International Journal of Agricultural Policy and Research
Vol.13 (1), pp. 15-24, February 2025
Available online at https://www.journalissues.org/IJAPR/
https://doi.org/10.15739/IJAPR.25.003
ISSN 2350-1561 (Online) ISSN:2955-1196(Print)

Original Research Article

Economic growth and food security in the West African Economic and Monetary Union (WAEMU)

Received 26 November, 2024 | Revised 14 January, 2025 | Accepted 26 January, 2025 | Published 6 February, 2025

Kassimou Issaka[1], Karl Alla Houessou[1], Francis Oninkitan Agani[1]* and Jacob Afouda Yabi[1]

[1]University of Parakou, Faculty of Agronomy, Laboratory for Analysis and Research on Economic and Social Dynamics (LARDES). BP 123 Parakou (Benin).

*Corresponding Author Email: franciscoagani1@gmail.com

Tel +2290196886121

This study examines the causal relationship between economic growth and food security across the eight member states of the West African Economic and Monetary Union (WAEMU). The analysis employs panel data and the seemingly unrelated regression (SUR) approach. Data from the FAO-World Bank database (WDI, 2018) spanning 2001-2016 were used, excluding the private for-profit sector due to limited coverage. Findings reveal that economic growth may worsen food insecurity, indicating that growth alone cannot solve food insecurity if economic inequalities persist. Research and development (R&D) expenditure significantly reduces undernourishment, whereas access to electricity for rural populations has a positive impact on undernourishment at a 5% significance level. Agricultural development flow is significant at 10%, and gross agricultural fixed capital formation at 5%. The study also highlights the long-term geographic expansion of food insecurity, underscoring that the current economic growth levels are insufficient to ensure food security across WAEMU.

Keywords: Economic growth, food security, WAEMU, West Africa.

INTRODUCTION

Food insecurity remains a major challenge for the population of West Africa. The conclusions drawn from the annual and restricted meetings of the Food Crisis Prevention Network (RPCA) highlight the severity of the situation. In April 2023, the Sahel and West Africa Club Secretariat (CSAO/OCDE) and the Executive Secretariat of the Permanent Inter-State Committee for Drought Control in the Sahel issued a warning to decision-makers. They projected that, without adequate intervention, approximately 42.5 million people could face a food and nutrition crisis during the lean season from June to August 2023. This figure is more than five times the level recorded before the launch of the Sustainable Development Goals (SDGs) in 2014. They emphasized the need for sustained political and financial commitments to address the root causes of food and nutrition insecurity in the region (CSAO/OCDE, 2023).

Food insecurity is increasingly affecting coastal countries, raising significant concerns. In conflict-affected areas such as Burkina Faso and Mali, the hunger crisis has reached alarming levels due to insecurity, which hinders the delivery of humanitarian aid. The situation is exacerbated by the interplay of conflict and socio-economic shocks. Fragility and violence remain key obstacles to poverty reduction in many nations, with 20 of the 39 countries classified as fragile, conflict-ridden, and violent (FCV) in 2023 being in Africa (Calderon et al., 2019).

Extreme climatic shocks, the lingering effects of COVID-19, and surging food prices continue to worsen hunger and malnutrition across the region. These crises stem from both internal and external factors, notably the lack of investment in agricultural food production, leading to insufficient cereal supply and heavy reliance on food imports. One visible consequence is the sharp rise in food prices, making staple foods like wheat, milk, maize, rice, and sugar increasingly difficult to afford (Diallo and Marcel, 2021).

The current price crisis is not due to a supply shortage but is fundamentally a poverty crisis. Rising international prices for oil, cereals, and other essential goods have severely impacted impoverished populations, particularly in urban areas (Bricas and Daviron, 2012). Food crisis monitoring systems primarily focus on rural areas, tracking rainfall, agricultural threats, production levels, and prices. In response, governments have employed trade policies such as reducing import taxes and restricting exports, while some nations lacking sufficient agricultural resources have sought large-scale land acquisitions abroad to ensure food security (Bricas & Daviron, 2012). However, insecurity and local conflicts continue to impede humanitarian assistance, leading to increased displacement and vulnerability (PAM, 2022).

According to the March 2023 food security analysis by the Harmonized Framework, the number of people experiencing food insecurity is expected to rise to 48 million during the June-August lean season, marking a fourfold increase in just five years.

Despite these challenges, economic growth in the West African Economic and Monetary Union (WAEMU) appears relatively robust compared to other sub-Saharan African nations. According to the WAEMU economic report, growth in the zone reached approximately 6.0% in 2022, following 6.1% in 2021 and 1.7% in 2020. In contrast, sub-Saharan Africa's overall growth slowed to 4.0% in 2022 from 4.7% in 2021 (AFDB, 2023). The region's economic performance can be attributed to policy measures aimed at accelerating reforms, ensuring macroeconomic stability, and enhancing the business climate to attract more private investment, particularly in the agri-food and manufacturing industries (Agboton, 2024).

In 2023, WAEMU's economic activity was shaped by persistent security threats and a global economic slowdown. Despite these obstacles, the Central Bank of West African States (BCEAO) estimated in December 2023 that the Union's real GDP growth rate would remain at 5.7%, the same as in 2022. Growth was largely driven by the tertiary sector (accounting for 3.0 points of growth), followed by the secondary (+1.6 points) and primary (+1.1 points) sectors. The WAEMU countries achieved a growth rate of 4.0% in 2023, outpacing the global and sub-Saharan African averages of 3.1% and 3.3%, respectively (BCEAO, 2023a). To maximize the benefits of economic integration, monetary policies should be complemented by well-structured employment and social policies (Masna and Sandhy, 2023). Notably, financial integration has been shown to positively influence food availability (Souley and Charles, 2024).

Inflationary pressures eased in WAEMU during 2023, with an average rate of 3.7% compared to 7.4% in 2022. This decline is largely attributed to monetary policy measures and lower food prices following an increase in cereal production during the 2022/2023 agricultural season. A drop in international food and energy prices further contributed to this downward trend (Fernandes, 2023).

Regarding fiscal performance, the WAEMU states reduced their budget deficit to 5.3% of GDP in 2023, down from 6.7% in 2022. Consequently, the region's debt-to-GDP ratio fell to 55.7% in 2023 from 57.6% in the previous year, as reported in the WAEMU Commission's June 2023 multilateral surveillance report (BCEAO, 2023a).

External trade data for WAEMU countries showed an overall balance of payments deficit of CFAF 3,008.9 billion in 2023, an improvement from the CFAF 3,343.1 billion deficit recorded a year earlier. This improvement is mainly due to increased exports and reduced imports. Despite positive economic indicators, a critical question remains: is economic growth alone sufficient to combat food insecurity in the WAEMU region (BCEAO, 2023b)?

An encouraging economic outlook

BCEAO projections indicate that the resilience of the tertiary sector and the strengthening of the secondary sector will propel growth in the WAEMU zone to 6.5% in 2024 (BCEAO, 2023c). The secondary sector should benefit from increased extractive and manufacturing production, as well as from the boom in construction and public works. The tertiary and secondary sectors should contribute 3.5 and 2.0 points, respectively to the Union's growth in 2024. The primary sector is expected to contribute 1.0 percentage points to growth in 2024, compared with 1.1 percentage points a year earlier.

Inflation in the EU should continue to fall in 2024, below the EU norm of 2.5%. This is due to the anticipated easing of world prices for food and oil products imported by EU countries.

In terms of public finances, the budget balance should continue to improve in the EU member states in 2024, as reforms continue to be implemented to improve tax revenue mobilization and rationalize public spending. As a result, the Union's overall budget deficit as a proportion of GDP should represent 3.8% of GDP in 2024, after 5.3% and 6.7% of GDP in 2023 and 2022 respectively (EU, 2023).

Due to the start-up of gas and oil production in certain WAEMU countries, the Union's foreign trade should show a surplus in the overall balance of payments in 2024, after two consecutive years of deficit. The overall balance would show a surplus of 874.5 billions FCFA in 2024, compared with deficits of 3,008.9 and 3,343.1 billion FCFA in 2023 and 2022 respectively.

Literature Review

Conceptual clarification

Food security is multidimensional in nature, and is defined today from both quantitative and qualitative standpoints. It has four pillars/characteristics: food availability, food accessibility, food stability and food utilization (FAO, 2015). From this definition, we retain the dimension of the notion of food security, which provides information on the socio-economic variables involved. The concept of food supply is

closely related to the concept of food availability. It can include: national or domestic food production; food imports and food aid. Food supply is therefore the sum of these three components, minus food exports. Food supply is generally unstable, due to the variability of agricultural production (Azoulay and Dillon, 1993).

Access to available food is defined as the physical and economic ability of individuals to satisfy their food needs through the market over a given period. Accessibility faces two problems: economic access and physical access.

Food stability is synonymous with the spatio-temporal regularity of food availability. This stability depends on a number of factors: instability of national production (insecurity, climatic hazards, etc.), lack of storage infrastructure and marketing systems, inter-annual and inter-regional price fluctuations, cyclical fluctuations in supply and demand on international markets. Food utilization refers to the way in which people use food, and depends on the quality of the food, its storage and preparation, basic nutritional principles and the state of health of the people consuming it (Mushagalusa, 2009). Food security is not synonymous with hunger, which, according to the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), is a state in which “all people at all times have access to sufficient, safe and nutritious food for an active and healthy life”.

Economic growth

Economic growth is a macroeconomic indicator, signifying the increase in the annual value of a country's products and services. The measure of long-term economic growth is Gross Domestic Product (GDP) (OCDE, 2013). As an aggregate measure expressed in money, GDP is sensitive to price changes (ABS, 2023). This is why we need to distinguish between real and nominal GDP. The former refers to the increase in the value of products and services that is not the consequence of price changes (inflation/deflation). In economic growth theory, the GDP growth rate is also used as a measure of economic growth. In the short term, economic growth depends above all on domestic and foreign demand for goods (products and services), which act as consumer goods or investments. In the long term, economic growth depends above all on the supply and efficiency of production factors. Factors of production include land, physical capital, labor and, in recent years, human capital, social capital, intellectual capital, cultural capital, technical (technological) progress, technology diffusion and institutions (legal and economic systems).

Empirical work

Beke and N'guessan (2021) have simulated the gap between the prevalence of undernourishment observed and the prevalence that would be induced by the potential level of trade. Their results indicate that measures aimed at facilitating intra-regional agricultural trade contribute to improving food security in the ECOWAS region. For Dithmer and Abdulai (2017), there are essentially two ways (self-sufficiency and self-subsistence) of ensuring food security at national level. Trade is one of the essential components of food security strategies based on self-subsistence. Agricultural trade is conducive to food security in two ways. Firstly, it enables economic growth, which leads to higher incomes, greater access to unproduced food and agricultural inputs, and greater food availability thanks to food imports that reduce the variability of supply and food prices. Trade integration between countries in a regional area minimizes the costs of market fragmentation (Matthews, 2003). The development of intra-regional trade in agricultural products thus strengthens food security. Herath et al. (2014) show, for example, that the free trade agreement for Southeast Asian countries has increased the daily per capita food energy supply in these countries. For Laajimi (2011), strengthening food security at national level requires improvements in trade agreements, logistics and infrastructure, as well as support for the agricultural sector in areas with high agricultural potential. Effective social safety nets, including targeted food subsidies for the poorest, public works labor programs, conditional and unconditional cash transfer mechanisms, food aid, etc., are essential to guarantee food security for the most disadvantaged.

According to Timmer (2000), at country level, higher levels of economic growth translate into a greater ability to purchase food on international markets and thus increase national food stocks. However, neither a high average GDP per capita nor its increase automatically enhances national food security in all cases, as they do not always increase the incomes and access to food of the poorest sections of society, who are the ones most likely to suffer from food insecurity

For Fouda (2014), intra-regional trade is at the center of public decision-makers' concerns in most countries, due in particular to its leading role in countries' food security and economic growth. His study determined the impact of intra-regional trade on economic growth and highlighted its implications for food security in the CEMAC region. In order to take account of the individual and temporal specificities of growth phenomena, he used the Generalized Method of Moments (GMM) in a dynamic panel to estimate the growth equation for the CEMAC zone over the period 1990-2010, and then characterized the food trade position of this economic area. Generally speaking, the results show that intra-regional trade has a positive impact on economic growth in the CEMAC zone, even though it accounts for only a small proportion of the zone's trade. On the other hand, an increase in intraregional trade helps strengthen food security in the region. These results highlight the need to stimulate intra-regional trade, and to strengthen the integration process in Central Africa.

Hishamunda et al. (2011) propose methods for quantifying the contribution of aquaculture to national economies, poverty reduction and improved food security.

According to them, the contribution of aquaculture to a country's economy can be measured by the "aquaculture value-added multiplier", an indicator that represents the increase in GDP corresponding to a one-unit increase in aquaculture value-added. It should also be noted that job creation contributes to poverty reduction. Thus, the contribution of aquaculture to poverty reduction can be assessed through the "aquaculture employment multiplier", the increase in total employment for the economy as a whole corresponding to one additional job created in the aquaculture sector. The contribution to food availability, one of the four dimensions of food security, can be assessed through the "net sum of protein equivalent" (direct contribution) and the "ratio between the net foreign exchange gain of the aquaculture sector and the total value of food imports (indirect contribution)". The aquaculture sector's "labor income and employment multipliers" can be used to measure aquaculture's contribution to access to food, the second dimension of food security. The aquaculture tax multiplier and the "ratio between the net foreign exchange earnings of the aquaculture sector and the net foreign exchange earnings of the economy as a whole" can be used to assess the sector's contribution to food utilization, the third dimension of food security.

MATERIALS AND METHODS

Here, it was necessary to use the panel data analysis approach. This analysis makes it possible to capture the heterogeneity between the individuals that make up each of the eight WAEMU countries. This approach also avoids the problems of multicollinearity that can be encountered during estimation. The econometric model is then based on the dynamic panel method, which allows for one or more lags of the dependent variable. The empirical model on the link between economic growth and Food Security (SA) is based on the following equation:

$$PSA_{i,t} = \alpha_0 + \beta PSA_{i,t-1} + a_1 TCE_{i,t} + a_2 DRD_{i,t} + a_3 DAG_{i,t} + a_4 DET_{i,t} + a_5 DES_{i,t} + a_6 TAE_{i,t} + a_7 FBCFA_{i,t} + a_8 DFA_{i,t} + e_{it} \quad (1)$$

Where (i) designates the country studied and (t) refers to the analysis period. The individual country fixed effect is represented by the term (i). Finally, the error term is represented by (eit).

Where:

PSA: Prevalence of undernourishment, **TCE:** Economic growth rate (%)**DRD:** R&D expenses (million US$), **DPA:** Government agricultural spending**, DET:** Tertiary Education Expenditure (%), **DES:** Secondary Education Expenditure (%) TAE: **Electricity** Access Rate (% of population), **FBCFA:** Gross Agricultural Fixed Capital Formation, **DFA:** Development flows to agriculture

Variables Description

R&D expenses (million US$): The most important components of national expenditure on agricultural R&D are salaries and local operating expenses, inputs and long-term acquisitions for the agricultural sector, as well as expenditure on training researchers.

The notion of full-time equivalent (ETP) researchers in the ASTI analysis, financial data and human resources data are calculated on the basis of the number of full-time equivalent jobs, which takes into account the proportion of working time that scientists actually devote to R&D activities. In universities, for example, employees spend most of their working time on non-research activities (teaching, administration and supervision), which must be excluded from any calculation based on research resources. Expenditure on achievements in the sector is also included.

In view of the need to compare economic data, conversion using tools that facilitate common interpretation from one country to another is required. It seems preferable to refer to a set of Purchasing Power Parities (PPP) as a tool. PPP values measure the relative purchasing power of currencies from different countries by eliminating differences in price levels expressed in national currencies for a range of goods and services. PPP also apply to the conversion of current Gross Domestic Product (GDP) prices of different countries into a common currency unit. What's more, PPP values remain relatively constant over time, while currency exchange rates vary considerably.

Government agricultural spending (DPA): in local currency units (LCU) compiled from various sources (IFPRI, 2019) and national sources, using a more recent source in case of conflicting data points. LCU converted to constant 2015 US dollars using the conversion factor imputed from current GDP LCU divided by constant 2015 US dollar GDP (World Bank 2022). The aggregate value for a group is the sum of the GAEs for the countries in the group (World Bank 2022, national sources).

Gross Agricultural Fixed Capital Formation (FBCFA): The national accounts provide a macroeconomic measure of Gross Fixed Capital Formation. In agriculture, more precise work has been carried out to estimate tangible investment as accurately as possible. Given the specificities of the macroeconomic approach, a number of assumptions were made. While these may limit the results, they were difficult to circumvent. After presenting the various problems as they arose in the 1971 accounts, the article examines the major changes in agricultural GFCF since 1959 and its main components. Over and above the specific movements in the various types of investment, several major periods emerge, and in particular, for the last few years, a phase of decline in tangible investment in all its components. Agriculture seems to be more affected by this downturn in tangible investment than other activities, and its situation in this respect seems more worrying

Development flows to agriculture *(DFA):* The flows dataset is an important component of the statistics on agricultural investment financing, which also includes public spending on agriculture, foreign direct investment in agriculture and credit to agriculture. The aim of the DFA database is to provide readily available data to enable analysis of aid flows and the objectives they serve, with

particular emphasis on agriculture, its c omponents and environmental protection. This summary analyses the latest update of the DFA dataset.

Economic growth rate (%): Annual percentage rate of GDP growth at market prices based on constant local currencies. Aggregate data are based on constant 2010 US dollars. GDP is the sum of the gross value added of all resident producers in an economy plus any taxes on products and minus subsidies not included in the value of products. It is calculated without making deductions for the depreciation of manufactured goods or the loss of value or degradation of natural resources.

DET*: Tertiary Education Expenditure (%) and DES: Secondary Education Expenditure *(%): Public expenditure on education as a percentage of total government expenditure represents total current and capital public expenditure on education, expressed as a percentage of total government expenditure for all sectors in a given budget year. Public spending on education includes public spending on educational institutions (public and private), educational administration and subsidies.

Electricity Access Rate (% of population): Access to electricity corresponds to the percentage of the population with access to electricity. Electrification data are obtained from industry, national surveys and international sources.

Prevalence of undernourishment (%): The prevalence of undernourishment, is an estimate of the proportion of the population whose usual food intake is insufficient to provide the levels of dietary energy needed to maintain a normal, active and healthy life. It is expressed as a percentage.

Econometric method

Dynamic panel Generalized Moment Method (GMM) provides efficient estimation of the above model, unlike Ordinary Least Squares (OLS) methods, while controlling for individual and time-specific effects and remedying the endogeneity bias of explanatory variables such as official development assistance and other explanatory variables by means of instrumental variables generated by their lags.

This panel-based (GMM) method designs the instruments from the explanatory variables, unlike other instrumental variable estimation methods such as (2SLS and 3SLS), which require the choice of one or more theoretical instrumental variables that are uncorrelated with the explanatory variables and the residual; which is a difficult thing to do.

To estimate our model, we use Arellano and Bond's (1991) Difference Generalized Moment Method (Diff GMM). This estimator is based on the first difference of the variables and thus eliminates country-specific effects, while taking as instruments appropriate levels of lagged values (in level) for all potentially endogenous variables.

Indeed, GDP per capita time series are precisely accentuated over time, and the number of years of observation in our model is narrow. The lagged values of the explanatory variables are weak instruments of the first-difference equation. What's more, the differentiation of the equation into levels eliminates inter-country variations and only takes into account intra-country variations. Following Arellano and Bover (1995), Blundell and Blond (1998) propose a solution in the form of the system GMM estimator (Sys-GMM), which simultaneously estimates the first-difference equation and the level equation.

The Dynamic Panel GMM method has the following advantages: (i) avoids simultaneity bias problems (ii) solves the problem of reverse causality and omitted variables (iii) controls for individual and temporal specific effects (iv) overcomes variable endogeneity bias.

Data sources

The data originates from the World Bank database (World Bank, 2018) and spans the period from 2001 to 2016, as well as the Agricultural Science and Technology Indicators (ASTI). ASTI collects primary time-series data on agricultural research capacity and expenditure levels through national survey series in over 80 low and middle-income countries. Data collection is carried out by national focal points, who distribute survey forms to all agencies known to carry out agricultural research in a given country, including government non-profit and higher education agencies. This dataset excludes the private for-profit sector due to its limited coverage. The FAO database provides the prevalence of undernourishment.

RESULTS

Descriptive statistics for the variables are given in Table 1. Economic growth averaged 4.24% for all WAEMU countries over the period studied (2001-2016). Meanwhile, total public investment in agriculture averaged 2,200 million dollars. The average proportion of the rural population with access to electricity is 12.8% over the period (2001-2016). Government spending on agriculture averages $0.14 trillion. Gross agricultural fixed capital formation averaged $10.5 millions over the period for WAEMU countries.

Unit root test

All variables are stationary in level, with the exception of “Development Flows to Agriculture” and “Government Agricultural Expenditure”, which are stationary in first difference. The results of the stationarity tests are reported (Table 2).

The Variance Inflation Factor is less than 2, which means that there is no risk of multiple collinearity between the explanatory variables(Table 3).

The results show that the coefficients of three variables were found to be insignificant. These were : growth rate (GR), education expenditure (DEDUCS) and public agricultural expenditure (PAE). R&D expenditure is a negatively significant variable for the prevalence of undernourishment. Rural population access to electricity is

Table 1 : Descriptive statistics

Variables	Nb Obs	Moy.	Ecart-type	Min	Max
Proportion of undernourished people	128	16.38047	6.783306	3.8	35.1
R&D expenditure (million US$)	128	2200.00	1720.00	147.00	7610.00
Government agricultural expenditure (billion US$)	128	0.1441797	0.1090501	0.001	0.458
Economic growth rate (%)	128	4.2422	2.906642	-4.38725	15.37624
Secondary education expenditure (%)	128	27.448	6.416	10.325	53.772
Electricity Access Rate (%)	128	12.800	10.915	0.765	38.300
Gross Fixed Capital Formation in Agriculture	128	10.49165	7.643617	2.32063	39.66658
Development Flows to Agriculture	128	7.201747	3.995568	0.186844	18.85055

Source : Realised by author

Table 2 *:* Unit root test results

Variables	P-value in Level	First Difference
R&D expenditure (million US$)	0.0151	-
Prevalence of undernourishment	0.0001	-
Economic growth rate	0.0053	-
Secondary education expenditure (%)	0.0118	-
Electricity Access Rate (%)	0.0000	-
Gross Agricultural Fixed Capital Formation		0.0000
Government agricultural expenditure (billion US$)		0.0004
Development Flows to Agriculture		0.0001

Source : Realised by author

Table 3: Multicollineality detection

Variable	VIF	1/VIF
Accese	1.36	0.734683
D1. Fbcfa	1.29	0.773617
Lndrd	1.24	0.808942
Dfa	1.08	0.927578
D1. Deducs	1.06	0.944087
D1. Dpa	1.04	0.965376
Mean VIF	1.18	

Source : Realised by author

positively significant at 5% for undernourishment. The coefficient of the agricultural development flow variable is significant at the 10% level. Gross agricultural fixed capital formation is significant at 5%. Below are the results by country(Table 4).

All study variables showed significant coefficients for Guinea Bissau. We found significant R&D expenditure for Mali and Guinea Bissau, along with the variable Gross Agricultural Capital Formation (GACF). Secondary education expenditure is significant for Burkina Faso. The dispersed convergence of countries towards the budget deficit threshold imposed by the macroeconomic convergence criteria makes Mali, Senegal and Benin the best performers in the zone in terms of effective deficit management(Table 5).

DISCUSSION

Growth does not always improve food security. Several studies highlight this. According to SOFI (2012), over the last decade, all regions have experienced economic growth, demonstrating that growth can be a powerful driver of increased food security when it leads to agricultural growth and, in particular, when it is inclusive and concerns smallholders and women. However, the effect of economic growth on reducing food insecurity has not been uniform in all parts of the world. While some regions have made considerable progress, others seem to be lagging behind, failing to fully exploit the potential resulting from the growth of their economies – growth that does not seem to have reached the poorest. To reduce poverty and hunger, it

Table 4*:* Estimation of the influence of growth on food security

PSA	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
L1. PSA	0.9359138	0.0144404	64.81	0.000	0.9076112	0.9642165
TC	-0.083014	0.0205044	-0.40	0.686	-0.0484892	0.0318864
LNDRD	-0.5866873	0.0783673	-7.49	0.000	-0.7402844	-0.4330901
DEDUCS	-0.0062755	0.0099924	-0.63	0.530	-0.0258603	0.0133093
ACCESE	0.0291202	0.0138708	2.10	0.036	0.0019339	0.0563065
D1.DPA	-0.5911724	1.091927	-0.54	0.588	-2.73131	1.548965
D1. FBCFA	-0.0044949	0.002203	-2.04	0.041	-0.0088127	-0.000177
D1.DFA	0.0038981	0.0020838	1.87	0.061	-0.0001861	0.0079822
_cons	2.312906	0.5246197	4.41	0.000	1.28467	3.341142

Source : Realised by author

Table 1 : Estimates by WAEMU country

PSA	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
id#c.tce					
Benin	-.2101888	.9041192	0.23	0.817	[-2.021357, 1.60098]
Burkina-Faso	2.307485	1.213569	1.90	0.062	[-.1235857, 4.738555]
Ivory Coast	-.0959271	.2966515	0.32	0.748	[-.690191,5 .4983373]
Guinea Bissau	3.54916	.7015751	5.06	**0.000**	[2.143736, 4.954584]
Mali	.1772803	.6360263	0.28	0.781	[-1.096834, 1.451394]
Niger	-.0762391	.416166	0.18	0.855	[-.909919,7 .7574415]
Senegal	.0737817	.6648344	0.11	0.912	[-1.258042, 1.405605]
Togo	-.2627585	.3691058	0.71	0.479	[-1.002166, .4766493]
id#c.lndrd					
Benin	-4.276083	16.13696	0.26	0.792	[-36.60229, 28.05013]
Burkina-Faso	-2.42181	5.153981	0.47	0.640	[-12.74648, 7.902855]
Ivory Coast	-15.1077	20.47152	0.74	0.464	[-56.11708, 25.90168]
Guinea Bissau	5.351843	1.456326	3.67	**0.001**	[2.434471, 8.269215]
Mali	2.081111	10.67406	0.19	0.846	[-19.30159, 23.46382]
Niger	-8.070836	3.264564	2.47	**0.016**	[-14.61054, -1.531129]
Senegal	-5.895937	6.825482	0.86	0.391	[-19.56902, 7.777146]
Togo	6.788126	7.189107	0.94	0.349	[-7.613385, 21.18964]
id#c.deducs					
Benin	.1449576	.3766204	0.38	0.702	[-.6095038, .899419]
Burkina-Faso	.5763688	.2931096	1.97	**0.054**	[-.0108002, 1.163538]
Ivory Coast	-.0548939	.4045361	0.14	0.893	[-.865277, .7554892]
Guinea Bissau	1.692469	.4823946	3.51	**0.001**	[.7261165 ,2.658822]
Mali	-.1466548	.1448497	1.01	0.316	[-.4368236, .143514]
Niger	.2621005	.354479	0.74	0.463	[-.4480063, .9722073]
Senegal	.4139761	.5425813	0.76	0.449	[-.6729448, 1.500897]
Togo	.0711433	.1860991	0.38	0.704	[-.301658, .4439445]
id#c.accese					
Benin	-.5852653	.5187348	1.13	0.264	[-1.624416, .4538854]
Burkina-Faso	3.744435	2.137372	1.75	0.085	[-.5372354, 8.026106]
Ivory Coast	-.0575776	.3320718	0.17	0.863	[-.7227975, .6076422]

Table 5 Cont.

Guinea Bissau	.9079233	.3759151	2.42	**0.019**	[.1548748, 1.660972]
Mali	-.5977812	.287022	2.08	**0.042**	[-1.172755, -.022807]
Niger	-.1065125	.4585521	.23	00.817	[-1.025103, .8120778]
Senegal	-.4465655	.1348312	3.31	**0.002**	[-.7166649, -.1764662]
Togo	-.2834097	.4062765	0.70	0.488	[-1.097279, .53046]
id#cD.dpa					
Benin	16.56468	56.04505	0.30	0.769	[-95.70705, 128.8364]
Burkina-Faso	54.53116	36.75762	1.48	0.144	[-19.1032, 128.1655]
Ivory Coast	-4.942616	19.63584	0.25	0.802	[-44.27793, 34.3927]
Guinea Bissau	-1688.89	779.4015	2.17	**0.035**	[-3250.218, -127.5609]
Mali	-11.80296	18.70569	.63	0.531	[-49.27497, 25.66905]
Niger	-6.055008	20.98163	0.29	0.774	[-48.08627, 35.97625]
Senegal	10.86052	19.68074	0.55	0.583	[-28.56474, 50.28578]
Togo	-50.17192	83.36045	0.60	0.550	[-217.163, 116.8191]
id#cD.fbcfa					
Benin	.0356002	.1372273	0.26	0.796	[-.2392992, .3104996]
Burkina-Faso	-.0326268	.0889651	0.37	0.715	[-.2108453, .1455916]
Ivory Coast	-.0136504	.0197611	0.69	0.493	[-.0532367, .0259359]
Guinea Bissau	-4.77248	1.15146	4.14	**0.000**	[-7.079131, -2.465828]
Mali	-.1507233	.0818484	1.84	**0.071**	[-.3146853, .0132388]
Niger	.0107313	.0962832	0.11	0.912	[-.1821471, .2036098]
Senegal	.086421	.0726145	1.19	0.239	[-.0590433, .2318854
Togo	-.0897777	.3237372	0.28	0.783	[-.7383012, .5587458]
id#cD.dfa					
Benin	-.0106466	.1490472	0.07	0.943	[-.309224, .2879307]
Burkina-Faso	-.0652475	.0611226	1.07	0.290	[-.1876909, .0571958]
Ivory Coast	.0179501	.0317194	0.57	0.574	[-.0455915, .0814916]
Guinea Bissau	.7629041	.4565139	1.67	**0.100**	[-.1516031, 1.677411]
Mali	-.012803	.0519168	0.25	0.806	[-.1168048, .0911988]
Niger	.0007006	.056093	0.01	0.990	[-.1116671, .1130683]
Senegal	.0139522	.0543681	0.26	0.798	[-.0949603, .1228647]
Togo	.0191212	.213891	0.09	0.929	[-.409354, .44759]
_cons	17.21735	14.4783	1.19	0.239	[-11.78616, 46.22086]
sigma_u	40.104534				
sigma_e	3.72787				
rho	.9914336 (fraction of			Variance due	to u_i)
F test that all	u_i=0: F(7. 56) = 2.48			Prob > F = 0.0275	

Source: Created by author

psa: Prevalence of undernourishment., Sof: Secondary Education Expenditure (%)
tce: Economic growth rate (%),**drd**: R&D expenses (million US$). **dpa**: Government agricultural spending
tae: Electricity Access Rate (% of population). **fbcfa**: Gross Agricultural Fixed Capital Formation., **dfa:** Development flows to agriculture.

is essential that growth reaches the poor and is able to satisfy the increased need for income to create demand for the assets controlled by these populations. Poor households must be able to use the additional economic assets to improve both the quantity and quality of their diets. The analyses have identified some of the elements considered essential to facilitate inclusive and pro-poor economic growth, namely education, social protection, good governance and strong government action; it is therefore essential that governments use the additional resources resulting from economic growth to implement these measures. Pambou's (2014) study showed that the combined effect of limited access to quality education, health, nutrition, technology and innovation, are all warning signals for us to support Africa's growth and its entry into higher value-added areas of production and competition. However, conditions vary. A better understanding of how good governance and social protection must operate is important for economic growth to translate into improved food security and nutrition.

Our finding that growth rate and prevalence of undernourishment are not correlated is consistent with two key findings of CARE, reported in its 2023 report. CARE's (2023a) study filled the knowledge gap on the interaction between income inequality, gender inequality, and economic growth in relation to the prevalence of food insecurity in a country. The aim is to seek comprehensive and effective solutions to the growing global food crisis, exacerbated by ongoing conflicts, economic shocks, and the climate crisis. Using national data from the countries involved in this study before and after the pandemic, and using the seemingly unrelated regression (SUR), this study provides empirical evidence, highlighting the important role of gender and income inequality in addressing food insecurity. The study found a positive correlation between food insecurity and gender and income inequality. Interestingly, the findings indicate that economic growth can exacerbate food insecurity, especially in the post-pandemic context. This suggests that economic growth alone is not enough to address food insecurity if economic and gender inequalities persist. Therefore, country responses and agricultural interventions to the global food crisis should focus more on gender-neutral macroeconomic and microeconomic instruments and adopt a gender transformative approach. The study concludes that economic growth alone will not solve this problem. It suggests that improving GDP is not enough. The latest data show that due to inequality, economic growth can lead to greater food insecurity, especially since COVID-19. In 57 countries, GDP is increasing while food security is decreasing. As gender and income inequality increase, hunger also increases. This implies that GDP growth will not solve the global food crisis if we do not also address the scarcity of "growing inequality" shortage.

Conclusion

Our analysis indicates that the economic growth rate does not serve as a determinant of undernourishment. This finding has several economic implications: (1) The structural dynamics of growth are more crucial for food security than growth itself; (2) The existing growth levels are inadequate to generate substantial benefits for rural economies and low-income populations. Given that economic growth is a measured indicator, its underlying mechanisms must be inclusive to ensure equitable distribution of benefits. Furthermore, the statistical insignificance of the growth rate highlights its structural weakness within WAEMU economies, reinforcing the need for institutional reforms and more effective economic policies to enhance development outcomes.

Author's statement of contribution and declaration of conflict of interest

All the authors of this paper contributed to the research and writing. They declare no conflict of interest.

REFERENCES

Australian Bureau of Statistics ABS (2023). GDP price measures. Released 6/09/2023. GDP price measures | Australian Bureau of Statistics

Arellano M, Bond S (1991). Some tests of specification for panel data: monte carlo evidence and an application to employment equations. Review of Economic Studies, 58 (2): 277–297. https://doi.org/10.2307/2297968.

AFDB (2023). Africa's economic performance and outlook. aeo_2023-chap1-en.pdf

Azoulay G, Dillon JC (1993). La sécurité alimentaire en Afrique. Manuel d'analyse et d'élaboration des stratégies, Paris, ACCT « - Karthala.

Agboton DJ (2024). Prevision des cycles budgetaires dans les etats membres de l'union economique et monetaire ouest africaine (uemoa) : une approche basee sur les chaines de MARKOV. MPRA Paper (121821). Online at https://mpra.ub.uni-muenchen.de/121821/

BCEAO (2021a). State of financial inclusion in waemu in financial year 2021 annual report

BCEAO (2023a). Communiqué de presse de la session ordinaire du Conseil des Ministres de l'UEMOA (16 juin 2023) au titre de sa 2ème session ordinaire pour l'année 2023.

BCEAO (2023b). Rapport sur la politique monétaire dans l'UEMOA. Rapport sur la politique monétaire_DEC_2023.pdf

BCEAO (2023c). Rapport sur la politique monetaire dans l'UEMOA. Rapport_CPM_JUIN_2023_Version_Anglais_3e_lecture_31_05_2024_0.pdf

BCEAO (2024). Rapport sur la politique monetaire dans l'UEMOA. Rapport-sur-la-politique-monetaire_Juin_2024.pdf

Beke TE N'Guessan M D-D. (2021). Echanges agricoles intrarégionaux et sécurité alimentaire dans l'espace

CEDEAO. Region et Developpement (54) : 51-81.
Bricas N, Daviron B (2012). La crise alimentaire : une recomposition du jeu d'acteurs. Les politiques publiques », Paris, Lares, Bureau Issala, Fondation Farm. 165p
Calderon C, Kambou G, Korman V, Kubota M, Cantu Canales C (2019). Une analyse des enjeux façonnant l'avenir économique de l'afrique. The World Bank. https://doi.org/10.1596/978-1-4648-1510-2
Diallo D, Marcel KY (2021). Les facteurs de la crise alimentaire de 2008 dans l'union économique et monétaire de l'afrique de l'ouest. D'histoire, D'Art et Archéologie. Rev.Ivoir. Sci. Hist (10) : 2520-9310 ; 284p
Dithmer J, Abdulai A (2017). Does trade openness contribute to food security? A dynamic panel analysis, Food Policy, (69) : 218-230,
European Commission (2023). Budgetary balance in the European Union and the Euro area from 2013 to 2023 in relation to the gross domestic product (GDP).
FAO, WFP and IFAD (2012). The State of Food Insecurity in the World 2012.
Economic growth is necessary but not sufficient to accelerate reduction of hunger and malnutrition. Rome, FAO. https://openknowledge.fao.org/handle/20.500.14283/i3027e
FAO (2015). Cadre stratégique mondial pour la sécurité alimentaire et la nutrition quatrième version (2015). Quarante-deuxième session « Sécurité alimentaire et nutrition – faire la différence ». content
Food Security Dashboard (2023). Food Security Sector Dashboard, northeast Nigeria.
Fernandes, CM (2023). Inflation Dynamics in the West African Economic and Monetary Union: WAEMU. Selected Issues Paper (SIP/2023/38). Washington D.C. International Monetary Fund.
Fouda ESY (2014). Commerce inter-régional et croissance économique : quels enjeux pour la sécurité alimentaire dans l'espace CEMAC ? *Contribution pour la Conférence annuelle du Projet d'analyse du commerce mondial (GTAP)*, *18 au 20 juin 2014, Dakar, Sénégal*
Herath H, Cao L, Chen Y (2014). "Impacts of regional trade agreements on food security: a case of ASEAN free trade agreement. *ArXiv preprint arXiv : 1407.2677*
Hishamunda N, Cai J, Leung P (2011). Aquaculture commerciale et croissance économique, réduction de la pauvreté et sécurité alimentaire : cadre d'évaluation, FAO Document technique sur les pêches et l'aquaculture, Rome, FAO. (512) : 65p
IFPRI (2019). Statistics on Public Expenditures for Economic Development (SPEED): 2019 Global Food Policy Report. Statistics on Public Expenditures for Economic Development (SPEED): 2019 Global Food Policy Report Table 2 - IFPRI Datasets - IFPRI Knowledge Collections
IMF (2024). Staff report on common policies for member countries—press release; staff report; and statement by the executive director for the west african economic and monetary union. IMF Country Reports (24/090). 1934-7685-002.2024.issue-090-en.pdf
Laajimi A (2011). Croissance, développement durable et sécurité alimentaire : les défis majeurs de l'agriculture des PSEM. New Medit, 10 (2)
Masna SS Sandhy W (2023). Analyzing Government Policies in Addressing Unemployment and Empow-ering Workers: Implications for Economic Stability and Social Welfare. In Law and Economics, 2023, Vol. 17, No. 2. (PDF) Analyzing Government Policies in Addressing Unemployment and Em-powering Workers: Implications for Economic Stability and Social Welfare
Matthews A (2003). Regional Integration and Food Security in Developing Countries. TCAS Working Document April 2003. FAO Agricultural Policy Support Service Policy Assistance Division. RegionalIntegrationpaperfinal23April2003.pdf
Mushagalusa K (2009). Analyse des défis et opportunités de la sécurité alimentaire dans la cité de Kamituga, territoire de Mwenga (RD. Congo). Mémoire Online. Memoire Online - Analyse des défis et opportunités de la sécurité alimentaire dans la cité de Kamituga, territoire de Mwenga (RD. Congo) - Francisco Mulungula Kyalondawa
OCDE (2013). La Mesure de La Croissance (Docs) (2012-2013). CHAP 1 - 11 - La Mesure de La Croissance (Docs) (2012-2013) | PDF | Indice de développement humain | Produit intérieur brut. pp 1-12.
PAM (2022). Plan stratégique du PAM pour 2022-2025. Conseil d'administration Deuxième session ordinaire Rome, 15-18 novembre 2021. https://executiveboard.wfp.org/fr.
Pambou L (2014). La mondialisation, une chance pour l'Afrique ? les Afriques noires francophones de l'ouest et du centre : sujets d'hier, acteurs de demain ? https://www.torrossa.com/gs/resourceProxy?an=4947497&publisher=FZ2990
UEMOA (2023). Note d'information de la zone UEMOA - Juillet 2023
Souley AB, Charles AB (2024). Les effets de l'intégration économique sur la sécurité alimentaire en Afrique subsaharienne : une analyse novatrice de la disponibilité alimentaire à travers la méthode des moments généralisés en panel dynamique. Alternatives Managériales Economiques (6) : 225–246.
Timmer CP (2000). "The Macro Dimensions of Food Security: Economic Growth, Equitable Distribution, and Food Price Stability." Food Policy. Vol 25, pp 283- 295. The macro dimensions of food security: economic growth, equitable distribution, and food price stability - ScienceDirect
World Bank (2018). World Development Indicators (WDI). Database World Bank. https://databank.worldbank.org/source/world-development-indicators.
Wold Bank (2022). PPP conversion factor, GDP (LCU per international $). PPP conversion factor, GDP (LCU per international $) | Data