there is an urgent need to modernize rural employment. Policymakers should promote higher-value, market-oriented agricultural activities by supporting mechanization services, building strong agribusiness value chains, and providing vocational training and skills development for rural youth. These measures will help transition rural workers into more productive and better-paying roles, consistent with the principles of the Structural Transformation Theory.

Finally, the strong positive effect of food inflation on hunger emphasizes the importance of stabilizing food prices to protect poor households from sudden price shocks. The government should strengthen national grain reserves, enhance market linkages to reduce supply chain bottlenecks, and invest in storage and distribution systems to lower post-harvest losses. In times of high food price volatility, targeted food subsidies or cash transfer programs may be necessary to safeguard the purchasing power of the most vulnerable populations. Together, these measures can help cushion households from the impacts of inflation and ensure that macroeconomic gains translate into real food security improvements on the ground. A holistic approach that combines smart public investment, rural transformation, and sound price stabilization policies will be vital if Ghana is to make meaningful progress toward ending hunger and building a more resilient and food-secure future.

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