Energy Shocks and Food System Transmission: A Rapid Assessment Framework for Import-Dependent Economies with Evidence from Malawi

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Technical Report

International Water Management Institute (IWMI)

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Cover photo

Farmer Grace Malaitcha, from Zidyana, near Nkhotakota, Malawi, pictured on her maize plot (*photo*: Patrick Wall/ CIMMYT)

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Project

The Ukama Ustawi+ (UU+) project builds on the success of the CGIAR Initiative for Diversification in East and Southern Africa (Ukama Ustawi). The proposed extension, financed by MFAT, is not a new project but a strategic continuation of high-impact activities. The project prioritizes local ownership, capacity development, and partner leverage, with intensified support in Kenya, Malawi, and Zambia, and leveraged activities in Ethiopia, Zimbabwe, Tanzania, and Rwanda. UU+ aims to deepen systems transformation, reach thousands more farmers, and ensure lasting impact through robust partnerships and evidence-based scaling.

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NEW ZEALAND FOREIGN AFFAIRS & TRADE Manatū Aorere

New Zealand Ministry of Foreign Affairs and Trade (MFAT)

Contents

1. Key Messages

This paper develops a unified framework for analyzing how global shocks transmit into food systems and operationalizes that framework through a structured empirical approach. Drawing on evidence from the COVID-19 pandemic, the Russia-Ukraine crisis, and recent market dynamics in Malawi, it assesses how different types of shocks resulting from energy market disruptions spread through import-dependent economies.

Regardless of different origins, global shocks transmit through a common set of interconnected channels, including energy and transport, trade, agricultural inputs, and macroeconomic adjustment. These channels are mutually reinforcing, which generates system-wide effects on food prices, production systems, and access to food.

The transmission is heterogeneous and spatially differentiated. Market integration, geographic location, and commodity characteristics shape the outcomes. Remote and poorly connected markets experience stronger and more persistent price pressures due to higher transport costs and more constrained supply flows.

Empirical evidence from Malawi shows that transmission of shocks follows a structured sequence. Energy shocks are reflected immediately in the prices of fuel and imported commodities, while domestically produced staples exhibit a delayed response, driven by transport costs, market integration, and input price pass-through. The absence of immediate food price increases does not imply weak transmission but reflects the time taken for adjustment across channels.

These dynamics have important implications for Pacific and other import-dependent economies. Structural reliance on imported food and maritime transport means that transmission is likely to be faster and more pronounced although outcomes may vary across countries depending on their market structure, geographic dispersion, and the role of local food systems.

Strengthening resilience to shocks requires a systems-based policy approach that goes beyond crisis-specific responses. Priorities include stabilizing energy and transport systems, safeguarding access to agricultural inputs, maintaining predictable trade flows, investing in water and production systems, and strengthening data, monitoring, and early-warning mechanisms.

2. Introduction

International shocks, whether arising from global health crises or geopolitical conflicts, are increasingly demonstrating their capacity to transmit their effects rapidly into domestic food systems, including in countries that have only limited direct exposure to the origin of the shock. The COVID-19 pandemic and the Russia-Ukraine war provide two recent examples, both of which revealed structural vulnerabilities in food systems across Sub-Saharan Africa, particularly in low-income and import-dependent economies such as Malawi. These experiences underscore the extent to which domestic food systems are embedded within global economic and supply networks, and how external disruptions can generate significant internal consequences.

Evidence from the COVID-19 pandemic shows that disruptions to mobility, trade, and market operations affected food supply chains through both demand and supply channels. Empirical analysis across African markets shows that food price responses during the crisis were highly heterogeneous and spatially differentiated. Rural markets experienced higher prices due to increased transaction costs and constrained supply flows, while some urban markets experienced price declines associated with reduced demand linked to loss of people's incomes and closure of institutions. These patterns highlight the importance of market integration, spatial connectivity, and commodity characteristics in shaping how shocks are transmitted, and demonstrate that impacts are mediated by local market structures rather than being uniformly distributed (Yade et al. 2021).

The Russia-Ukraine war imparted a different type of shock, primarily by disrupting global commodity and input markets. Russia and Ukraine account for a significant share of global exports of wheat and sunflower oil, and disruptions in the Black Sea region generated systemic effects for global food systems. At the same time, fertilizer markets experienced sharp price increases due to supply disruptions, higher energy costs, and export restrictions. Given the high dependence of many African countries on imported fertilizers, these developments had direct implications for agricultural production and food security in those countries. The Russia-Ukraine crisis highlighted the critical role of input markets, particularly fertilizers, as a key transmission channel linking global shocks to domestic production systems (Laborde Debucquet et al. 2023).

In Malawi, these global disruptions translated into higher prices for imported commodities, fuel, and agricultural inputs, with cascading effects across domestic food systems. Empirical evidence shows that imported commodities responded rapidly to global price increases, reflecting the direct exposure to international markets, while domestically produced staples exhibited delayed but sustained price adjustments driven by pass-through of higher transport and input prices. These dynamics illustrate how global shocks interact with domestic structural conditions such as market integration, infrastructure constraints, and input dependence to shape food system outcomes (Matchaya 2022).

The geopolitical conflict involving Israel, USA and Iran is imparting a third category of shocks centered on global energy markets. The disruption of key energy traffic through the Strait of Hormuz has the potential to generate sustained increases in oil prices, with direct and indirect implications for food systems. Unlike previous shocks, which were primarily demand-driven as in the case of the COVID-19 pandemic, or commodity-specific as in the case of the Russia-Ukraine crisis, energy-driven shocks operate across multiple dimensions simultaneously. They affect transport systems, agricultural production, input markets, and macroeconomic conditions, creating system-wide effects along the entire food value chain.

These developments are particularly significant for import-dependent and geographically remote economies, where reliance on imported fuel, food, and agricultural inputs makes them more vulnerable to global market volatility. In such contexts, rising transport costs, disruption of food imports, and increasing input prices are likely to interact with and reinforce each other, amplifying impacts on food availability, affordability, and access. This is especially relevant for small island and Pacific economies, where dependence on maritime transport and imported food implies potentially faster and more pronounced transmission of shock through energy and trade channels.

This paper builds on these strands of evidence to develop a unified framework for understanding how global shocks transmit into food systems and to operationalize this framework through a structured empirical approach. The central argument is that while shocks differ in origin, their transmission follows a structured pattern that is mediated through interconnected energy, trade, input, and spatial market channels, producing differentiated outcomes across commodities, locations, and economies. The framework is applied to Malawi as an empirical demonstration, which is then used to derive forward-looking insights for Pacific and other import-dependent economies. By linking past evidence to current and emerging risks, the paper provides a foundation for systematic, cross-country analysis to support monitoring, early-warning, and policy response under conditions of increasing global uncertainty.

3. Global Shocks and Transmission Mechanisms

3.1 Conceptual Framework: Structured Transmission of Global Shocks to Food Systems

Global shocks affect food systems through a set of structured but interacting transmission mechanisms. These mechanisms do not operate uniformly; their effects are mediated by structural, spatial, and institutional conditions, including market integration, infrastructure, and exposure to global trade. As a result, similar shocks can generate heterogeneous outcomes across countries, regions, and commodities.

A central principle emerging from the literature is that transmission of shocks is conditional on system structure and location. Price responses and availability outcomes differ across rural and urban markets, surplus and deficit regions, and highly versus weakly integrated markets. These differences reflect variation in transaction costs, infrastructure quality, and market connectivity. Poorly connected and remote markets, including many rural areas and small island and Pacific economies, are particularly vulnerable due to high transport dependence, thin supply chains, and limited substitution possibilities.

At a system level, global shocks propagate through three underlying mechanisms. First, **direct exposure**, by which countries are affected through immediate trade or input linkages with disrupted regions or commodities. Second, **indirect exposure**, whereby impacts are transmitted through third-party trade relationships, global price adjustments, and reallocation of supply. Third, **systemic contagion**, in which price movements, expectations, and behavioral responses spread across interconnected commodity and factor markets. These mechanisms jointly determine how localized disruptions evolve into broader food system impacts.

Within this structure, transmission of shocks operates through four primary and interconnected channels:

The **energy and transport channel** functions through changes in fuel prices, which affect the cost of moving food across domestic and international markets as well as the cost of mechanized agricultural operations. This channel is particularly important in geographically remote and import-dependent contexts. In small island and Pacific economies, where maritime transport dominates, fuel costs are a major component of the final price of imported food. In landlocked economies, inland transport costs amplify and sometimes delay transmission, as goods must travel longer distances through multilayered distribution systems. Increases in fuel prices therefore raise shipping costs, disrupt supply chains, and increase the cost of accessing both inputs and final food products.

The **trade channel** operates through import prices, availability, and global supply conditions. Disruptions in major exporting regions, changes in trade policies, or shifts in global demand affect both the price and physical availability of food imports. Countries with high import dependence, limited storage capacity, and concentrated sourcing are particularly exposed. In such contexts, even moderate disruptions can translate into significant food security risks, especially for staple commodities that are not easily substituted domestically.

The **input channel** operates through fertilizers and other agricultural inputs, which are both energy-intensive to produce and highly dependent on global supply chains. Disruptions in energy markets, as well as disruptions in key producing regions such as the Persian Gulf, directly affect the availability and price of fertilizers, including urea and ammonia. Increases in input prices reduce affordability and alter production decisions, leading to lower input use, reduced yields, and potential declines in future food availability. While the relative importance of this channel varies across farming systems, it remains relevant even in contexts with partial reliance on organic inputs because transport, processing, and complementary inputs are also affected by global energy and market conditions.

The **macroeconomic channel** operates through exchange rates, inflation, and fiscal constraints. Rising import bills increase pressure on foreign exchange reserves and can lead to currency depreciation, which further raises the domestic price of imported food and inputs. At the same time, inflationary pressures reduce real incomes and purchasing power, while fiscal constraints may limit governments' ability to implement mitigating policies such as subsidies or social protection. These dynamics amplify the transmission of shocks from global markets to household-level food access.

In addition, global shocks also propagate through the **energy-water-food nexus**, particularly in irrigation-dependent agricultural systems. Rising fuel prices increase the cost of water pumping, groundwater abstraction, and irrigation operations, raising production costs and affecting cropping decisions. These effects are especially important in contexts where irrigation is expanding as part of climate adaptation strategies. When combined with climate-related shocks such as drought, energy-driven cost increases can generate compound effects on production and food availability.

These channels are mutually reinforcing. Increases in energy prices raise both transport and input costs; trade disruptions affect availability and price formation; macroeconomic pressures amplify these effects; and water-related production costs introduce additional feedback into the system. The interaction of these channels generates complex and often nonlinear outcomes, with impacts that vary across locations, commodities, and population groups.
Taken together, this framework provides a structured basis for analyzing the food security implications of global shocks, including those originating in energy markets. It highlights that the magnitude and distribution of impacts are determined not only by the size of the initial shock, but also by the degree of exposure, the structure of domestic food systems, and the capacity of countries to absorb and respond to external pressures.

3.2 Temporal Dynamics and Spatial Differentiation of Shock Transmission

The transmission of global shocks to food systems unfolds over distinct time horizons, with different channels dominating at each stage.

In the short-term, impacts are driven primarily by immediate adjustments in energy prices, exchange rates, and expectations. The energy and transport channel typically responds first, with increases in fuel prices translating rapidly into higher freight and distribution costs. This effect is particularly pronounced in island and Pacific economies, where maritime transport dominates food supply and shipping costs constitute a large share of final consumer prices. Coastal import-dependent economies experience a relatively rapid pass-through effect through port-based supply chains, while landlocked economies face additional inland transport layers that may delay but also amplify price transmission.

At the same time, exchange rate pressures may emerge in import-dependent economies, increasing the domestic price of imported food and inputs. Commodities that are directly traded internationally, particularly imported staples such as rice and wheat products, tend to adjust more quickly than locally produced staples.

In the medium-term, secondary transmission effects become more prominent as cost increases propagate through supply chains. Higher transport costs pass through to wholesale and retail prices, while substitution effects across commodities intensify. Trade adjustments, including changes in sourcing, substitution between imported and domestically produced foods, and shifts in import volumes, influence both availability and price dynamics. During this phase, the interaction between energy, trade, and macroeconomic channels becomes more visible, leading to broader, though still uneven, impacts across food systems. Commodity characteristics play a key role, with highly tradable commodities adjusting earlier, while domestic staples and perishable goods respond more gradually depending on storage capacity, market integration, and local supply conditions.

In the long-term, third-order effects emerge through input and production systems. Sustained increases in fertilizer and input costs influence production decisions, reduce input use, and may lead to lower yields, particularly in input-dependent agricultural systems. These effects contribute to tightening domestic supply conditions and can lead to more generalized and persistent food price increases. While this channel may be less dominant in some Pacific and island contexts where fertilizer use is relatively lower, it remains relevant through indirect effects on transport, processing, and complementary inputs. In more input-intensive and commercially oriented agricultural systems, particularly in continental economies, this channel becomes a central driver of long-term adjustment.

These temporal dynamics are closely linked to spatial and structural heterogeneity. Remote and poorly integrated markets tend to experience stronger impacts through the energy and transport channel, although these effects may be lagged due to slower market integration and delayed price transmission. Urban and well-integrated markets tend to reflect shocks earlier due to stronger market connectivity, although initial price increases may be more moderate. In contrast, rural and less integrated markets often experience delayed but more pronounced adjustments as costs accumulate through transport and supply constraints. Differences also arise between coastal and inland markets: in coastal markets, proximity to ports facilitates faster adjustment for imported goods, while inland markets face layered transport costs that shape both the timing and magnitude of price transmission.

Finally, net food-importing and geographically isolated economies, particularly in the Pacific, are more exposed in the short-term through import and transport channels, while domestic production systems play a larger role in shaping medium- and long-term outcomes in more agriculturally self-sufficient contexts. The absence of immediate food price responses in some settings should therefore not be interpreted as weak transmission, but rather as reflecting the sequencing of adjustment across channels, commodities, and locations over time.

Table 1 presents a stylized ex ante transmission matrix summarizing the likely direction, relative magnitude, and spatial incidence of price effects under an external energy shock. These expected patterns serve as a conceptual guide for empirical application to Malawi.

Table 1. Expected shock transmission patterns across time horizons and market types.

Time horizon	Dominant transmission channels	Commodity price effects	Rural market effects	Urban market effects
Short-term (immediate)	Energy and transport cost shock; exchange-rate pressure; precautionary buying; temporary supply-chain disruption.	Imported staples (rice, wheat, edible oil): ↑[a]; fuel: ↑↑; domestic staples (maize, beans, cassava): → to slight ↑	Remote rural markets: ↑↑ due to freight costs and reduced trader movement. Rural deficit markets: ↑ as incoming supply tightens. Rural surplus markets: → buffered by own stocks/local harvests.	Urban import-dependent markets: ↑ through faster pass-through on imported foods and fuel. Low-income consumers affected first.
Medium-term	Transport pass-through; trade adjustment; substitution from imports to local staples; stock depletion; trader margin adjustments.	Imported foods: ↑↑; maize: ↑; beans/ locaL foods: ↑; processed foods: ↑↑	Remote rural markets: ↑↑ persistent logistics burden. Rural deficit markets: ↑↑ as dependence on purchased food intensifies. Rural surplus markets: ↑ as traders move grain outward and local demand rises.	Urban markets: ↑ sustained. Consumers substitute toward maize/beans, spreading inflation beyond imports; informal settlements most exposed.
Long-term	Input costs (fertilizers, seeds, chemicals); macroeconomic inflation; lower production response; wage pressures; currency weakness	Maize: ↑↑; other staples: ↑; imported foods: ↑↑; livestock products: ↑	All rural markets: ↑. Remote rural markets: ↑↑ highest persistent prices. Former surplus zones: ↑ as input costs reduce future supply. Deficit zones: ↑↑ chronic stress risk.	All urban markets: ↑ broad-based food inflation. Real incomes eroded, especially for wage earners and poor households.

Note: [a] Arrows pointing upward imply increase.

The table synthesizes the anticipated sequencing of transmission of shock effects in a landlocked, import-dependent economy such as Malawi. In the short term, imported commodities and transport-sensitive markets are expected to adjust first through the fuel-price and exchange-rate channels. In the medium term, substitution effects and supply-chain pass-through are likely to broaden inflationary pressures to domestically produced staples and food-deficit markets. In the long term, rising input costs and macroeconomic adjustment may generate more generalized food price increases, with remote rural areas facing the strongest and most persistent pressures.

4. Operationalization of the Framework and Empirical Strategy

The conceptual framework outlined in Section 3 is operationalized through a structured empirical approach designed to detect and interpret short-run transmission dynamics of global shocks into food systems. The objective is not to estimate long-run equilibrium relationships or to generate forecasts, but to identify the timing, channels, and spatial differentiation of transmission following a structural shock.

The empirical strategy combines three complementary components:

First, a temporal comparison framework is used to capture the immediate effects of shocks. High-frequency price data are used to define pre-shock and post-shock periods, allowing identification of early-stage adjustments in key variables, including food prices, fuel prices, and exchange rates. This approach enables the detection of initial transmission effects across different channels, particularly those expected to respond rapidly, such as energy and trade-related variables.

Second, a spatial disaggregation approach is applied to capture heterogeneity in transmission across market types. Markets are classified based on structural characteristics, with a primary distinction made between urban and rural markets as a proxy for differences in market integration, infrastructure, and access to supply chains. This reflects the expectation, grounded in existing evidence, that poorly integrated and remote markets face higher transaction costs and may experience stronger or more persistent transmission effects (Yade et al. 2021). Spatial differentiation is therefore used to assess how transmission varies across locations with different levels of connectivity and exposure.

Third, a difference-in-differences structure is employed to isolate differential impacts across market categories while controlling for common external shocks. By comparing changes in outcomes across urban and rural markets before and after the shock period, this approach identifies relative differences in price dynamics attributable to the structural characteristics of markets rather than to the common external shock itself. This provides a structured basis for assessing heterogeneous transmission across space.

The analysis focuses on a set of key variables that correspond directly to the transmission channels identified in the conceptual framework above. These include food prices for both imported and domestically produced commodities, fuel prices as a proxy for the energy and transport channel, exchange rates capturing macroeconomic adjustment, and aggregate food price indices reflecting system-wide effects. Where possible, prices are analyzed both in local currency and USD terms to distinguish between domestic price dynamics and exchange rate effects.

The empirical design is aligned with the expected temporal sequencing of transmission. In the short term, attention is placed on variables that are expected to respond immediately to external shocks, including fuel prices, exchange rates, and imported food commodities. In the medium term, the analysis considers the propagation of cost increases through domestic supply chains, including transport cost pass-through and substitution effects across commodities. In the longer term, the framework anticipates adjustments through input and production systems, although these effects may not be fully observable within the short time horizon of the available data.

Importantly, the absence of immediate price changes in certain commodities or markets is not interpreted as evidence of weak transmission. Rather, it is understood as reflecting the sequencing of adjustment processes across channels, commodities, and locations, as outlined in the conceptual framework. This interpretation is central to the empirical strategy, which is designed to capture the timing and structure of transmission rather than its full long-term effects.
The approach is intentionally modular and transferable. By combining temporal comparison, spatial disaggregation, and differential analysis across market types, it provides a consistent framework that can be applied across countries

with varying data availability. This makes it particularly suitable for comparative analysis across import-dependent and structurally diverse economies, including small island and Pacific contexts, where similar transmission mechanisms are expected to operate but with different magnitudes and timing.

5. Empirical Application: Malawi

In this section, Malawi is used as an empirical application of the operational framework, providing a test case for assessing how global shocks are transmitted into a landlocked, agrarian, and partially import-dependent food system. The purpose is not to generalize from Malawi alone, but to demonstrate how this analytical approach can be applied in practice to detect and interpret transmission dynamics across channels, commodities, and locations.

Malawi represents a structurally relevant context for this analysis. As a landlocked economy with high dependence on imported fuel and agricultural inputs, and with a food system characterized by both subsistence and market-oriented production, it is exposed to multiple transmission channels. At the same time, spatial variation in market integration, infrastructure, and access conditions provides a useful setting for examining heterogeneous responses across locations. Consistent with the empirical strategy outlined in Section 4, this analysis focuses on high-frequency price data across key commodities and markets. The dataset includes prices for both imported and domestically produced food commodities, alongside fuel prices, exchange rates, and an aggregate food price index. Markets are disaggregated into urban and rural categories to capture differences in market integration and access to supply chains.

The analysis examines price dynamics across defined pre-shock and post-shock periods, allowing identification of short-run transmission effects. Particular attention is given to differences across commodities and market types, reflecting the expectation that transmission varies depending on exposure to global markets and structural characteristics of domestic food systems.

The evidence from Malawi indicates that transmission occurs in a structured and differentiated manner. Imported commodities exhibit relatively rapid adjustments, reflecting direct exposure to international price movements. In contrast, domestically produced staples show more gradual responses, with price adjustments emerging over time as higher transport costs and input prices propagate through domestic supply chains. These patterns are consistent with indirect transmission mechanisms, where energy and input costs affect production and distribution processes before being reflected in consumer prices.

Spatial differentiation is also evident. Rural markets tend to experience stronger and more persistent price pressures over time relative to urban markets, reflecting higher transport costs, weaker market integration, and more limited supply alternatives. These findings are consistent with broader evidence from African markets, which highlights the role of spatial factors in shaping the magnitude and timing of price transmission (Yade et al. 2021).

Overall, the Malawi application provides empirical support for the structured transmission framework. It illustrates how energy, trade, input, and macroeconomic channels interact to generate differentiated outcomes across commodities and locations, and how the timing of price responses reflects the sequencing of transmission processes rather than the absence of impact.

At the same time, the Malawi case highlights the importance of context. The observed dynamics are shaped by the country's specific structural characteristics, including its landlocked geography, reliance on imported inputs, and the composition of its food system. These features influence both the channels through which shocks are transmitted and the speed and magnitude of adjustment.

This underscores the importance of context-specific empirical analysis when applying the framework across countries. While the structure of transmission is broadly consistent, outcomes are shaped by country-specific conditions, including import dependence, market integration, infrastructure, and the role of domestic production systems. The Malawi application therefore serves as a proof of concept, demonstrating how the framework can generate empirically grounded insights that are transferable to other settings, including Pacific and small island economies. In this regard, Malawi provides a structurally informative case through which early-stage transmission dynamics can be identified and interpreted ahead of broader system-wide effects.

6. Empirical Results: Evidence of Short-Run Transmission Dynamics

6.1 Global Energy Shock: Scale and Timing

To situate the current shock within a longer-term context, Figure 1 presents the evolution of Brent crude oil prices over an extended period, while Figure 2 provides a high-frequency view of recent price movement, highlighting the sharp increase observed in early 2026. Together, Figures 1 and 2 establish both the structural nature and timing of the current energy shock, providing the basis for assessing its downstream transmission into domestic food systems.

Figure 1. Brent crude oil prices (annual/long-term: 1987–2026)

Source: Author, with data from EIA (2026)

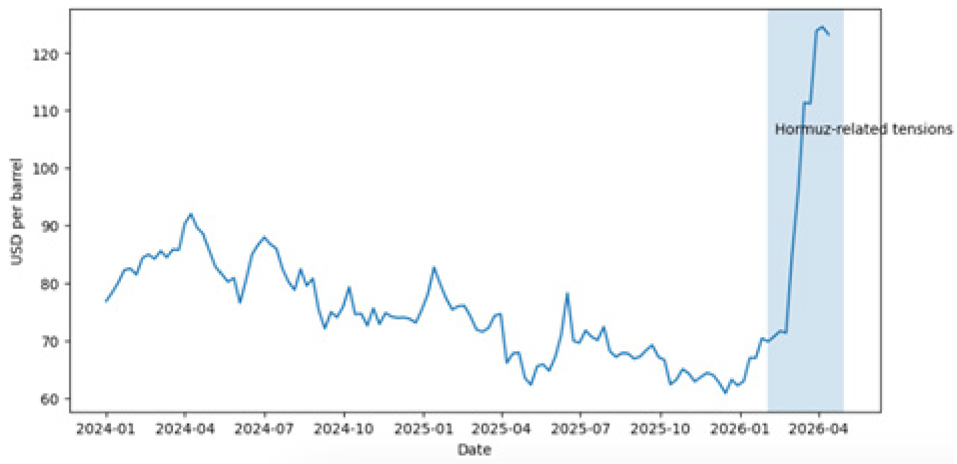

Figure 2. Brent crude oil prices (weekly: 2024–2026, with shock period highlighted).

Source: Author, with data from EIA (2026)

These figures show that the recent increase in oil prices were a sharp deviation from the relatively stable range observed in the preceding period. The spike observed in early 2026 reflects a rapid escalation consistent with disruption to shipping through the Strait of Hormuz, one of the key energy supply routes. This pattern is indicative of a structural energy shock, rather than normal price variability, and provides the basis for assessing transmission into domestic food systems.

6.2 Aggregate Price Dynamics

Building on the global energy dynamics illustrated in Figures 1 and 2, Table 2 presents corresponding movements in domestic commodity prices in Malawi, allowing an initial assessment of short-run transmission into food systems.

Table 2. Commodity price movement in Malawi in 2025 vs 2026, expressed in Malawian kwacha (MWK).

Variable	Jan-Feb 2025	Mar-Apr 2025	% change (2025)	Jan-Feb 2026	Mar-Apr 2026	% change (2026)
Maize	1,175.53	1,133.25	-3.60%	1,093.86	1,048.54	-4.14%
Beans	5,022.67	5,544.16	10.38%	5,767.53	5,571.59	-3.40%
Rice	3,575.82	4,262.74	19.21%	3,874.54	4,025.44	3.89%
Food Price Index	7.00	7.69	9.94%	7.60	7.48	-1.49%
Exchange rate	1,749.80	1,750.33	0.03%	1,750.08	1,760.99	0.62%
Brent crude oil (USD per barrel)	77.35	70.43	-8.95%	68.74	113.63	65.29%

Source: Author, with data from World Food Programme (2026) and EIA (2026)

The results show a clear divergence between energy markets and domestic food prices in the short run. In 2026, Brent crude oil prices increased by over 65% between January-February and March-April, indicating a strong external energy shock. However, this increase is not yet reflected in broad-based food price inflation. Prices of domestically produced staples, including maize and beans, continued to decline, while the Food Price Index fell slightly.

In contrast, rice, which is more exposed to international markets, recorded a modest increase in 2026, consistent with early-stage transmission through the trade channel. The exchange rate shows a slight depreciation over the same period, indicating the initial emergence of macroeconomic transmission effects. While still limited in magnitude, this movement is consistent with increased foreign exchange pressures associated with higher import costs, suggesting that broader macroeconomic amplification may materialize over time.

These patterns are consistent with the expected short-run dynamics, where energy shocks are reflected immediately in fuel prices and import-exposed commodities, while domestic staples adjust with a lag.

6.3 USD Price Analysis

To isolate the exchange rate effects and distinguish between domestic and external price drivers, Table 3 presents the same commodity price dynamics expressed in USD terms.

Table 3. Commodity price movement in Malawi in 2025 vs 2026, expressed in USD.

Commodity	Jan-Feb 2025	Mar-Apr 2025	% change	Jan-Feb 2026	Mar-Apr 2026	% change
Maize	0.672	0.647	-3.6%	0.625	0.595	-4.7%
Beans	2.870	3.167	10.3%	3.296	3.164	-4.0%
Rice	2.044	2.435	19.2%	2.214	2.286	3.3%
Food Price Index	0.00400	0.00439	9.9%	0.00434	0.00425	-2.1%

Source: Author

Expressed in USD terms, the results reinforce the limited short-run transmission of the energy shock into domestic food prices. The stability and decline observed across most commodities indicate that these dynamics are not driven by exchange rate movements but reflect underlying domestic supply conditions and delayed transmission mechanisms.

The persistence of a modest increase in rice prices confirms that import-exposed commodities respond earlier than domestically produced staples, which is consistent with the sequencing of transmission across channels.

6.4 Commodity Differentiation: Imported vs Domestic Staples

While Tables 2 and 3 provide aggregate evidence of limited short-run transmission, further insight can be gained by examining differences across commodity types. Figure 3 disaggregates price dynamics between imported and domestically produced staples across urban and rural markets in Malawi over the 2024-2026 period.

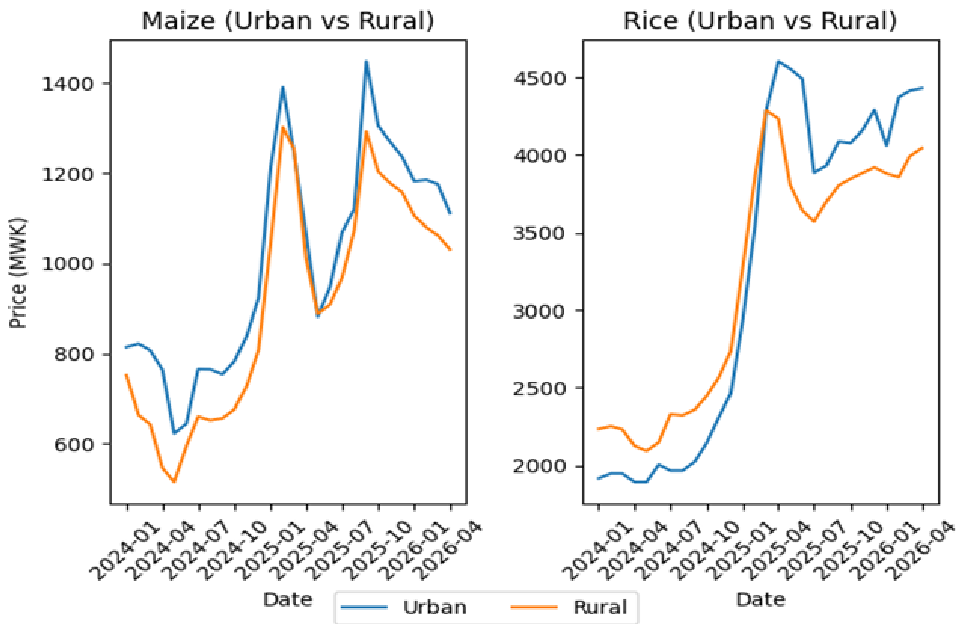

Figure 3. Urban vs rural price dynamics of imported and domestic staples in Malawi (2024-2026).
Source: Author

Urban-rural price dynamics differ across commodity types in the short run, particularly in terms of adjustment time. Maize, a domestically produced staple, shows broadly similar trends across urban and rural markets, with limited divergence during the period. In contrast, rice, an import-dependent commodity, exhibits higher price levels and earlier adjustment in urban markets, reflecting faster transmission of global price signals in more integrated market environments.

The figure highlights both commodity-specific and spatial dimensions of transmission. For maize, price movements remain closely aligned across urban and rural markets, indicating that domestic staples are primarily influenced by local supply conditions in the short term. In contrast, rice displays more pronounced and earlier adjustment, particularly in urban markets, consistent with direct exposure to international price movements. Rural markets follow similar trends but with more gradual and delayed adjustment, indicating lagged transmission relative to urban markets due to higher transaction costs and weaker market integration.

This contrast underscores a central feature of transmission dynamics: import-dependent commodities respond earlier and more consistently to global shocks, while domestically produced staples adjust more gradually through indirect channels such as transport costs and input price pass-through. The divergence observed in Figure 3 therefore reinforces the structured transmission framework, highlighting the role of commodity characteristics in shaping both the timing and magnitude of price adjustments.

6.5 Spatial Differentiation: Urban and Rural Markets

Building on the commodity-level differentiation shown in Figure 3, Tables 4 to 6 examine spatial heterogeneity in transmission by comparing urban and rural markets and estimating differential effects using a difference-in-differences approach.

Table 4. Commodity price movement[a] in Malawi's urban markets (Jan–Feb vs Mar–Apr, 2025–2026).

Variable	Jan-Feb 2025	Mar-Apr 2025	% change (2025)	Jan-Feb 2026	Mar-Apr 2026	% change (2026)
Maize	1,302	1,157	-11%	1,184	1,143	-3%
Beans	4,607	4,985	8%	5,357	5,172	-3%
Rice	3,251	4,445	37%	4,217	4,422	5%
Food Price Index	7	7	12%	8	8	-1%
Exchange rate	1,750	1,750	0%	1,750	1,761	1%
Brent crude oil	77	70	-9%	69	114	65%

Source: Author

Note: [a] Prices are in Malawi Kwacha except for Brent crude oil price which is in USD

Table 5. Commodity price movement[a] in Malawi's rural markets (Jan–Feb vs Mar–Apr, 2025–2026).

Variable	Jan–Feb 2025	Mar–Apr 2025	% change (2025)	Jan–Feb 2026	Mar–Apr 2026	% change (2026)
Maize	1,174	1,133	-3%	1,092	1,047	-4%
Beans	5,029	5,553	10%	5,774	5,578	-3%
Rice	3,581	4,260	19%	3,869	4,019	4%
Food Price Index	7	8	10%	8	7	-2%
Exchange rate	1,750	1,750	0%	1,750	1,761	1%
Brent crude oil	77	70	-9%	69	114	65%

Source: Author

Note: [a]Prices are in Malawi Kwacha except for Brent crude oil price which is in USD

Table 6. Difference-in-differences (DiD) effect on commodity prices (MWK) in Malawi markets (urban minus rural, 2026).

Variable	DiD effect
Maize	5
Beans	11
Rice	56

Source: Author

The urban-rural comparison presented in Tables 4 and 5 shows that the 2026 energy shock is clearly reflected in oil markets but has not yet translated into broad-based food price increases. Brent crude oil prices increased sharply by approximately 65% across both urban and rural markets, while exchange rate movements remained nearly identical, confirming that the external shock is common across locations.

Food price responses remain heterogeneous and commodity-specific. In both urban and rural markets, prices of maize and beans declined between January-February and March-April 2026, indicating that short-run transmission of price shock into domestically produced staples has not yet occurred. This is consistent with the expected lag in transmission through transport and input channels, as well as the influence of seasonal supply dynamics.

In contrast, rice prices increased in both market types, with a slightly stronger adjustment observed in urban markets. This pattern is consistent with early-stage transmission through the trade channel and reflects the higher exposure of imported commodities to global price movements.

The difference-in-differences (DiD) results reported in Table 6 reinforce this interpretation. The largest divergence is observed for rice: a positive DiD effect indicates relatively stronger adjustment in urban markets, consistent with higher market integration and faster pass-through of global price signals. In contrast, the DiD effects for maize and beans are small, and there is no divergence in aggregate indicators such as the Food Price Index or exchange rates yet.

Overall, the results indicate that in the immediate phase of the shock, transmission of shock is concentrated in energy markets and import-linked commodities, while domestic staples remain primarily influenced by local supply conditions. Spatial differentiation is present but limited at this stage, suggesting that broader divergence across markets is likely to emerge as transmission progresses through transport costs, input markets, and production systems over time.

6.6 Synthesis: Early-Stage Transmission Dynamics

Taken together, the evidence from Figures 1-3 and Tables 2-6 provides consistent support for the presence of early-stage transmission dynamics. The shock is clearly visible in energy markets, as reflected in the sharp increase in oil prices, partially transmitted to import-exposed commodities such as rice, and largely absent in domestically produced staples in the short run.

This pattern reflects the expected sequencing of transmission across channels. Energy and trade channels respond first, with immediate effects on fuel prices and import-dependent commodities. These initial adjustments are then expected to propagate more gradually through transport costs, input markets, and domestic supply systems, affecting production and distribution processes over time.

The limited response observed in maize and beans should therefore not be interpreted as weak transmission, but rather as a timing effect consistent with indirect transmission mechanisms. As costs accumulate through transport and input channels, broader and more persistent impacts on domestic food prices are likely to emerge.

Taken together, these priorities underscore the importance of a systems-based policy approach in which energy, trade, agriculture, water, and social protection are addressed in an integrated manner. While the structure of transmission is broadly consistent, the magnitude and timing of impacts depend on country-specific conditions. This reinforces the need for context-specific application of the framework across different country settings. Extending this approach to Pacific and other import-dependent economies would enable systematic identification of vulnerabilities, early-stage transmission dynamics, and targeted policy responses under evolving global energy shocks.

7. Policy Implications and Strategic Responses

The empirical results, interpreted through the structured transmission framework, highlight the need for policy responses that address not only immediate price pressures but also the underlying mechanisms through which shocks propagate across food systems. Given the increasing frequency of global disruptions, effective responses must strengthen resilience across interconnected energy, trade, input, and production systems.

In the short term, stabilizing energy and transport systems is critical. The results show that shocks are transmitted rapidly through fuel prices, with immediate implications for transport and distribution costs. Policies aimed at managing fuel price volatility, ensuring reliable supply for food transport and agricultural operations, and reducing the sensitivity of domestic supply chains to energy shocks are therefore central, particularly in remote and poorly connected areas.

Ensuring sustained access to agricultural inputs, especially fertilizers, is essential for preventing medium- to long-term supply constraints. Evidence from previous crises demonstrates that disruptions in input markets can translate into reduced production and higher food prices over time (Laborde Debucquet et al. 2023). Policy priorities should therefore include securing input supply chains, maintaining affordability during periods of global price increases, and promoting more efficient and integrated input use systems.

Maintaining predictable and open trade regimes is equally important. The analysis shows that import-exposed commodities respond early to global shocks, underscoring the importance of reliable access to international markets. Avoiding uncoordinated trade restrictions and strengthening import logistics can reduce the amplification of shocks, particularly in import-dependent economies where domestic production cannot fully offset supply disruptions.

At the production level, investment in water and irrigation systems plays a critical role in strengthening resilience. Expanding small-scale and farmer-led irrigation, alongside improved water governance, can reduce dependence on rainfall variability while mitigating the indirect effects of energy and input shocks on production systems. This is particularly important within the energy-water-food nexus, where rising fuel costs directly affect irrigation and water access.

Strengthening social protection systems is necessary to mitigate welfare impacts as transmission of shocks progresses from energy markets to food prices. Targeted support to vulnerable households can help maintain access to food during periods of rising prices while contributing to longer-term resilience.

Finally, improving data systems, market monitoring, and early-warning mechanisms is essential for timely and effective policy responses. The analytical approach developed in this paper demonstrates the value of high-frequency, disaggregated data in identifying early-stage transmission dynamics. Integrating information on food prices, fuel costs, input markets, and trade flows into coordinated monitoring systems can enable proactive rather than reactive responses.

Taken together, these priorities underscore the importance of a systems-based policy approach in which energy, trade, agriculture, water, and social protection are addressed in an integrated manner. While the structure of transmission is broadly consistent, the magnitude and timing of impacts depend on country-specific conditions. This reinforces the need for context-specific application of the framework, particularly in import-dependent and geographically remote economies, including Pacific Island states, where transmission is likely to be faster and more pronounced.

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