

The Determinants of Food Security in The West African Economic and Monetary Union (WAEMU) Countries: A dynamic Approach

SANON Monsi¹ & OUEDRAOGO Nosseyemba Somba Benjamin²

¹PhD candidate at the Laboratory of Applied Economics (LABEA), Norbert ZONGO University (UNZ), Koudougou in BURKINA FASO

²Associate Professor, Researcher at the Laboratory of Applied Economics (LABEA) and teacher at Norbert ZONGO University (UNZ), Koudougou in BURKINA FASO

*Corresponding Author: SANON Monsi

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Article History	Abstract
Original Research Article	<p><i>This article examines the determinants of food security in the WAEMU countries. First, Principal Component Analysis (PCA) is used to compute a composite food security index in order to take into account the four dimensions of food security, namely availability, accessibility, stability, and utilization. The Pooled Mean Group (PMG) method is then applied to estimate an ARDL model. The results indicate the existence of a long-run relationship between food security and the explanatory variables. A disequilibrium of 38.7% observed in food security in the previous year is corrected in the following year. Moreover, the short-run determinants of food security include cereal yields, GDP per capita, and population growth. In the long run, the same variables, along with arable land area, significantly influence food security. This study makes an original contribution to the understanding of food security in WAEMU countries through a dual methodological approach. It proposes the construction of a composite food security index based on several key dimensions, in line with FAO recommendations. The research employs the ARDL model to examine the short- and long-run determinants of food security. The combination of these two approaches gives the study significant scientific added value. Methodologically, it enriches the literature on composite measurement of food security in the African context. Empirically, it provides WAEMU policymakers with a more reliable tool for assessment and monitoring, as well as a dynamic analysis of economic factors likely to sustainably improve food security.</i></p> <p>Keywords: food security, WAEMU countries, principal component analysis, ARDL model, economic determinants.</p>
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I. Introduction

The concept of food security first emerged in response to poor global harvests, rising oil prices, and declining cereal stocks in the 1970 (Clay, 2012). However, the official definition originates from the 1996 World Food Summit: “Food security exists when all human beings, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their energy needs and food preferences for an active and healthy life.” Today, this concept has become increasingly complex and represents a major concern for the international community (Tohon, 2021).

Nevertheless, measuring food security remains a challenge. As a palliative, the FAO proposes a large number of indicators by dimension, making it possible to obtain a broader assessment of food security. However, it does not provide a single indicator that captures food security in all its aspects (Namé, 2019). Indeed, there is broad consensus on the multidimensional nature of food security. The literature generally identifies four main dimensions: food availability, physical and economic access to food, proper food utilization, and the stability of food supplies. This multidimensionality makes analysis complex. Consequently, empirical studies require the use of

multivariate descriptive statistics to synthesize multiple data into a few significant and easily interpretable factors (Diagne, 2014). Thus, factorial methods particularly principal component analysis, factor analysis, and correspondence analysis are best suited to achieve this objective.

The interest of this research is twofold. On the one hand, it makes it possible to determine the level of food security in *WAEMU* countries through a robust composite indicator. On the other hand, it provides relevant empirical results that can inform policymakers and organizations in their decision-making processes aimed at ensuring food security in *WAEMU* countries.

The main objective of this paper is to identify the determinants of food security in *WAEMU* countries from 2001 to 2022. More specifically, it seeks to determine the level of food security in the countries concerned over the period and then to estimate the socioeconomic factors affecting these levels of food security.

The remainder of the paper is structured into four sections. The first section reviews the theoretical and empirical literature. The second describes the methodological approach. The third section presents the results, and the final section provides the conclusion along with policy implications.

II. Literature Review

2.1. Measuring Food Security

The “holy grail” of food security measurement would be a single, valid, and reliable measure that is comparable over time and space and that captures the different elements of food security (Maxwell et al., 2013). However, a common measure that makes it possible to identify shared determinants of food insecurity across multiple countries is still lacking (Smith et al., 2017). As recently as two decades ago, there were approximately 200 definitions of food security in the published literature (Arib & Et-touile, 2022), highlighting the context-dependent nature of the concept. For this reason, measurement indicators evolve alongside the concept of food security across time and space. Consequently, the analysis of food security indicators differs between developed and developing countries. As a result, progress in the development of indicators has been mixed (Maxwell et al., 2013).

An analysis of the evolution of the food security concept reveals three major periods in terms of perspectives on food security and its determinants. In the early 1980s, a first period equated food security with “the objective of sufficient food availability (calories and proteins) to feed a country’s population” (Rastoin & Gherzi, 2010). The food availability approach is undoubtedly the oldest and most

influential (Arib & Houria, 2022). It is known as the Malthusian approach, as it was popularized by Thomas Malthus. A second period, which can be described as post-Sen, views food security as a function of income, prices, social safety nets, and entitlements. This perspective led to household consumption and expenditure surveys for monitoring food insecurity (Smith et al., 2006).

Today, food security is increasingly viewed from a vulnerability or nutritional risk perspective and incorporates a growing number of indicators related to individuals’ coping behaviors. In this regard, the 2009 World Summit Declaration on Food Security defines four main pillars of food security: availability, access, utilization, and stability. This definition has become the standard conceptual framework for food security today. Maxwell (1996) shows that it is possible to identify a range of strategies for establishing severity and frequency scales in order to develop a reasonably reliable cumulative index of food security. However, the most commonly used measures at the national level include the Global Food Security Index proposed by the Economist Intelligence Unit, the prevalence of undernourishment used by the FAO, the Global Hunger Index developed by the International Food Policy Research Institute (IFPRI), the Multidimensional Poverty Index developed in collaboration with the University of Oxford, and the Hunger Reduction Commitment Index (Palkovič, 2024).

There is therefore no consensus on a single measure of food security. However, Santeramo (2014) urges researchers to focus on the algorithms used to transform raw data into composite indices and to be aware of the implications of each method.

2.2. The literature on the determinants of food security

Food security is a complex issue with multiple dimensions (Palkovič, 2024). Accordingly, the literature describes a wide range of possibilities for improving food security. On the one hand, this can be achieved by acting on food security indicators through increasing food supply, promoting access to food, or improving the purchasing power of populations (Chavas, 2017). On the other hand, it can be addressed by acting on key determining factors such as agriculture and food production (Fan & Brzeska, 2016); agricultural value added or land productivity (Matkovski et al., 2020); or, even more effectively, by controlling corruption (Brankov & Milovanović, 2015).

The work of Smith (2020) focused on determining the importance of improving food availability for reducing child malnutrition in developing countries. Using panel data from 63 developing countries over the period 1970–1996, the estimation of a fixed-effects econometric model reveals a strong, positive, and statistically significant

impact of national food availability on child nutrition. Moreover, this study identifies other important determinants of children's nutritional status, such as education, women's status, and the quality of the sanitary environment.

Regmi and Krishna (2015) identify the determinants of household consumption in Namibia using quantile regression. They find that rural households whose main activity is agriculture have lower cash consumption than rural households engaged in other activities. This research suggests that there is greater potential to increase total consumption among both rural and urban households by raising per capita income, encouraging people to create their own businesses, and reducing income inequalities between rural and urban areas.

Smith and Haddad (2001) use the food insecurity experience scale to identify and examine common determinants of food insecurity in 134 countries worldwide. Using a series of multilevel linear probability models, the results reveal five characteristics most strongly associated with the likelihood of experiencing food insecurity: low levels of education, lower social capital, weak social networks, low household income, and unemployment. Furthermore, their research notes significant heterogeneity in the determinants of food insecurity according to levels of economic development. For example, the associations between food insecurity and gender, the number of adults in the household, rural status, employment status, and GDP per capita all vary by development level. Thus, this research highlights the need for country-specific development policies, as a one-size-fits-all approach to development aid may not be effective. Although this study explores a highly relevant new measurement approach, it nevertheless suffers from limitations related to the analysis of causality between food insecurity and its determinants. Indeed, the cross-sectional analysis used in this research does not allow for correction of the potential endogeneity of the determinants of food insecurity.

The study by Lacmago (2023), covering the period 2000–2015, classifies the factors of food insecurity into two main categories: technical determinants (socioeconomic factors and natural hazards) and political and institutional determinants (political instability, armed conflicts, and quality of governance), with the hypothesis that the former are directly influenced by the latter. This research shows that variables such as the political stability index, strengthening of the democratic framework, control of corruption, the rule of law and better regulation, the transport infrastructure index, food production, increased food imports, and greater trade openness lead to a reduction in food insecurity. Conversely, it finds that income

inequality and population growth increase food insecurity in Sub-Saharan African countries.

III. Methodology

The first step consists in computing the indicator variable of food security using Principal Component Analysis (PCA), followed by estimating its determinants. The objective of PCA is to construct an indicator that summarizes, in a single variable, the common component of several variables whose movements are highly correlated, given that they contribute to the realization or non-realization of the same phenomenon (Anago & Hougbe, 2015). Principal Component Analysis is a technique frequently used in the literature to measure food security (Emile et al., 2020).

To compute the food security index for each WAEMU country over the study period, we select relevant variables corresponding to the four dimensions of food security. Table 1 in the appendix presents the indicators chosen for the calculation of the food security index. These indicators were selected based on the literature and their relevance. Table 2 in the appendix presents the correlations among the food security indicators. Overall, there are low correlations among the variables; therefore, PCA can be used to extract the underlying factors. However, since the variability of food supplies is negatively correlated with the other variables, it is recommended to use its inverse. In addition, in order to ensure metric homogeneity and comparability of indicators across countries and over time, it is necessary to normalize the variables (Caccavale & Giuffrida, 2020).

Nevertheless, the correlation matrix does not allow for measuring the overall quality of inter-item correlations, which justifies the use of the KMO index. Kaiser (1974) recommends not accepting a factor decomposition if the KMO is below 0.5. In this study, the overall KMO is 0.61 (see Table 4 in the appendix). This indicates that the overall sampling quality is good and that the sample is adequate for conducting a Principal Component Analysis.

PCA was performed on all selected variables (see Table 3 in the appendix) in order to reduce the dimensionality of the data and to highlight the main components explaining the observed variability. The results show that two principal components have eigenvalues greater than one. The first principal component alone explains 55.20% of the total variance, while the second increases the cumulative explained variance to 80.65% (see Table 5 in the appendix). According to Kaiser's criterion, the first two components provide a relevant basis for constructing the composite food security index. In this paper, we adopt the method for calculating the food security index proposed by Sullivan (2002), Etwire (2013), Kumar et al. (2013), and Bah et al. (2018). Accordingly, the score that is, the food security

index for each country i in year t is obtained using the retained principal components and their eigenvalues. The computation of the composite indicator is given by:

$$ISA_i = \frac{\lambda_1 COMP_1 + \lambda_2 COMP_2 + \dots + \lambda_k COMP_k}{\sum_{j=1}^k \lambda_j} \quad (1)$$

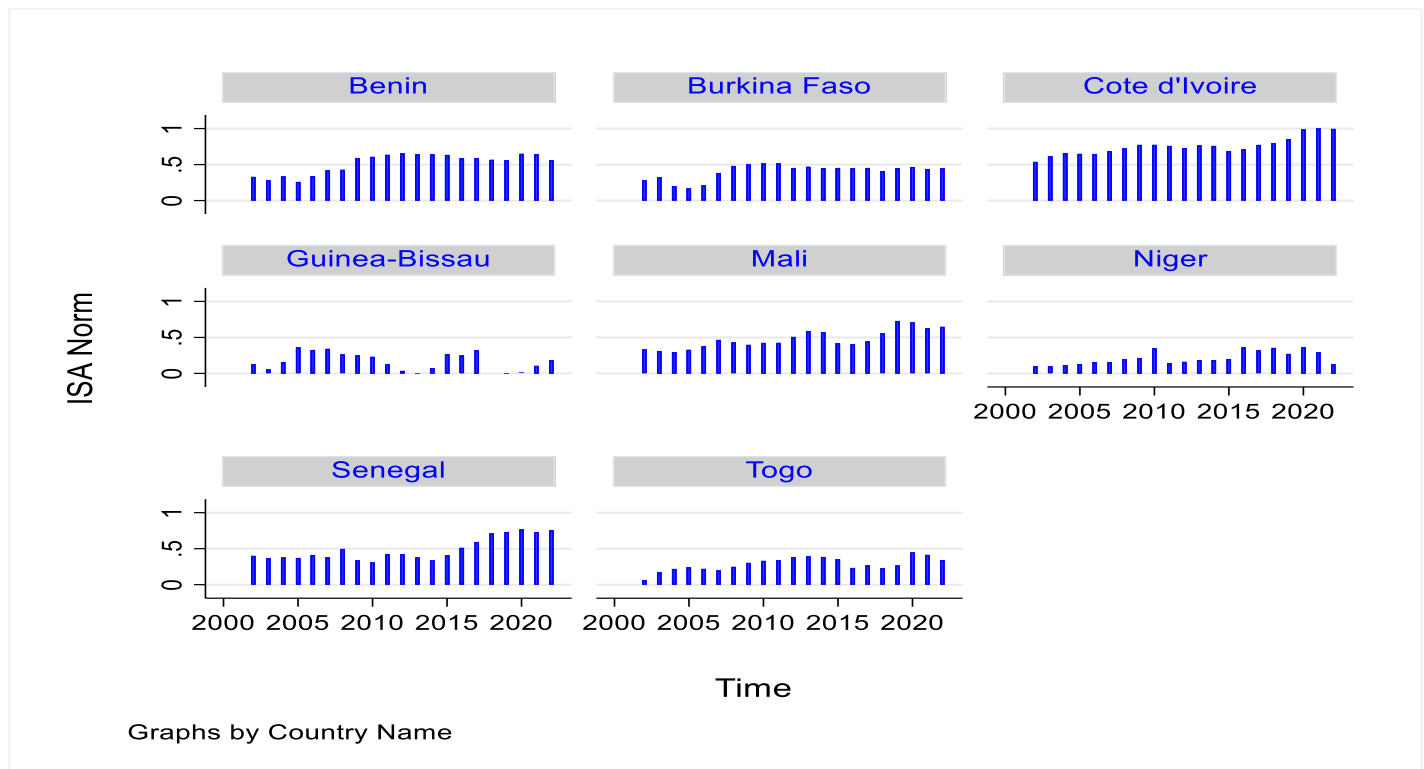
Where ISA_i denotes the food security index of country i ; λ_j represents the eigenvalues selected according to Kaiser's criterion ($\lambda > 1$); and $COMP_k$ are the retained principal components.

After this calculation, the food security index is normalized using the following formula:

$$ISA_{norm} = \frac{ISA_i - \min(ISA)}{\max(ISA) - \min(ISA)} \quad (2)$$

The figure below presents the evolution of the normalized food security index (ISA_{norm}) calculated over the period 2002–2022 in WAEMU countries. A high degree of variability in the index is observed across all countries during the 2002–2022 period. Nevertheless, Côte d'Ivoire remains the country with the best performance among the eight (08) countries. In addition, countries such as Benin, Burkina Faso, and Mali exhibit food security index values that fluctuate around the average. However, countries such as Guinea-Bissau, Niger, and Togo have food security indices that are structurally below the average.

Figure 1: Evolution of the food security index by country from 2002 to 2022.



Source : Authors Own elaboration

Once the food security index has been computed, its determinants are estimated using an appropriate econometric regression.

The theoretical specification of the panel data model is as follows:

$$ISA_{it} = \beta_0 + \sum_{j=1}^n \beta_k X_{ijt} + \varepsilon_{it} \quad (2)$$

Where ISA denotes the food security index computed using PCA; X represents the explanatory variables of food security in WAEMU countries; β and ε respectively denote

the parameters to be estimated and the error terms. The indices $i ; j$ and t refer respectively to countries, variables, and time.

Before selecting the econometric estimation model, it is necessary to conduct preliminary diagnostic tests on the data. The results of the Im, Pesaran, and Shin (IPS) unit root test (Im et al., 2003) are reported in Table 1. These results indicate that all variables are stationary in first differences, except for the inflation rate and cereal productivity, which are stationary in levels.

Table 1: Unit Root Tests

Variable	IPS		Décision
	P-value at level	P-value at first difference	

ISA	0.4544	0.0000	I(1)
PIB	1.0000	0.0000	I(1)
Inf	0.0000		I(0)
Pop	1.0000	0.0048	I(1)
Trad	0.5731	0.0000	I(1)
Prod	0.0006		I(0)

Source : Authors

The results of the stationarity tests suggest the possibility of cointegration. Accordingly, the Kao (1999) cointegration test is employed for this purpose. This test reveals the presence of cointegration among the variables (see Table 2).

Table 2: Kao Cointegration Test

	Statistic	p-value
Modified Dickey-Fuller t	-3.8543	0.0001
Dickey-Fuller t	-3.2174	0.0006
Augmented Dickey-Fuller t	-2.5815	0.0049
Unadjusted modified Dickey-Fuller t	-5.0484	0.0000
Unadjusted Dickey-Fuller t	-3.5716	0.0002

Source : Authors

Based on the results of these various tests, this study proposes an econometric estimation using an Autoregressive Distributed Lag (ARDL) approach, implemented through the Pooled Mean Group (PMG) estimator developed by Pesaran, Shin, and Smith (1999). This method offers several advantages when working with dynamic panel data characterized by heterogeneity across individuals. First, it can be applied to variables with different orders of integration, namely I(0), I(1), or a mixture of both (Elmorchid, 2022). Second, the PMG estimator effectively accounts for cointegration relationships. Finally, it is particularly suitable and efficient for small samples, as is the case for most empirical studies on developing countries (Cheung & Lai, 1993).

The dynamic panel ARDL model is specified as follows:

$$y_{it} = \sum_{j=1}^p \varphi_{ij} y_{i,t-j} + \sum_{j=0}^q \delta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (3)$$

Where $i = 1 \dots 8$ denotes the number of countries; $t = 1 \dots 22$ denotes the number of periods (years); φ_{ij} are scalar parameters; δ_{ij} are coefficients to be estimated; μ_i and ε_{it} represent, respectively, the fixed effects and the error terms; y_{it} denotes the dependent variable; and $X_{i,t}$ refers to the vector of explanatory variables.

From equation (3), the following error correction equation is derived:

$$\Delta y_{it} = \phi_i (y_{i,t-1} - \theta_i X_{i,t}) + \sum_{j=1}^p \varphi_{ij} \Delta y_{i,t-j} + \sum_{j=0}^q \delta_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (4)$$

Where ϕ_i denotes the speed of error correction, which must be negative and have an absolute value less than unity; φ_{ij} and δ_{ij} capture short-run dynamics. Δ is the first-difference operator between two periods. Equation (4) is estimated using an ARDL (1, 1, 1, 0, 0) specification. This study proposes the empirical formulation given by equation (5):

$$\begin{aligned} \Delta ISA_{it} = & \phi_i (ISA_{it-1} - \theta_i PIB_{it} - \theta_i Trad_{it} - \theta_i Pop_{it} \\ & - \theta_i Prod_{it} - \theta_i Inf_{it}) + \delta_{ij} \Delta ISA_{it} \\ & + \delta_{ij} PIB_{it} + \delta_{ij} Trad_{it} + \delta_{ij} Pop_{it} \\ & + \delta_{ij} Prod_{it} + \delta_{ij} Inf_{it} + \mu_i + \varepsilon_{it} \quad (5) \end{aligned}$$

IV. Results and Discussion

In this section, the ARDL model is used to estimate the short-run and long-run equations of the determinants of the composite food security index. The results indicate the existence of a long-run relationship between food security and the explanatory variables. The error correction coefficient is negative and statistically significant at the 1% level, thereby validating the adopted model. Specifically, 38.7% of the disequilibrium observed in food security in the previous year is corrected in the following year.

Table 3 below reports the short-run estimation results. In this context, the main determinants are GDP growth, population growth, and agricultural productivity as captured by cereal yields. However, variables such as the share of trade in GDP and the annual inflation rate do not have a statistically significant impact on food security.

GDP growth exerts a negative and statistically significant effect on food security at the 5% level. A one–percentage point increase in GDP growth leads to a 0.61% decrease in the food security index, ceteris paribus. This result contrasts with the findings of Smith and Haddad (2001) and Noshaba et al. (2021), who report a positive effect of economic growth on food security. However, Chen and Chen (2023) show that in China, the relationship between GDP per capita and food security risk follows a Kuznets-type curve. On this basis, it can be argued that the effect of economic growth on food security is subject to a threshold effect. In developing countries such as those of WAEMU, high income inequalities undermine the potential benefits of economic growth in reducing food insecurity (Holleman & Conti, 2020).

Population growth has a negative and statistically significant effect (at the 1% level) on the food security index in WAEMU countries in the short run. Specifically, a one–percentage point increase in population growth results in a 41.6% decrease in the food security index, all else being equal. In the short run, rapid population growth constitutes a burden in terms of food requirements, which explains the simultaneous decline in the food security index.

Cereal yields have a positive and statistically significant effect at the 10% level. An increase in cereal yields by 1 kg per hectare leads to a 0.0127% increase in the food security

index, ceteris paribus. This result is consistent with Zidouemba (2020), who finds that household consumption is sensitive to food productivity in Burkina Faso. Similarly, Zahid et al. (2022) show that the prevalence of undernourishment is expected to decrease with increases in agricultural productivity. Indeed, sustained growth in cereal productivity enhances national food availability, which is essential for ensuring food security in a country.

The inflation rate has a negative but statistically insignificant effect on the food security index in the short run. This finding is consistent with the results of Djamal et al. (2025) in their study on developing African and Arab countries. According to these authors, this result can be explained by the fact that developing countries depend heavily on external markets for food imports. Given that all WAEMU countries are developing economies, this study further reinforces this widely shared view.

Trade openness also has a positive but statistically insignificant short-run effect on the food security index in this study. The sign of this variable is consistent with the findings of Palkovič (2024) in the context of European countries. This can be explained by the importance of trade in achieving food security in general, and particularly in WAEMU countries. Indeed, in a globalized world, countries engage in international trade to import goods they do not produce and, in return, export surplus production.

Table 3: Estimation Results of the Short-Run Model Using the PMG Estimator

VARIABLES	Short-run Coefficient
Ec	-0.387*** (0.0983)
ΔPIB	-0.00614** (0.00258)
ΔPop	-0.416*** (0.147)
ΔTrad	0.00257 (0.00198)
ΔProd	0.000127* (7.39e-05)
ΔInf	-0.000933 (0.00112)
Constant	-0.131*** (0.0455)
Observations	160

Standard errors in parentheses *** p<0.01; ** p<0.05; * p<0.1

Table 4 reports the estimated coefficients of the long-run determinants of the food security index. The results indicate that the statistically significant determinants include GDP growth, population growth, and cereal productivity.

However, trade openness and the inflation rate have positive but statistically insignificant effects on the index.

In the long run, GDP growth has a negative and statistically significant effect on the food security index at the 5% level. This implies that a one–percentage point increase in

economic growth leads to a 0.0234 decrease in the food security index in the long run. This result contrasts with the findings of Zahid et al. (2022), who report that, in the long run, economic growth can play a key role in reducing the prevalence of undernourishment. However, this divergence may be attributable to differences in the indicators used to measure food security. The result obtained here suggests that GDP growth does not benefit the entire population, thereby widening disparities reflected in the food security index.

Population growth has a positive and statistically significant effect at the 10% level on the food security index in the long run. All else being equal, a one-percentage point increase in population growth leads to a 0.193 increase in the food security index in the long run. Over the long term, population is considered a form of human capital capable of supporting national food production in WAEMU countries, where agriculture remains the main source of employment. This, in turn, contributes to an improvement in the food security index.

In the long run, the coefficient of cereal productivity is positive and statistically significant at the 1% level with respect to food security. Specifically, a long-run increase in cereal yields by 1 kg per hectare results in a 0.000209 increase in the food security index, ceteris paribus. Agricultural productivity remains an intrinsic indicator for ensuring food security in both developed and developing countries.

In the long run, trade openness remains positive but statistically insignificant. This suggests that trade continues to serve as an alternative channel for improving food security in WAEMU countries.

In the long run, inflation exerts a positive but statistically insignificant effect. This result contrasts with the findings of Djamel et al. (2025) for African countries. This discrepancy may be attributable to differences in the country samples considered across studies. In the present context, all WAEMU countries belong to a monetary union characterized by relatively moderate inflation. As a result, the adverse effects of inflation are not observable.

Table 4: Long-Run Model Estimation Results

VARIABLES	Long-run Coefficient
PIB	-0.0234**
	(0.0106)
Pop	0.193*
	(0.0988)
Trad	0.000247
	(0.00261)
Prod	0.000209***
	(8.01e-05)
Inf	0.00322
	(0.00676)
Observations	160

Standard errors in parentheses *** p<0.01; ** p<0.05; * p<0.1

V. Conclusion and Economic Policy Implications

This article examines the determinants of food security in WAEMU countries. However, for an accurate identification of these determinants, a proper assessment of food security remains essential. Accordingly, Principal Component Analysis (PCA) was used to construct a robust composite index based on the four main dimensions of food security identified in the economic literature. Once a synthetic measure of the dependent variable was obtained, the explanatory variables were selected from the existing literature. Subsequently, the econometric analysis relied on

an ARDL estimation using the Pooled Mean Group (PMG) method. This approach reveals the existence of a long-run equilibrium relationship between food security and the selected explanatory variables. Specifically, 38.7% of the disequilibrium observed in the previous period is corrected in the subsequent period.

Moreover, GDP growth, population growth, and cereal productivity emerge as the main factors that significantly influence the food security index in both the short run and the long run. These findings call for a redefinition of economic policies to ensure that economic growth benefits

disadvantaged populations, who are generally the most food insecure. In addition, given the impact of population growth, population policies that enhance and valorize human capital are necessary. The results also indicate that increases in cereal productivity improve food security, highlighting this factor as a key policy lever.

In light of these findings, this study recommends a more equitable redistribution of the wealth generated by economic growth so that its benefits accrue to vulnerable populations. Furthermore, it is important to invest in human capital, particularly through youth education and training, as this factor constitutes a long-term driver of food security. Finally, the implementation of national agricultural production policies aimed at increasing agricultural productivity is essential for improving food security.

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Annexes :

Table 1: Variables Considered in the Estimation of the Food Security Index

Dimensions of food sécurité	Variables	Référence
Availability	Average Dietary Energy Supply Adequacy (AMAEA)	(Slimane, 2017); The Economist Intelligence Unit (2012) ; (Ly et al., 2020)
Access	Gross Domestic Product per Capita (PIB)	(Diagne, 2014) ; (Tohon, 2021)
Stability	Supply Variability (VA)	Ly et al. (2020) Tohon (2021)
Utilization	Use of Basic Drinking Water Services and Basic Sanitation Services (USEA)	Slimane (2017) Tohon (2021) ; The Economist Intelligence Unit (2012)

Source: Authors based on the literature.

Table 2: Descriptive Statistics of Food Security Indicators

Variable	Obs	Mean	Std.Dev.	Min	Max
AMAEA	168	2524	187.4	2122	2956
GDP per capita	168	2708	1150	1183	6700
VA	168	-29.94	14.21	-63	-4
USEA	168	61.95	10.81	39	86

Source : Authors' calculations

Table 3: Correlation Matrix of Food Security Indicators

Observations = 168				
	AMAEA	GDP per capita	VA	USEA
AMAEA	1			
GDP per capita	0.497	1		
VA	-0.336	-0.237	1	
USEA	0.441	0.715	-0.0312	1

Source : Authors' calculations

Table 4: Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy

Variable	KMO
AMAEA	0.7647
GDP per capita	0.6085
VA	0.4559
USEA	0.5683
Overall	0.6102

Source : Authors' calculations

Table 5: Total Variance Explained by the Principal Components

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.20809	1.19002	0.5520	0.5520
Comp2	1.01807	0.499664	0.2545	0.8065
Comp3	0.518405	0.262972	0.1296	0.9361
Comp4	0.255433	.	0.0639	1.0000

Source : Authors' calculations

Table 6: Principal Eigenvectors

Variable	Comp1	Comp2	Comp3	Comp4	Unexplained
AMAEA	0.5211	0.2144	-0.8256	-0.0299	0
GDP per capita	0.5931	-0.1807	0.3529	-0.7007	0
VA	0.2756	0.8543	0.3883	0.2084	0
USEA	0.5484	-0.4376	0.2078	0.6816	0

Source : Authors' calculations

Table 7: List of Variables Used in the Econometric Regression

Variables	Description	Source
<i>Dependante Variable</i>		
Food Security Index	Composite Indicator Calculated by the Author	Author's Calculation Based on FAOSTAT Data
<i>Explanatory Variables</i>		
PIB	GDP Growth Rate	WDI
Agricultural Productivity	Cereal Yields (kg per hectare)	WDI
Inflation	Consumer Price Inflation	WDI
Trade Openness	Total Exports and Imports as a Percentage of GDP	WDI
Population Growth	Annual Population Growth Rate	WDI

Source : Authors