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Multisector Drivers of Healthy Diet Costs and Gender Disparities in Africa

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Abstract

Structural inefficiencies in food systems and socioeconomic inequalities increasingly constrain the affordability of nutritionally adequate diets across many African countries. This study examines the multisectoral factors of the real cost of healthy diets (CoHD) and the gender-related effects in shaping diet affordability across selected African countries. Using cross-country panel data covering 2017–2024 from Food System Dashboard and Food Prices for Nutrition, the analysis integrates indicators from market performance, infrastructure, food system performance, agricultural productivity, socioeconomic, governance, and environmental conditions. Specifically, the study examines how supply chain infrastructure, retail market development, food price volatility, remittances, gender inequality, food supply variability, food policy, and agricultural value-added influence the cost of healthy diets. A log-linear panel regression is employed to estimate the fixed-effects and random-effects models, allowing for unobserved heterogeneity and temporal dynamics. The results indicate that food supply instability, growth in retail of ultra-processed foods, and food price volatility significantly increase the cost of healthy diets, while agricultural value addition and improved supply chain infrastructure moderate diet costs. Personal remittances show a mixed association with diet affordability, suggesting their impact on household dietary consumption smoothing. Gender inequality is a major structural driver associated with higher diet costs, indicating that social disparities worsen nutrition access and performance. The findings highlight the importance of nutrition-sensitive and gender transformative strategies within the food system that cuts across multifunctional factors whose influence trickle down to higher cost of healthy diet. These insights contribute to the broader view of food system transformation and nutrition strengthening policies in the Global South.

Keywords: Cost of Healthy Diet (CoHD); Food Systems; Food Price Volatility; Gender Inequality; Nutrition Affordability

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Introduction

Healthy diets are essential for reducing malnutrition and diet-related issues; however, the cost of diets has been more expensive in developing countries (Hu et al., 2026; Masters et al., 2025). Despite the growing interest and priority of food security in regional policy interventions, healthy diets remain persistently out of reach of two-thirds of Africans (FAO 2026; Abdi et al., 2025). With only a few years left to achieve the 2030 SDGs 2 (Zero Hunger), about 309 million people in Africa still face hunger (FAO, 2026). Consequently, one out of five people is hungry, estimated to be about 20% of the population compared to 6% in Asia (FAO, 2026). These figures imply a possible risk of missing key nutrition targets in the region by 2030. Substantial evidence increasingly demonstrates how structural inefficiencies, localized conflicts, climate extremes, global financial shocks, and urbanization disrupt food systems and subsequently increase the cost of a healthy diet (CoHD) (Naja et al., 2026, Omotayo et al., 2026; Aduteye and Tubene, 2026). Specifically, food prices, governance and political stability, remittances, skewed access to resources, and other sociocultural factors form the basis of gender-related investigations of dietary costs in African countries like Kenya, Nigeria, Rwanda, Ethiopia, Algeria, and South Africa (Majiwa et al., 2025; Ikudayisi et al., 2019). Unfortunately, some of the underlying factors fall short of explaining the specific effects within a multisectoral framework, while most vulnerable populations, particularly women and children, are disproportionately affected (Saad et al., 2022). Evidently, the cost of a healthy diet (CoHD) stems beyond production and food price mechanisms to more of a multisectoral and gender-related food system challenge. This study analyzes multisectoral drivers and gender disparities in healthy diet costs across 15 African countries from 2017-2024, covering a broad spectrum of macroeconomic, political, economic, and gender inequality contexts. As the region grapples with the affordability of healthy diets, an investigation of multisector drivers and gendered gaps can be understood as evidence in pursuit of policy reforms towards inclusive agrifood systems and the pursuit of global efforts towards achieving SDG 2 (Zero Hunger) and 5 (Gender Equality).

Methodology

The study utilizes a panel dataset covering 15 countries from 2017 to 2024, with data sourced from the Food Prices for Nutrition (FPN), World Development Indicators (WDI), and Food System Dashboard. The selected countries cut across the five regions of the African continent, which include Western (Nigeria, Ghana, and Senegal), Southern (South Africa, Namibia, Botswana); Eastern (Kenya, Rwanda, Ethiopia); Central (Democratic Republic of Congo, Angola); and Northern (Egypt, Algeria, Morocco). The fixed effect (FE) regression model analyzes the within effects of multisector factors on the cost of healthy diets and gender for the selected African countries and addresses the heterogeneity that may arise from such specifications (Bell and Jones, 2015). The baseline fixed effects model in Equation (1) controls for unobserved country-fixed effects (μ_i) and year-fixed effects (λ_t):

$$\ln CoHD_{it} = \beta_0 + \beta_1 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where $\ln CoHD_{it}$ is the cost of a healthy diet, X_{it} is the vector of covariates specified in Table 1, and ε_{it} , stochastic error term. The disaggregated effects employ the prevalence of moderate or severe food insecurity of female and male adult populations interacted with food price volatility and remittances. The moderating terms provide distinct insights into the gender disparities shaping

social vulnerability in the cost of healthy diets explained by price and income preferences (Hu et al., 2026). The interaction regression model is specified in Equations (2) and (3).

$$\ln\text{CoHD}_{it(\text{male})} = \beta_0 + \beta_1 X_{it} + \beta_2 G_{it} + \beta_3 (G_{it}^m * Y_{it}) + \beta_4 (G_{it}^m * Z_{it}) + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

$$\ln\text{CoHD}_{it(\text{female})} = \beta_0 + \beta_1 X_{it} + \beta_2 G_{it} + \beta_3 (G_{it}^f * Y_{it}) + \beta_4 (G_{it}^f * Z_{it}) + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

where X_{it} ; covariates; G_{it} ; nutrition variable of interest. β_1 ; β_2 ; baseline effects when interaction terms are zero. $(G_{it}^m * Y_{it})$; $(G_{it}^f * Z_{it})$ are the interaction terms for male and female adult population.

Results

From the baseline result (Table 1), the significant effects of urbanization and exchange rate reflect the entry points of developmental pressure and global economic shock on food and nutrition insecurity, especially domestic currency depreciation and uneven rapid urban growth. However, supply chain infrastructure tends to reduce diet costs, suggesting that functional transportation and logistics across all value chain segments would trickle down to reduce food environment operational costs (Abdi et al., 2025). Expectedly, the significant relationship between food price volatility and CoHD further increases the price effect of accessing least combined nutritious foods (Ikudayisi, 2021). Although the baseline analysis shows significant pathways, the important trade-offs of gender disparity are presented at the disaggregated level. The mixed outcome of the baseline personal remittances received is indicative that its role is not limited to smoothing consumption but varies by male and female food insecurity level (Table 2). Notably, the moderating impact of food price volatility (0.0177, $p < 0.03$) and remittances (0.0002, $p < 0.03$) on the prevalence of food security among men underscore how a sex-disaggregated approach shapes access to healthy diets. The significant and negative association of remittances and diet costs suggests the role of inflows in easing financial constraints; however, the effect flattens due to the small significant positive interaction term with male food insecurity.

Table 1: Baseline fixed effect regression analysis

Variable	Coefficient	Standard Error	t -value	p- value
Exchange rate	0.2224	0.0442	5.03	0.000
Supply chain infrastructure	-0.0100	0.0037	2.69	0.008
Food price volatility	0.0921	0.0259	3.55	0.001
Remittance	0.0897	0.0326	2.75	0.007
Gender Inequality Index	0.687	0.3799	1.81	0.074
Prevalence of moderate or severe food insecurity	0.2302	0.1299	1.77	0.080
Urbanization	1.1471	0.2485	4.62	0.000
Political instability	0.0395	0.0648	0.61	0.543
Constant	-5.5845	1.0376	-5.38	0.000
F test	22.12;			
	p<000			

The negative association between volatile prices and female food insecurity (-0.6484; $p < 0.041$) does not imply optimized dietary costs but suggests that dietary transition and behavioural coping

mechanisms mediate this relationship among adult females (Hu et al., 2026). Similarly, the highly moderating effect of remittance on female food insecurity (0.6043, $p < 0.002$) shows a reinforcing effect of higher diet costs associated with unequal economic resilience, especially female-headed households (Majiwa et al., 2025). These moderating interactions elucidate male and female food insecurity status amid high diet costs, demonstrating gender disparities in attaining a healthy diet. In addition, the time effect captures the year effect, showing the escalation of diet costs over time. Specifically, the time period highlights the COVID-19 shocks of localized lockdowns (2020-2021), supply shocks of the Russia-Ukraine war (2022-2024), and subsequent food, energy, and exchange-rate pressures, which may influence the estimated associations.

Table 2: Gender disaggregated fixed effect analysis

Variables	Male	Female
Exchange rate	-0.0007*** (0.0017)	-0.0008*** (0.0002)
Supply chain infrastructure	-0.0114 (0.0115)	-0.0006 (0.0104)
Food price volatility	0.8304** (0.3630)	2.4686** (1.1856)
Remittance	-0.0104*** (0.0038)	-2.3363** (0.7842)
Prevalence of moderate or severe food insecurity	0.0042 (0.0128)	-1.4211 (0.8879)
Interaction by food price volatility	0.0177** (0.0075)	-0.6484** (0.3135)
Interaction by remittance	0.0002** (0.0001)	0.6043** (0.1904)
Year fixed effects		
2018	0.0325 (0.0903)	-0.0212 (0.0925)
2019	0.0053 (0.0930)	0.05819 (0.0931)
2020	0.1546* (0.094)	0.1605 * (0.0946)
2021	0.4032*** (0.0949)	0.3918 *** (0.0965)
2022	0.8008*** (0.0949)	0.7802*** (0.0986)
2023	1.2139*** (0.0964)	1.2068*** (0.1002)
2024	1.4887*** (0.1039)	1.4353*** (0.1038)
Constant	3.6922*** (0.8468)	9.1616*** (3.7242)

Standard errors in parentheses and significance level as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Conclusion

The study shows that access to a healthy diet involves multisectoral interactions rather than solely agrifood system operations. The baseline analysis reveals the varying effects of urbanization, supply chain infrastructure, exchange rate, and gender inequality in explaining the rising cost of diets in Africa. However, the disaggregated outcomes and heterogeneity effects confirm that financial capabilities and volatile food prices are central to understanding gender disparities amid rising dietary costs. This outcome further substantiates prioritizing women's dietary preferences and equal access to social welfare in policy reforms, such as converging country-specific transformative interventions toward healthier diets.

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