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Price Shocks and Associated Policy Responses Stemming from the Russia-Ukraine War and Other Global Crises: *Evidence from Ghana, Kenya, Nigeria, Senegal, Tanzania, and Zimbabwe*

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Executive Summary

Recent years have brought a deluge of shocks to agrifood systems, particularly for low- and middle-income countries. The Covid-19 pandemic starting in early 2020 brought a global economic slowdown and supply chain disruptions, and various measures to curb the spread of the virus by limiting mobility and public congregation upended the functioning of food markets. Then, in early 2022, the Russia-Ukraine war set off startling global price spikes in fuel, fertilizer, and food as key supplies of fertilizer, wheat, and edible oil were cut off from their markets, and upheaval in the petroleum market followed from international responses to Russia's actions. The result has been a widespread cost-of-living crisis that is especially felt in lower income settings. At the same time, manifestations of climate change are becoming increasingly evident, with more frequent weather extremes and catastrophic climate events affecting cycles of agricultural production. As but one example, from 2020 to 2023, the Horn of Africa experienced its longest and most severe drought on record.

In response to recent shocks in prices and availability of fuel, fertilizer, and foods (the “3Fs”), governments worldwide have pursued both reactive and proactive measures aimed at softening the impact of various shocks and making their economies more resilient to future stress. For example, in response to soaring costs of fertilizer and food, African governments have alternately reduced tariffs on increasingly expensive imports, incentivized the substitution of locally produced commodities for imports, and invested in increased domestic production of the products most affected by recent international turmoil.

The “Shocks and Policy Responses” project explores the nature of recent price shocks in the 3Fs along with policy responses undertaken in six African countries, namely Ghana, Kenya, Nigeria, Senegal, Tanzania, and Zimbabwe. These countries represent diverse agro-ecologies and positions along the trajectory of agrifood systems transformation. The objectives of the study are (1) to assess how prices have changed in these six countries for fertilizer, fuel, and key foods; (2) to characterize policy responses to recent global shocks and explain any cross-country patterns observed; and (3) to consider how these patterns in policy responses are alternately encouraging or a cause for concern.

Data on prices and availability of the 3Fs since 2019 were obtained from relevant ministries in each participating country, using the most up-to-date and detailed information available as of the time of writing. Our results confirm that prices for maize flour shot up across all six countries. By 2022, the price in Senegal was 48% higher than it had been in 2019 in nominal terms. In Kenya, the price of maize in 2022 was 106% higher. By 2023, the price of maize was 71% higher in Tanzania, 123% higher in Nigeria, and a shocking 310% higher in Ghana. For Zimbabwe, which experienced hyperinflation during this period, the price of maize flour in 2023 was 131 times the price in 2019. In general, the greatest price jumps seem to have occurred in 2022 and 2023, suggesting that it was the delayed (not immediate) impact of the Covid-19 pandemic and especially the arrival of the Russia-Ukraine war that induced these price increases.

For rice, we see relative price stability in most countries through 2021, after which prices began to rise. Prices rose most slowly in Senegal (where they were nominally 32% higher in 2023 than they had been in 2019) and Kenya (33%), and they rose most dramatically in Ghana (175%) and Nigeria (190%). For Zimbabwe, the price of rice in 2023 was 75.5 times the price in 2019. The global market for wheat has been particularly impacted by the Russia-Ukraine war, given the prominent role of Russia and (to a lesser extent) Ukraine as wheat exporters. Between 2019 and 2023, wheat prices rose 19% in Senegal, 53% in Nigeria, and 58% in Tanzania. In Zimbabwe, the price of wheat in 2023 was 146 times the price in 2019. As for vegetable oil, the price had risen by 23% and 28% in Tanzania and Senegal, respectively,

between 2019 and 2022. In Nigeria, where vegetable oil prices were available for 2023, the price had risen by 150% over four years, and in Zimbabwe, the price in 2023 was 105 times the price seen in 2019.

Prices for urea, a common inorganic fertilizer, escalated dramatically in all countries. The price of urea rose relatively more slowly in Kenya and Tanzania, where it was 51% and 67% higher in 2023 (in nominal terms) than it had been in 2019. This value was 101% in Senegal, 191% in Nigeria, and 450% in Ghana. In Zimbabwe, the price of urea in 2023 was 72 times the price in 2019. The high price of fertilizer would logically lead farmers to turn to substitutes, such as organic fertilizer, or apply fewer inputs to their crops. This is worrisome if it leads to lower agricultural production, which would place further pressure on food prices.

As for petrol, prices in Senegal were fairly stable, rising by only 14% between 2019 and 2022. The price of petrol rose faster in Kenya, where it was 42% more expensive in 2022 than it had been in 2019. Tanzania seems to have been able to control the price, which remained elevated but did not rise further between 2022 and 2023. However, in Nigeria, the price of petrol skyrocketed in 2023 to reach a value 138% higher than it had been in 2019. This is because the Government of Nigeria repealed a fuel subsidy in 2023, which caused prices to surge from their subsidized baseline. As a result of hyperinflation, the price of fuel in Zimbabwe in 2023 was 110 times what it had been in 2019.

In each country, we completed a desk review to identify policies most relevant in the national response to recent shocks, and we conducted semi-structured interviews with policy makers and other key stakeholders (e.g., private sector leaders) to understand their experiences with, and perspectives on, policy responses to recent and ongoing shocks. In total, 104 interviews were conducted across the six countries. To our knowledge, this is the first study to synthesize the full breadth of policy responses to multiple recent crises and the first to incorporate qualitative data on policy responses to account for policy makers' perspectives. The content of the interviews was analyzed to draw out themes and identify areas of convergence and divergence in how these countries have so far responded to shocks. The most prominent themes are discussed below.

First, countries exhibit an intensifying emphasis since 2020 on self-sufficiency in food and fertilizer. While a desire for national self-sufficiency has always been common among policy makers, our interviews indicate that this has deepened in recent years in the countries examined. In terms of food self-sufficiency, the Ghana Covid-19 Alleviation and Revitalization Enterprise Support (CARES) Obaatanpa Programme aims to accelerate competitive import substitution for rice, poultry, cassava, sugar, and tomatoes. In 2023, the Government of Senegal launched a multi-sectoral program for food sovereignty. The Government of Tanzania responded to price shocks in wheat by introducing new wheat production areas and requiring wheat companies to source wheat domestically before importing. The Government of Zimbabwe similarly implemented a Wheat Input Support Program, which capacitated Zimbabwean farmers to produce enough wheat to meet national demand by 2022.

In terms of fertilizer self-sufficiency, the National Fertilizer Council in Ghana expedited discussions on establishment of a local fertilizer manufacturing plant. The Nigerian Government launched a comprehensive fertilizer intervention program focused on revitalizing domestic fertilizer production and reducing import dependency. In Zimbabwe, the Five-Year Fertilizer Import Substitution Roadmap (2020-2024) aimed to increase local production of phosphates and ammonium nitrate to reduce fertilizer imports, and a new fertilizer blending plant which uses phosphate from Dorowa Mine is expected to enable Zimbabwe to meet half the current national demand for basal fertilizer. As for

Tanzania, the government is fast-tracking investment in urea production using gas from offshore deposits.

Second, though new subsidies and reductions of existing tariffs are a readily available policy response, the fiscal burden can be quite high. Among many examples of subsidies, in Ghana, the Coronavirus Alleviation Programme (CAP) included (among other features) three months of free water and sanitation for households and a three-month subsidy for electricity. The Government of Kenya responded to the energy price crisis by introducing a petrol and diesel subsidy for fiscal year 2021/22. The Government also responded to high flour prices by offering a short-term maize flour subsidy in mid-2022 and scaling up the fertilizer subsidy program in 2021/2022. In Zimbabwe, the Government's Pfumvudza/Intwasa conservation farming program from 2020 to 2021 distributed agricultural inputs, including seed and fertilizer, to 1.8 million smallholder farmers.

Governments also utilize reductions in tariffs, duties, and taxes to alleviate price shocks. Among many examples, the Government of Tanzania reduced excise duties on gasoline, diesel, and kerosene; granted a duty remission of 10% rather than 35% on imported wheat grain; removed import duties for rice; lowered customs duties for cooking oil; and set aside the VAT for double refined edible oil from locally grown seeds by local manufacturers. Nevertheless, across multiple countries, key informants noted that developing countries can only forego revenues or offer expenditure-based assistance for a limited time. Notably, these tools are generally not sustainable for the full duration of current-day crises which seem to arrive in succession. In both Senegal and Nigeria, subsidies on diesel have been rolled back in an effort to manage government spending and direct assistance in a more targeted manner.

Third, country responses to shocks sometimes lack coherence, with some policies essentially offsetting the others' impacts. In Senegal, for example, even as the government introduced various policies and programs to cushion the impact of global shocks, it responded to pressure from technical and financial partners to raise the regulated price of fuel. Along the same lines, Tanzania recently increased the fuel tax for diesel and petrol by 100 TZS/liter. Given the centrality of fuel costs in many industries and value chains, this was understood to worsen the cost-of-living crisis in the country. In Kenya, food prices have remained high despite implementation of a scaled-up fertilizer subsidy and a good harvest in 2023. This is evidently because fuel prices (which are strongly correlated with food prices) have dramatically increased due to exchange rate fluctuations as well as tax reform, with fuel subsidies removed and higher taxes introduced. There are various reasons a country may opt to remove a market-distorting subsidy, including pressure from external partners, a need to limit government expenditures, or a desire to redistribute benefits to different subpopulations. However, the perception of policy incoherence seems to be problematic.

Fourth, while recent shocks have triggered some trade realignment, they evidently have not stimulated increased within-Africa (intra-regional) trade. Across the six countries of this study, we heard of some instances of trade realignment. When Nigeria's source of potash was abruptly cut off in 2022, the country was able to pivot in its trade relations to access potash from Canada. In 2022, Nigeria also signed a Memorandum of Understanding with Poland to enhance food and energy security, thereby strengthening this trade relationship. In Kenya, the introduction of Covid-19-associated lockdown measures by trading partners had a positive effect on exports but a negative effect on imports. For a time, it seems lockdown policies reshuffled existing trade patterns. However, although the African Continental Free Trade Area (AfCFTA) aims to create a barrier-free trade zone among members with the removal of tariffs and the harmonization of trade rules, across the countries in this study, shocks that disrupted global supply chains did not prompt an increase in within-Africa (intra-regional) trade. Overall, it does not seem the AfCFTA has played a role in how countries responded to these shocks.

Fifth, countries exhibit an increasing appreciation for organic fertilizer and increasingly recognize climate change and associated environmental stress when thinking about fertilizer policy. While far greater resources are directed towards promoting inorganic fertilizer use, countries now appear more likely to be interested in pairing this with organic fertilizer promotion. In Ghana, the “Green Ghana” project advocates for the complementary use of both imported inorganic fertilizers and locally produced organic fertilizer, and through the Planting for Food and Jobs (PFJ) initiative, the Government of Ghana has encouraged fertilizer companies to also venture into manufacturing organic fertilizers. Along the same lines, in 2021, the Government of Senegal included organic fertilizers among the set of subsidized fertilizers.

Some policy responses also address climate change in progressively sophisticated ways. In Nigeria, the Climate Change Act of 2021 established a legal framework for sustainable agriculture and resilience to climate change. This Act provides a framework for mainstreaming climate change actions, sets up a system of carbon budgeting, and establishes the National Council on Climate Change. In Zimbabwe, the Presidential Input Scheme, which was launched in 2020, sets an expectation that beneficiaries will adopt Conservation Agriculture Principles (CAP) as a climate change adaptation strategy. In Ghana, which experienced a major drought in 2021, the National Climate Change Policy and the National Drought Management Plan both aim to improve water management, promote sustainable farming practices, and help farmers cope with drought.

Altogether, these results underscore a need for more (and more thoughtful) discourse on the proper balance between national self-sufficiency and participation in international trade. More attention might be given to the potential role of within-Africa (intra-regional) trade and regional (not national) value chains to promote continental self-sufficiency and thereby ameliorate economic vulnerability to shocks. It does not seem that countries currently view this as a viable response to global shocks, which suggests a need to understand why intra-regional trade is not viewed more favorably and whether relevant obstacles and bottlenecks can be addressed.

In addition, many of the policy responses noted in this study have been reactive and have especially taken the form of spending or revenue measures. Such approaches tend to be financially unsustainable for resource-constrained countries over the protracted duration and compounding nature of present-day crises. It follows that more attention ought to be allocated to proactive measures aimed at making national economies more productive and resilient to future shocks.

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1. Introduction

Recent years have brought a deluge of shocks to agrifood systems, particularly for low- and middle-income countries. The Covid-19 pandemic brought a global economic slowdown and supply chain disruptions with serious repercussions for countries that import agricultural production inputs and hope to export agricultural products. Across Africa, various measures to curb the spread of the virus by limiting mobility and public congregation had the impact of upending the functioning of food markets (Agyei-Holmes et al. 2021). Then, in 2022, the Russia-Ukraine war set off startling global price spikes in fuel, fertilizer, and food as key supplies of fertilizer, wheat, and edible oil were cut off from their markets, and upheaval in the oil market followed from international responses to Russia's actions (Alexander et al. 2022). The result has been a widespread cost-of-living crisis that is especially felt in low- and middle-income countries. At the same time, manifestations of climate change are becoming increasingly evident, with more frequent weather extremes and catastrophic climate events affecting cycles of agricultural production. For example, from 2020 to 2023, the Horn of Africa experienced its longest and most severe drought on record (NASA 2022).

These shocks seem to arrive in waves, each one rolling in before impacts of earlier shocks have been resolved. The shocks have been described as cascading, interconnected, and compounding, and authors grasp for new vocabulary to describe the scale of a crisis with so many components and causes. Ferrero et al. (2023) refer to “stacked emergencies”, defined as emergencies that occur simultaneously or in quick succession. The World Economic Forum introduced the term “polycrisis” in the Global Risks Report 2023, noting that “present and future risks can also interact with each other to form a ‘polycrisis’ – a cluster of related global risks with compounding effects, such that the overall impact exceeds the sum of each part”. As of the time of writing, there is little indication that the situation is abating; rather, it seems the near future will remain volatile.

The extent and nature of recent shocks in prices and availability of fuel, fertilizer, and foods (the “3Fs”) have been documented elsewhere, along with some discussion of their likely impacts in low- and middle-income countries (Alexander et al. 2022; Arndt et al. 2023; Glauber and Laborde 2023; Lin et al. 2023; Mottaleb et al. 2023; Rose et al. 2023). However, the existing literature has not focused on policy responses, and when such responses are noted, the literature tends to focus on one type of response or one shock (e.g., Amaglobeli et al. 2023) rather than presenting the full breadth of policy responses to these recent shocks. Yet governments worldwide have responded with both reactive and proactive measures aimed at softening the impact of various shocks and making their economies more resilient to future stress. For example, in response to soaring costs of fertilizer and food, African governments have alternately reduced tariffs on increasingly expensive imports, incentivized the substitution of locally produced grains at the stage of food processing, and invested in domestic production of the products most affected by recent international turmoil.

Also missing from the discourse on price shocks are the voices of policy makers and other key stakeholders who have the clearest view of the appropriateness and effectiveness of policy responses. Documenting the diversity of policy responses and understanding the views of policy makers and other stakeholders is important if we are to think realistically about how to promote coherent and effective policy responses to these complex crises.

This paper explores the nature of recent price shocks in the 3Fs along with policy responses undertaken in six African countries, namely Ghana, Kenya, Nigeria, Senegal, Tanzania, and Zimbabwe. These countries represent diverse agro-ecologies and positions along the trajectory of agrifood systems transformation. The objectives of the study are (1) to assess how prices have changed

in these six countries for fertilizer, fuel, and key foods; (2) to characterize policy responses to recent global shocks and explain any cross-country patterns observed; and (3) to consider how these patterns in policy responses are alternately encouraging or concerning.

Data on prices and availability of the 3Fs since 2019 were obtained from relevant ministries in each country, using the most up-to-date and detailed information available at the time of writing. In each country, we completed a desk review to identify policies most relevant in the national response to recent shocks, and we conducted semi-structured interviews with policy makers and other key stakeholders (e.g., private sector leaders) to understand their experiences with, and perspectives on, their country's policy responses to recent and ongoing shocks. In total, 104 interviews were conducted across the six countries. To our knowledge, this is the first study to synthesize the full breadth of policy responses to multiple recent crises and the first to incorporate qualitative data on policy responses, to account for policy makers' and other stakeholders' perspectives of the responses. The content of the interviews was analyzed to draw out themes and identify areas of convergence and divergence in how these countries have so far responded to shocks.

The remainder of the paper is structured as follows. Section 2 includes background information on global shocks and the six countries that are the focus of this study. Section 3 describes the quantitative and qualitative data and the methods of analysis applied to each. Section 4 presents a characterization of shocks in the prices and availability of the 3Fs, as well as a summary and analysis of policy responses noted in each country, drawing on both the literature review and stakeholder interviews. Section 5 offers a discussion of our results, noting key themes and lessons gleaned from this exercise, and section 6 concludes.

2. Background

2.1 Recent shocks

2.1.1 Covid-19 pandemic

The Covid-19 pandemic, which raged onto the world stage in early 2020, brought profound public health, economic, and social consequences for sub-Saharan Africa (SSA). Notably, by disrupting global supply chains and domestic food systems, the crisis affected prices for food and other basic necessities. The various avenues through which the pandemic affected food systems in SSA are depicted in Figure 1. An obvious path is through the direct health threat to food system actors: as of November 2022, official data across SSA showed 173,000 deaths and 8.7 million cases of Covid-19 (USAID 2022).¹ SSA governments responded by enforcing public health policies intended to limit the spread of the virus. In 2020 and 2021, almost every country introduced some restrictions on internal movement or public congregation, while some enforced market closures or limited public transport, and some went further with temporary stay-at-home requirements (Agyei-Holmes et al. 2021). Oftentimes, some exceptions were made to movement restrictions to ensure the continued function of the agri-food sector (Liverpool-Tasie et al. 2020). The Covid-19 pandemic also brought a global economic contraction which undercut the availability of imports (including for agricultural inputs and food) and the demand for exports. In turn, beginning in 2020, SSA countries experienced national economic contractions that reduced domestic purchasing power.

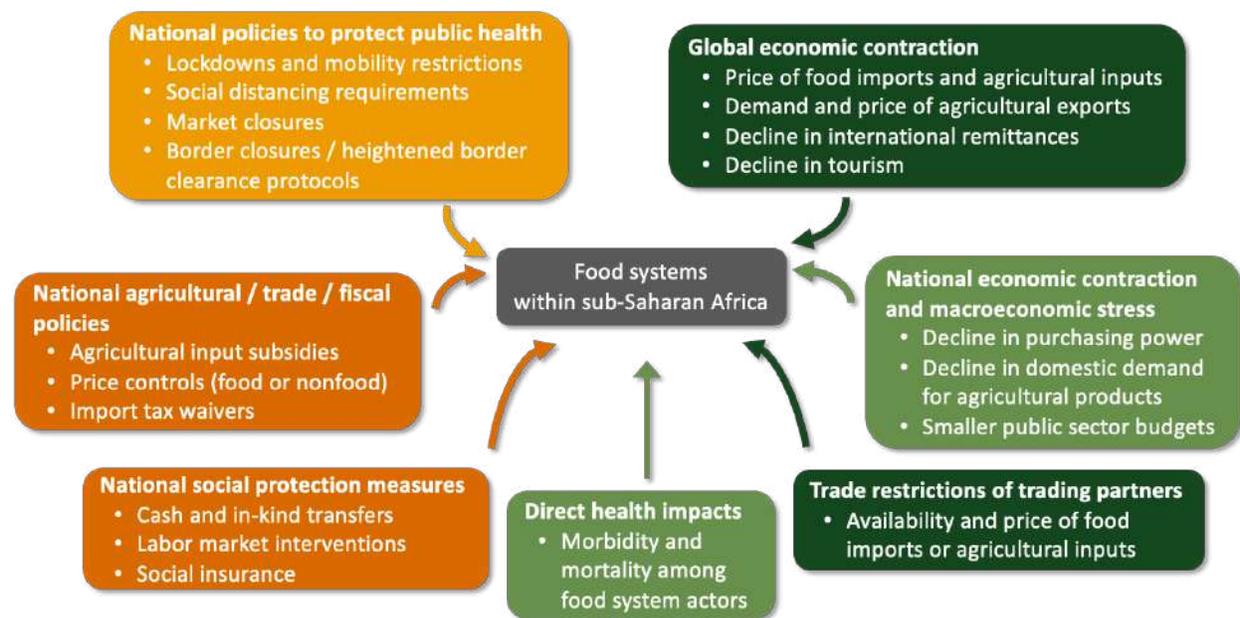
Overall, the Covid-19 pandemic brought significant negative impacts for food security and poverty (McDermott and Swinnen 2022; Maredia et al. 2022). Global food prices rose to what were, at the time, record highs. For example, in February 2022, the FAO Food Price Index was 21% higher than

¹ Official numbers of Covid-19 cases and deaths are very likely an undercount.

one year prior and 2% higher than the previous record from 2011 (Hassen and El Bilali 2022). Fertilizer prices also surged in 2021, driven by higher energy costs and supply and trade limitations (ibid). In many cases, SSA consumers experienced diminished food access due to a combination of higher food prices and lower income (Agyei-Holmes et al. 2021). Various studies found more severe income effects for non-agricultural sectors and urban households; however, even small income losses posed a serious threat to relatively poorer rural households whose baseline level of welfare was already precarious (McDermott and Swinnen 2022).

An early review of the literature on policy responses to the Covid-19 pandemic suggests that a large policy focus was on reducing contagion (i.e., protecting public health) (Agyei-Holmes et al. 2021). However, SSA governments also sought to cushion their populations and economies through social protection and agricultural, fiscal, and trade policies—though limited fiscal space meant the scope of these measures was typically inadequate to meet the need. Few countries offered direct income support, though it was more common to offer debt/contract relief, as when the government continues to provide services such as water or electricity without requesting payments. Some governments offered food assistance or tax postponements. Some countries also waived duties on imports to compensate for the burden of stricter border clearance protocols (Agyei-Holmes et al. 2021).

Figure 1. Pathways of impact of the Covid-19 pandemic on food systems in sub-Saharan Africa



Source: Copied directly from Agyei-Holmes et al. (2021)

2.1.2 Russia-Ukraine war

The Russia-Ukraine war began on 24 February 2022 with Russian’s sudden invasion of its neighbor, and the war continues at the time of writing in early 2024. Within Ukraine, the war had the immediate effect of impeding the crop harvest. Because Ukraine is a large exporter of agricultural commodities, this translated into a serious disruption in the availability and affordability of grains and edible oils on the global market (Mhjangana and Ndhlovu 2023; Rose et al. 2023). The war also resulted in restrictions on exports from Russia and Ukraine, with Russia refusing to allow Ukraine’s exports through the

Black Sea, and actions taken by the European Union and the United States resulting in severe restrictions on Russian exports.²

Much attention has been given to the Russia-Ukraine war's impact on international trade in grain, oilseed, and fertilizer. As of 2020, the two countries were responsible for a considerable share of trade in wheat/meslin (Russia: 17.7%, Ukraine: 8.0%), barley (Russia: 12.2%, Ukraine: 11.9%), maize (Russia: 1.1%, Ukraine: 13.3%), and sunflower seed/safflower/cottonseed oil (Russia: 18.6%, Ukraine: 40.0%) (Rose et al. 2023, citing the United Nations Statistics Division). Notably, Ukraine has been a key supplier of wheat to the World Food Programme (Jagtap et al. 2022). Previously, almost all (>90%) of Ukraine's agricultural exports were transported through Black Sea ports (Ben Hassen and El Bilali 2022; FAO 2022; Rose et al. 2023). These ports have been blockaded, leaving Ukraine with few alternate export routes. (The Black Sea Grain Initiative, which enabled Ukraine to export through the Black Sea, was in effect from July 2022 through July 2023; however, this agreement remains repealed as of the time of writing.) Sanctions against Russia, although intended to exclude agriculture and fertilizer, have added to global agricultural supply chain disruptions. The Russia-Ukraine war has also prompted some countries to impose export bans on various commodities with the intent to ensure sufficient supply for themselves. Export bans have affected palm oil from Indonesia, grain from Turkey, rice from India, and fertilizer from China (Ben Hassen and El Bilali 2022; Glauber and Mamun 2023; Hebebrand and Laborde 2022). Across our focus countries, we also heard of export bans of maize in Ghana.

The prominent role of Russia and Ukraine in the world's internationally traded wheat and edible oils is relevant in light of Africa's growing reliance on food imports and particularly rapid increase in wheat and edible oil demand. Food imports in Africa grew at an average annual rate of 3.3% from 1999 to 2015, which is faster than the rate of population growth (Olabisi et al. 2021). Furthermore, between 1980 and 2020, wheat consumption in Africa increased at a rate of 0.36 kg per capita per year (Silva et al. 2023), a trend that is driven by urbanization, income growth, women's participation in the labor market, and associated changes in food preferences. In fact, from 2000 to 2009, growth in per capita consumption of wheat outpaced that of any other major food grain (Mason et al. 2015). Although wheat production within Africa increased over this time, the gap between production and consumption widened, and across the continent, the wheat import bill grew by 9% per year over the past two decades (Silva et al. 2023). Imports of edible oils similarly grew by over 10% per year between 2006 to 2015 (Olabisi et al. 2021).

Russia also holds a prominent position in the markets for both fertilizer and oil. In 2020, Russia accounted for 14% of global fertilizer exports (Alexander et al. 2022) and was the world's third-largest producer of oil, much of which has typically been exported to Africa. The war in Ukraine disrupted exports of fertilizer and set off a marked increase in the global price of oil, as major traditional importers of oil from Russia limited or banned importation, and other competitors strained to meet the energy demands of new customers (Allam et al. 2022). This has had ripple effects throughout industries whose operational costs are inclusive of fuel. Higher fertilizer prices are expected to translate into reduced agricultural intensification, with farmers applying fewer inputs to their fields and thereby realizing lower yields. In addition, the food system uses considerable energy for agricultural machinery, food processing, storage (refrigeration and drying), packaging, and transport. In East Africa, Dillon

² Although international sanctions on Russian exports are not intended to limit exports of food or fertilizer, Russia was removed from the SWIFT payment system and has face prohibitively high shipping insurance costs that have effectively cut off Russian exports from their markets (Alexander et al. 2022). Russia itself also limited exports to countries that were not deemed "friendly" to its goals in Ukraine (Ben Hassen and El Bilali 2022).

and Barrett (2016) found that global oil prices affect food prices primarily through transport costs; moreover, global oil prices transmit more rapidly to local maize prices than do global maize prices. Alexander et al. (2022) find that the impact of higher input prices on the cost of food is greater than the impact of direct restrictions on Russian and Ukrainian food exports.

2.1.1 Climate change

The impacts of climate change are also being felt across Africa. Across the continent, the near-surface air temperature in 2022 was 0.16 °C above the long-term average over the prior 30 years (1991–2020) and 0.88 °C above the average over 1961–1990. This indicates that the rate of warming is increasing, with a rate of +0.3°C per decade between 1991 and 2022, compared to +0.2°C per decade over the preceding 30 years (WMO 2023). The year 2022 was characterized by flooding in Chad, Niger, Nigeria, and southern Sudan, as well as several tropical cyclones and tropical storms in southern Africa. Flooding naturally brings an impact for local food security (Reed et al. 2023). Yet rainfall was below normal in many other areas. As noted earlier, a drought in the Horn of Africa translated into five consecutive failures of the rainfall season, deeply affecting agricultural and agro-pastoral livelihoods in Ethiopia, Kenya, and Somalia (WMO 2023). This devastating drought was followed in early 2023 with flooding in key cropping areas of southern Somalia (FSIN 2023).

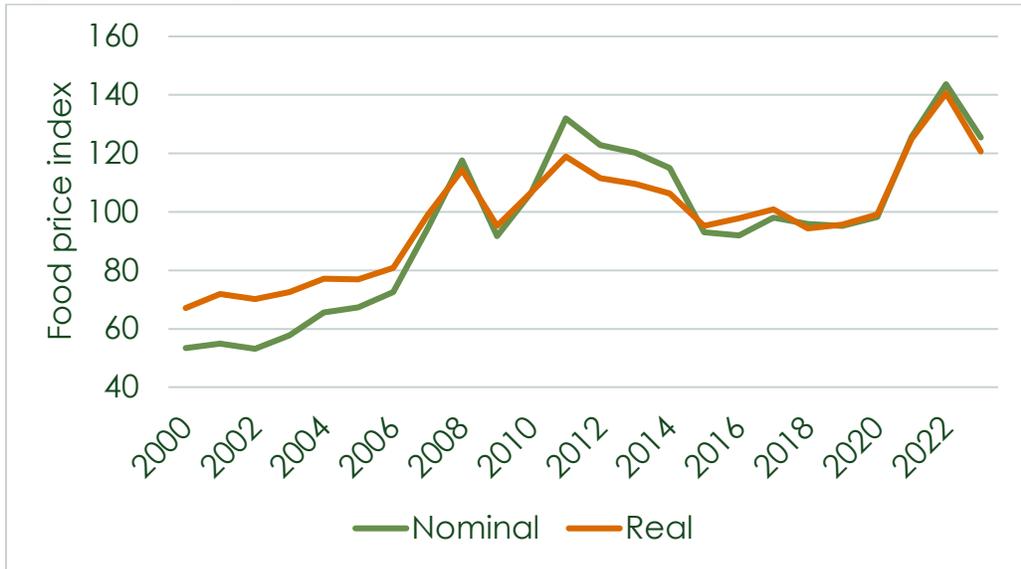
Among its other effects on agriculture and pastoral systems, drought has been found to exacerbate price seasonality, with especially low crop prices immediately at harvest time and especially high prices later in the year (Kakpo et al. 2022). Although farm-households may compensate for diminished on-farm production with food purchases (Wineman et al. 2017), the ability to do so declines as climate shocks extend over time (as in the recent protracted drought in the Horn of Africa) or arrive in quick succession. Climate change further impacts fisheries through ocean warming and changes to the nutrient cycle, and it also affects the sources, potency, and modes of transmission of food pathogens, presenting a threat to food safety (Galanakis 2023).

2.2 Global price trends

The effects of shocks enumerated in section 2.1 are evident in global price trends. The global food price index exhibits three peaks over the past two decades in 2007-2008, 2011-2013, and most recently in 2021-2023 (Figure 2). The very highest value over this period was observed in 2022, with a value of 143.7 in nominal terms; this is 51% higher than the value in 2019 (95.1), reflecting the shock of the Covid-19 pandemic and its associated supply chain disruptions, followed closely by the shock of the Russia-Ukraine war. The food price index shifted downward in 2023, albeit to a level that was still 32% higher than the value seen in 2019.

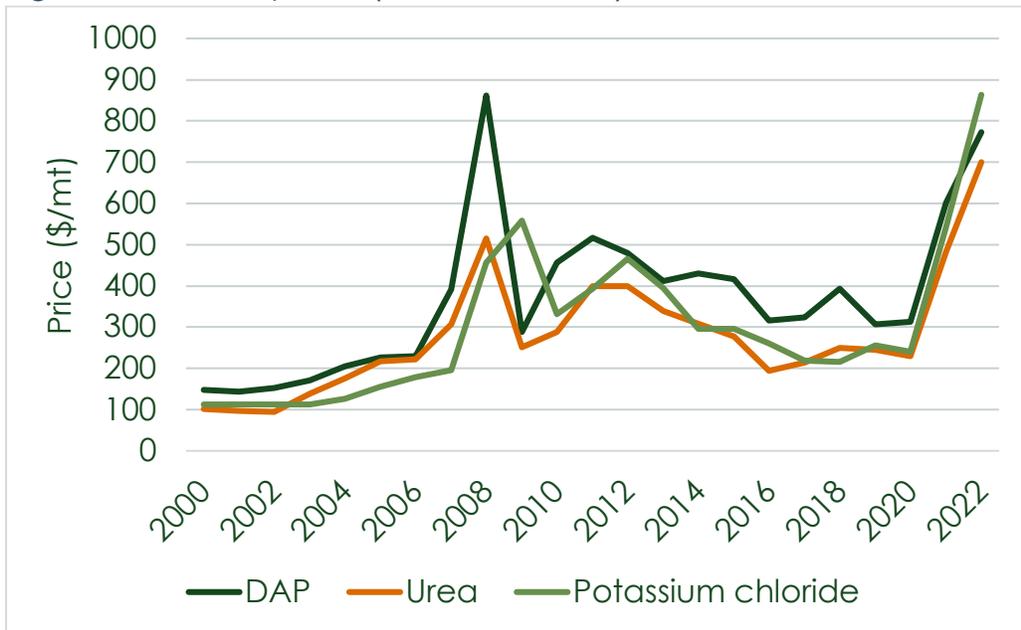
The global price of fertilizer was likewise jolted in 2021 (Figure 3), with the price of urea soaring from 229 \$/mt in 2020 to 483 in 2021 and 700 in 2022. It is notable that this upward trend, which began in 2021, is not a result of the Russia-Ukraine war, though the latter has certainly amplified prices. The global price of crude oil has fluctuated widely over time (Figure 4), with the highest value seen in 2012 at 105 \$/barrel. Prices fell in 2020 to the lowest price seen since 2004. Prices then ticked upward in 2021 and soared in 2022 to 97 \$/barrel, a value approaching the heights seen in 2012. These global prices are likely transmitted to the prices observed in our six focus countries.

Figure 2. Food price index



Source: FAO (2023)

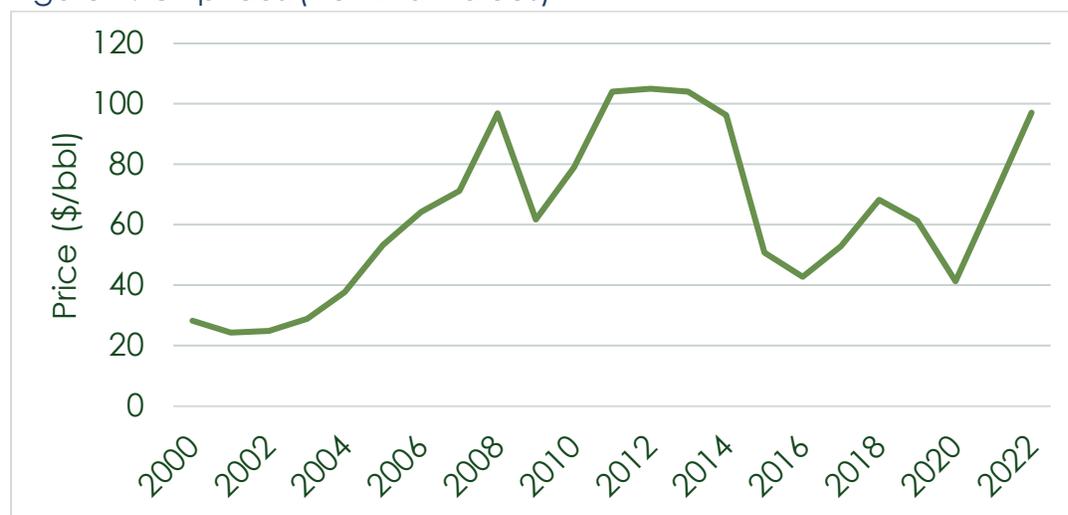
Figure 3. Fertilizer prices (nominal values)



Source: World Bank (2023b)

Note: Potassium chloride (KCl) is also referred to as muriate of potash.

Figure 4. Oil prices (nominal values)



Source: World Bank (2023b)

Note: Reflects the price for crude oil, average; bbl = barrel.

2.3 Policy responses to shocks

The shocks discussed in section 2.1 have prompted a flurry of policy responses in recent years to cushion their impact on national populations and economies. Policy responses can be categorized using various classifications/typologies. For example, policy responses may be either reactive (minimizing the hurt of an observed shock) or proactive (aiming to ensure the economy is broadly resilient to future shocks). Policy responses can also be short-, medium-, or long-term in nature, depending on the time until outcomes or impacts are likely to be realized. Cash transfers can be mobilized and distributed quickly, and if provided in response to a shock, are unlikely to be sustained over the long term. On the other hand, efforts to reinforce the agricultural sector against a changing climate likely need years to take effect, and if successful, will strengthen the agricultural economy in the long term.

Amaglobeli et al. (2023) categorize policy responses to price shocks as measures that are alternately related to revenue (e.g., a reduction in the excise tax rate), related to expenditure (e.g., cash transfers), below-the-line in nature (e.g., loans or guarantees to state-owned energy companies), or non-fiscal in nature (e.g., export bans). In an assessment of policy responses to high energy and food prices in 2022, the authors found that measures adopted by advanced economies tended to focus on softening the impact of high energy prices, while those taken in lower-income countries mainly focused on responses to higher food prices.

Yet another typology of policy responses is used in the Covid-19 policy response portal maintained by the International Food Policy Research Institute with support from the Food Security Group of Michigan State University (IFPRI 2023). Categories here include broad fiscal policies, business policies, Covid-19 specific health policies, farm policies, governance restrictions, monetary and financial policies, restrictions on population movements, social protection policies, and trade policies.

2.4 The six focus countries

This study focuses on six diverse countries from across the region, including Ghana, Nigeria, and Senegal in West Africa, Zimbabwe in Southern Africa, and Kenya and Tanzania in East Africa. Basic

descriptive statistics from 2019 (generally a pre-crisis year) are provided in Table 1, showing that the least urbanized countries in this set are Kenya and Zimbabwe, while the most urbanized are Nigeria and Ghana. GDP per capita ranges from \$2,203 in Zimbabwe to \$5,346 in Ghana, and the rate of moderate or severe food insecurity is highest in Zimbabwe (at 69.8%) and lowest in Ghana (at 38.2%). There is also variation in the share of the workforce employed in agriculture, with 23.0% in Senegal and 65.1% in Tanzania. Likewise, some countries seem to be especially dependent on imports to meet domestic cereal demand, with Tanzania seemingly most self-sufficient in cereals (at 3.3%) and Zimbabwe most dependent on imports (at 56.9%). This dispersion points to a broad set of experiences across these countries.

At the same time, much is in flux, and Table 2 shows the rates of inflation beginning in 2019. In almost all countries, inflation increased over time. At the start of this period, inflation was lowest in Senegal (at 1.76%). However, by 2022, inflation in Senegal had surged to overtake the more moderate rates seen in Tanzania and Kenya. Inflation in Ghana also soared from 9.97% in 2021 to 31.26% in 2022. Meanwhile, Zimbabwe has been experiencing hyperinflation, with somewhat lower rates seen in most recent years.

In such circumstances, social protection programs can play a pivotal role in cushioning the effect of higher prices (Devereux and White 2012). Table 3 shows the rates of social protection observed in the six countries. Coverage rates do not seem to correlate either positively or negatively with rates of poverty or food insecurity, neither reflecting greater need nor greater fiscal capacity. The lowest rates are observed in Tanzania and Senegal, while the highest is seen in Ghana. A relatively high benefit incidence in the poorest quintile in Zimbabwe means that nearly 60% of the population in this segment of the population receive at least some social protection.

Table 1. Characteristics of focus countries (2019)

Country	Urban population %	GDP per capita (constant 2017 international \$)	Poverty rate, international \$2.15 poverty line % ^a	Poverty rate, national poverty line % ^b	Prevalence of moderate or severe food insecurity %	Prevalence of severe food insecurity %
Ghana	56.7	5,346	25.2	23.4	38.2	6.0
Kenya	27.5	4,601	29.4	36.1	67.7	24.9
Nigeria	51.1	5,076	30.9	40.1	53.5	17.3
Senegal	47.7	3,430	9.2	46.7	44.0	10.0
Tanzania	34.5	2,578	44.9	26.4	56.3	24.4
Zimbabwe	32.2	2,203	34.2	38.3	69.8	32.1

Cont'd

Country	Agriculture, forestry, fishing as % of GDP	Employment in agriculture (% of total employment)	Cereal import dependency ratio (%) (average 2017-19)
Ghana	17.3	40.2	36.2
Kenya	20.9	33.6	44.8
Nigeria	21.9	35.5	17.1
Senegal	14.9	23.0	44.7
Tanzania	26.6	65.1	3.3
Zimbabwe	9.8	62.4	56.9

Sources: World Bank (2023c) for all variables except cereal import dependency ratio (FAOSTAT 2023)

^a Reflects the year 2016 (Ghana), 2015 (Kenya), 2018 (Nigeria, Senegal, and Tanzania), and 2017 (Zimbabwe)

^b Reflects the year 2016 (Ghana), 2015 (Kenya), 2018 (Nigeria and Tanzania), 2011 (Senegal), and 2019 (Zimbabwe)

Table 2. Consumer price index year-over-year percent change

Country	2019	2020	2021	2022
Ghana	7.14	9.89	9.97	31.26
Kenya	5.24	5.40	6.11	7.66
Nigeria	11.40	13.25	16.95	18.85
Senegal	1.76	2.54	2.18	9.70
Tanzania	3.46	3.29	3.69	4.35
Zimbabwe	255.30	557.20	98.55	104.71

Source: IMF (2023)

Table 3. Social protection coverage

Country	Year	Coverage (total)	Coverage (poorest quintile)	Benefit incidence (poorest quintile)
Ghana	2016	56.56	67.43	57.59
Kenya	2015	27.40	34.68	14.62
Nigeria	2018	20.48	28.13	4.70
Senegal	2011	16.79	9.34	1.16
Tanzania	2014	12.88	8.98	3.14
Zimbabwe	2019	36.74	58.96	37.55

Source: ASPIRE (2023a)

Note: Coverage is the % of the population participating in Social Protection and Labor programs; benefit incidence is the % of benefits that go to the poorest quintile; and Social Protection and Labor programs are inclusive of social assistance, social insurance, and labor market programs.

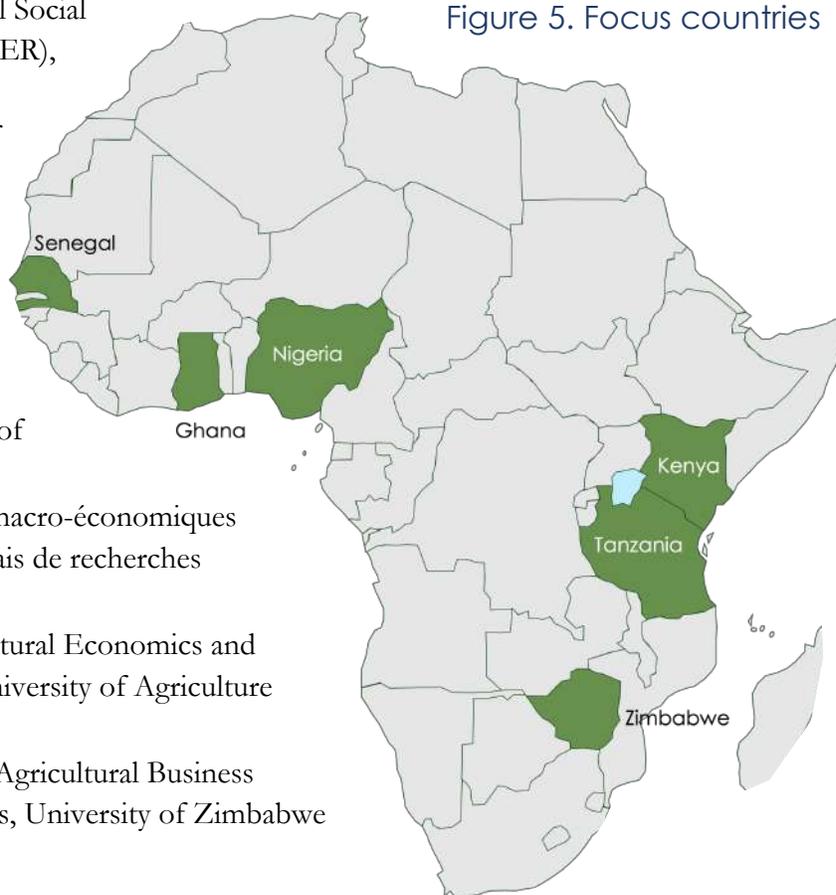
3. Data and Methods

3.1 Team composition and selection of countries

This research project is a collaboration between the African Network of Agricultural Policy Research Institutes (ANAPRI) and Michigan State University. As such, the selection of focus countries was guided by the location of ANAPRI member institutes that would be partners in this research, a consideration of the availability and accessibility of data on prices of the 3Fs, and the imperative to identify a set of countries that span a broad range of agro-ecologies and economic structures. The six ANAPRI member institutes that contributed to this study are as follows:

- **Ghana:** Institute of Statistical Social and Economic Research (ISSER), University of Ghana
- **Kenya:** Tegemeo Institute of Agricultural Policy and Development, Egerton University
- **Nigeria:** Innovation Lab for Policy Leadership in Agriculture and Food Security (PiLAF), University of Ibadan
- **Senegal:** Bureau d'analyses macro-économiques (BAME) de l'Institut sénégalais de recherches agricoles (ISRA)
- **Tanzania:** School of Agricultural Economics and Business Studies, Sokoine University of Agriculture (SUA)
- **Zimbabwe:** Department of Agricultural Business Development and Economics, University of Zimbabwe (UZ)

Figure 5. Focus countries



Each team produced a country-level technical report that fed into this analysis. The six reports are listed in Annex 1.

3.2 Quantitative analysis

Data on prices of fuel, fertilizer, and key foods in each country were collected from relevant national ministries and agencies wherever such data could be accessed. The sources of data included in this analysis are: AfricaFertilizer, Agence Nationale de la Statistique et de la Démographie du Sénégal (Senegalese Agency for Statistics and Demography—ANSD), Ghana National Petroleum Authority, Kenya Energy & Petroleum Regulatory Authority (EPRA), Kenya National Bureau of Statistics (KNBS) Economic Survey and the National Cereals and Produce Board Weekly Market Prices Survey Reports, Nigeria National Bureau of Statistics (NBS), Tanzania Energy and Water Utilities Regulatory Authority, Tanzania Ministry of Agriculture Market Intelligent Unit, Tanzania Fertilizer Regulatory Authority, World Food Program, and Zimbabwe Statistical Agency (ZimStat).

The list of foods analyzed in this paper include commodities affected directly by the Russia-Ukraine War (e.g., edible oils); commodities affected indirectly by the Russia-Ukraine War (whether because of the increase in fuel prices, because of other countries' situations, or because of changes in imports or availability on the world market); and foods that are most important to national food security. We focus here on a small set of products (maize, rice, wheat, and edible oils) that are at least somewhat relevant in all six focus countries, allowing for a comparison across countries. However, it should be noted that the most significant foods vary across these different countries. Wheat, for example, plays

an important role in some national diets and not others, and cassava or potato are staples in some countries and not others.

We aimed to access price data dating back to 2019 and to gather data at the most granular time interval available. In some countries, prices were available at a monthly time step, whereas elsewhere, they were available only at a quarterly or annual rate. We focus on nominal, and not real, prices because it does not seem to make sense to adjust for the rate of inflation when it is price increases in these products that largely determines the calculated rate of inflation. Price data are analyzed descriptively in section 4.1 to document how prices have changed in each country since 2019.

3.3 Qualitative analysis

In each country, we interviewed a diverse set of policy makers and other stakeholders regarding the policy responses to recent shocks. Interviewees included government representatives at the national, regional, and local levels; representatives of the private sector (e.g., the leadership of farmers' cooperatives and unions for traders, transporters, importers, processors of fertilizers, fuel, and key foods); and representatives of development partners. Key informants were selected by each country team based on their role in the value chains of the 3Fs, their knowledge of key policy issues, and their willingness to engage with this project. The intent was to conduct interviews until the point of "saturation", i.e., the point at which additional interviews cease to yield new information. However, resource limits often dictated the number of interviews, which ranged from 8 to 32 across the six countries. A tabulation of the informants is provided in Table 4, with more detail provided in Annex 2. In total, 104 interviews were conducted.

The interviews were semi-structured, with a set of guiding questions provided. The complete list of guiding questions is provided in Annex 3. Topics of conversation included the most important policies and policy responses to the recent crises, including the Russia-Ukraine war; the timeline and background of each policy response, as well as an evaluation of the experience of implementation and of its impacts; an evaluation of each policy's strengths and limitations; and a discussion of what the country could have done differently to be better prepared for shocks such as the Russia-Ukraine war.

Detailed notes were taken during and after each interview. To analyze the qualitative data, we reviewed these notes and looked for prominent themes that cut across interviews and countries, with attention to how views varied by country and stakeholder group. We identified points of convergence (where key informants in multiple countries seemed to share the same experience or perspective) and divergence (where policy responses, experiences, or perspectives seemed to vary in a meaningful way).

A limitation encountered in the course of conducting this analysis was the difficulty in some circumstances of identifying what counts as a policy and what counts as a response. For example, some countries had policies on the books that had not been implemented until a given shock, at which point they were revived. Some countries had policies in place prior to a given shock which were instrumental in the country's management of the shock. These can be considered proactive policy responses that were introduced earlier and were useful during our study period. Some countries tweaked policies to confront a new challenge, while others introduced brand new policies in response to shocks. In our analysis, we aimed to be comprehensive by considering all actions taken by government and all policies that were relevant to the country's experience of recent shocks.

Table 4. Key informants

Stakeholder category	Number of interviews						Total
	Ghana	Kenya	Nigeria	Senegal	Tanzania	Zimbabwe	
National government (including government agencies)	1	3	22	4	4	10	44
Regional or local government	2						2
Private sector	2	20	5	1	4	2	34
Civil society		2	2	3		2	9
Development partners	3		3		1		7
Research	2				2	4	8
Other							
Total number of interviews	10	25	32	8	11	18	104

3.4 Literature review

In each country, a literature review was conducted in order to contextualize and augment the findings of our quantitative and qualitative analyses. This exercise spanned academic (peer-reviewed) literature; gray literature published by research institutes and civil society organizations; newspaper articles; and government documents, including legislation. This literature is folded into our presentation of results in order to fill in gaps and add context.

3.5 Validation workshops

A validation workshop was held in each country in late 2023 to share country-specific findings and gather reactions and feedback. Participants in these convenings included the key informants that were interviewed (detailed in section 3.2), as well as other policy makers, industry leaders, and civil society representatives. These workshops provided opportunity for active discussion and engagement, and the perspectives gathered of these conversations were incorporated into our analysis.

4. Results

4.1 Prices and Availability of Key Foods, Fertilizers, and Fuels (2019–2023)

Each country team drew upon national price data of key foods, fertilizers, and fuels, typically maintained by a relevant government ministry. Below are the trends evident for several products that are important for food security and economic function in all countries. Figure 6 shows the average prices of maize in each year from 2019–2023 as a ratio of the 2019 price. While we were not able to access data for 2023 in all countries, a stark upward trend is evident everywhere. By 2022, the price in Senegal was 48% higher than it had been in 2019 in nominal terms. In Kenya, the price of maize in 2022 was 106% higher. By 2023, the price of maize was 71% higher in Tanzania, 123% higher in Nigeria, and a shocking 310% higher in Ghana. In general, the greatest price jumps seem to have occurred in 2022 and 2023, suggesting that it was the delayed (not immediate) impact of the Covid-19 pandemic and the arrival of the Russia-Ukraine war that induced these price increases.

Note that currency exchange rates influence the cost of importing goods; weaker local currencies translate into higher import costs and higher prices for consumers. All six countries experienced currency depreciation relative to the U.S. dollar during our study period. Ghana, in particular, experienced a deterioration of its exchange rate starting in 2022, and Zimbabwe experienced a new political dispensation in November 2017, which triggered extreme volatility in the exchange rate. The

Zimbabwe dollar depreciated 521% against the US dollar in 2022, falling from 108 per US dollar in January 2022 to 671 in December 2022. Altogether, this underscores the broad diversity of factors that drive how each country has experienced global shocks.

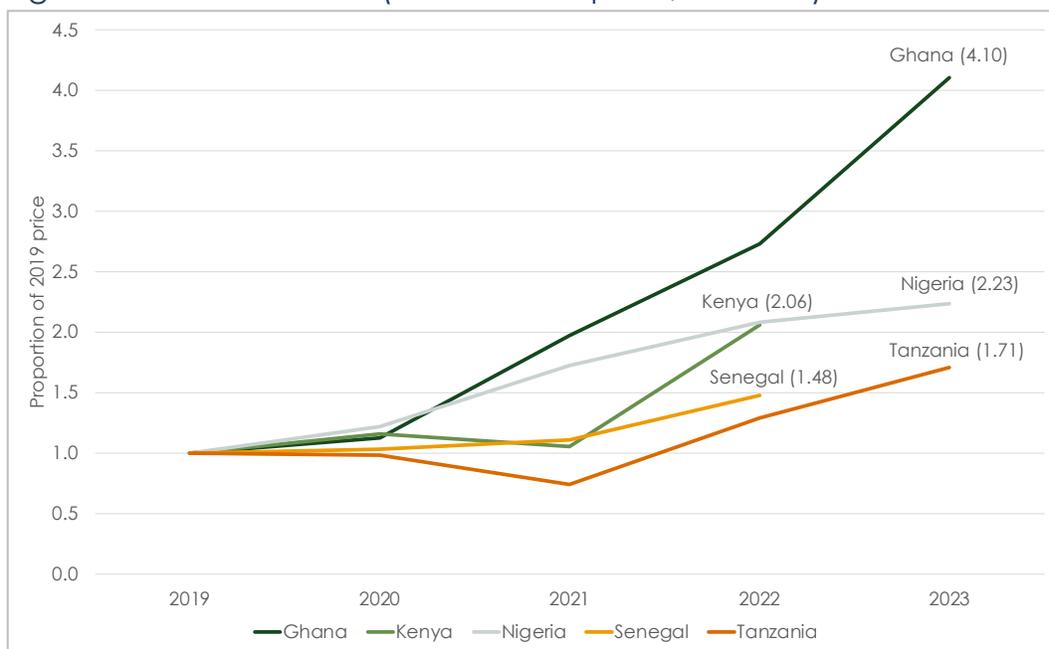
A parallel analysis of rice prices is presented in Figure 7. Here, we see relative stability in most countries through 2021, after which prices began to rise. Prices rose most slowly in Senegal (where they were 32% higher in 2023 than they had been in 2019) and Kenya (33%), and they rose most dramatically in Ghana (175%) and Nigeria (190%). As noted earlier, the global market for wheat is particularly impacted by the Russia-Ukraine war, given the prominent role of Russia and (to a lesser extent) Ukraine as wheat exporters. Figure 8 shows price trends for wheat in the countries for which such data were available. By 2023, the price had risen 19% in Senegal, 53% in Nigeria, and 58% in Tanzania. A similar presentation of prices of vegetable oil is offered in Figure 9. In Tanzania and Senegal, the price of vegetable oil had risen by 23% and 28%, respectively, by 2022. In Nigeria, where vegetable oil prices were available for 2023, the price had risen by 150% over four years.

Prices for urea, a common inorganic fertilizer, are presented in Figure 10. Again, we see a dramatic escalation in all countries. The price of fertilizer rose relatively more slowly in Kenya and Tanzania, where it was 51% and 67% higher in 2023 than it had been in 2019. This value was 101% in Senegal, 191% in Nigeria, and 450% in Ghana. The high price of fertilizer would logically lead farmers to turn to substitutes, such as organic fertilizer, or apply fewer inputs to their crops (Ben Hassen and El Bilali 2022). This is worrisome if it leads to lower production, which would place further pressure on prices.

Prices for petrol are presented in Figure 11. In Senegal, prices were fairly constant and had risen by only 14% by 2022. The price of petrol rose more quickly in Kenya, where it was 42% more expensive in 2022 than it had been in 2019. Tanzania seems to have been able to control the price, which remained elevated but did not rise further between 2022 and 2023. However, in Nigeria, the price of petrol skyrocketed in 2023 to reach a value that was 138% higher than it had been in 2019. As will be discussed in section 4.2, the Government of Nigeria repealed a fuel subsidy in 2023, which caused prices to surge from their subsidized baseline. In Ghana, where crude oil in the international market is traded in U.S. dollars, the exchange rate has been a key factor in determining prices.

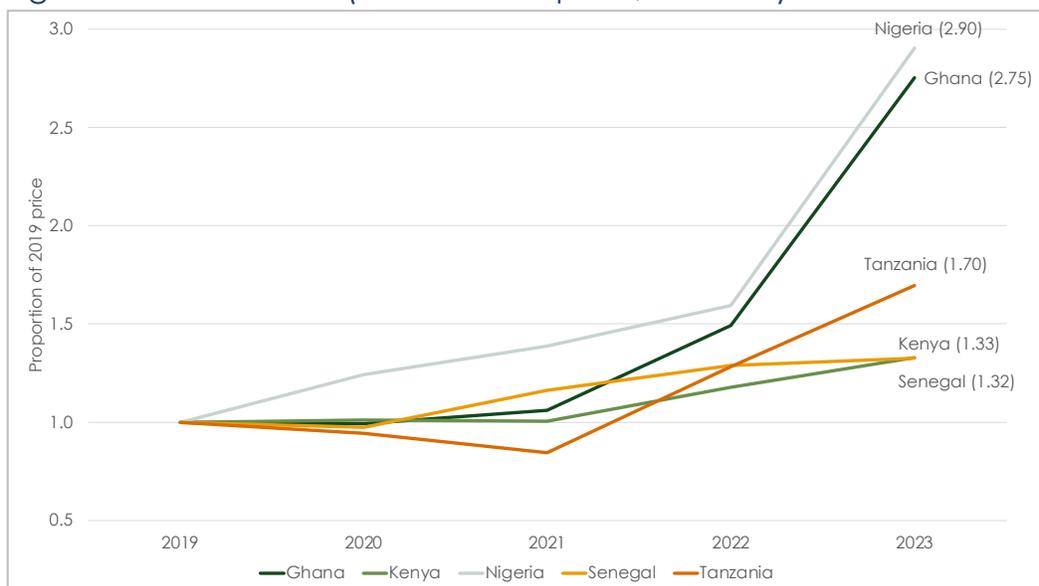
Because Zimbabwe experienced hyperinflation over this period, price trends for all products in Zimbabwe are displayed together in Figure 12. This shows that nominal prices rose dramatically in 2022 and 2023, with prices rising fastest for wheat. This prompted the government to prioritize wheat self-sufficiency through the wheat input support scheme. Specifically, the price of maize flour rose by 2023 to 131 times the price in 2019 (in nominal terms and in the local currency). This value was 146 for wheat, 105 for vegetable oil, 110 for fuel, and 73 for urea. Zimbabwe's rapidly deteriorating exchange rate plays a large role in the calculated price increases. According to key informants, Zimbabwe's wheat input support program had the impact of stabilizing the price of bread in U.S. dollars, though the price in local currency continued to rise precipitously.

Figure 6. Prices of maize (ratio to 2019 price, nominal)



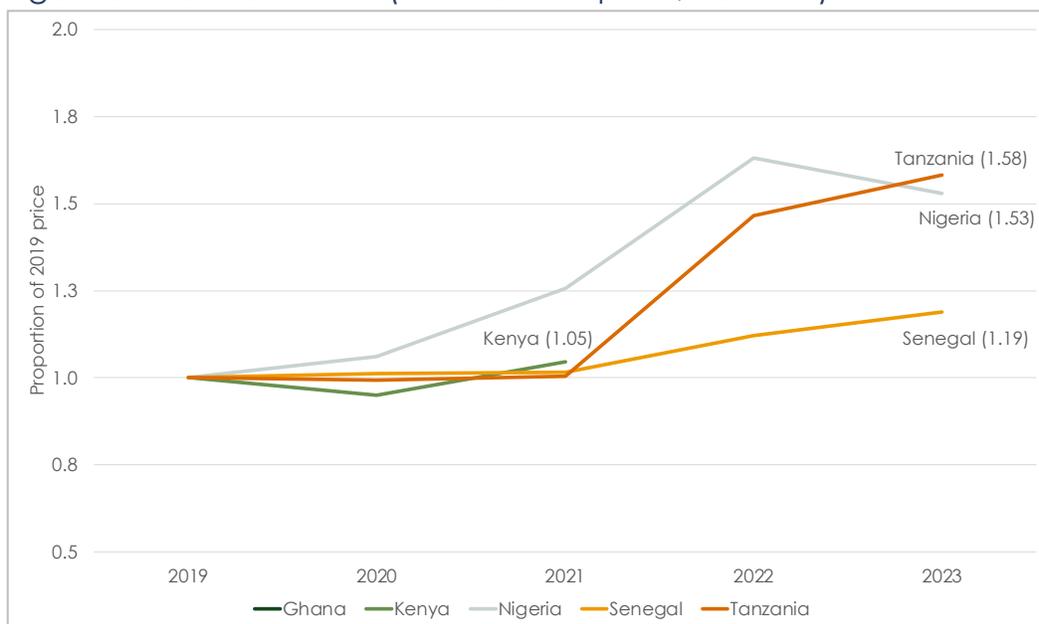
Sources: World Food Program (Ghana), KNBS Economic Survey and the National Cereals and Produce Board Weekly Market Prices Survey Reports (Kenya), NBS (Nigeria), ANSD (Senegal), Ministry of Agriculture Market Intelligent Unit (Tanzania)
 Notes: Zimbabwe is not yet shown. Specific products are white maize (Ghana), maize (Kenya and Tanzania), maize grain white sold loose (Nigeria), and dried corn kernels sold at retail (Senegal). Where prices were available at a monthly or more granular level, prices were averaged over the year. Values for 2023 are inclusive of the data available as of the time of writing.

Figure 7. Prices of rice (ratio to 2019 price, nominal)



Sources: KNBS Economic Survey and the National Cereals and Produce Board Weekly Market Prices Survey Reports (Kenya), NBS (Nigeria), ANSD (Senegal), Ministry of Agriculture Market Intelligent Unit (Tanzania)
 Notes: Zimbabwe is not yet shown. Specific products are rice (local) retail (Ghana), rice (Kenya and Tanzania), rice local sold loose (Nigeria), and local long grain rice (Senegal). Where prices were available at a monthly or more granular level, prices were averaged over the year. Values for 2023 are inclusive of the data available as of the time of writing.

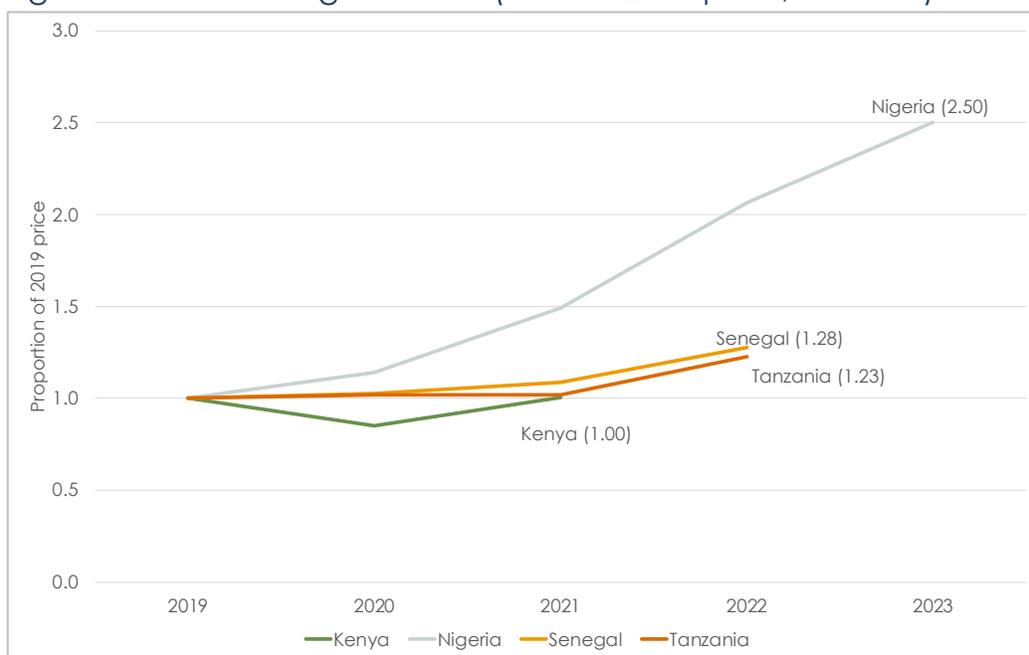
Figure 8. Prices of wheat (ratio to 2019 price, nominal)



Sources: KNBS Economic Survey and the National Cereals and Produce Board Weekly Market Prices Survey Reports (Kenya), NBS (Nigeria), ANSD (Senegal), Ministry of Agriculture Market Intelligent Unit (Tanzania)

Notes: Zimbabwe is not yet shown. Specific products are wheat (Kenya and Tanzania), wheat flour prepackaged (Nigeria), and retail wheat flour (Senegal). Where prices were available at a monthly or more granular level, prices were averaged over the year. Values for 2023 are inclusive of the data available as of the time of writing.

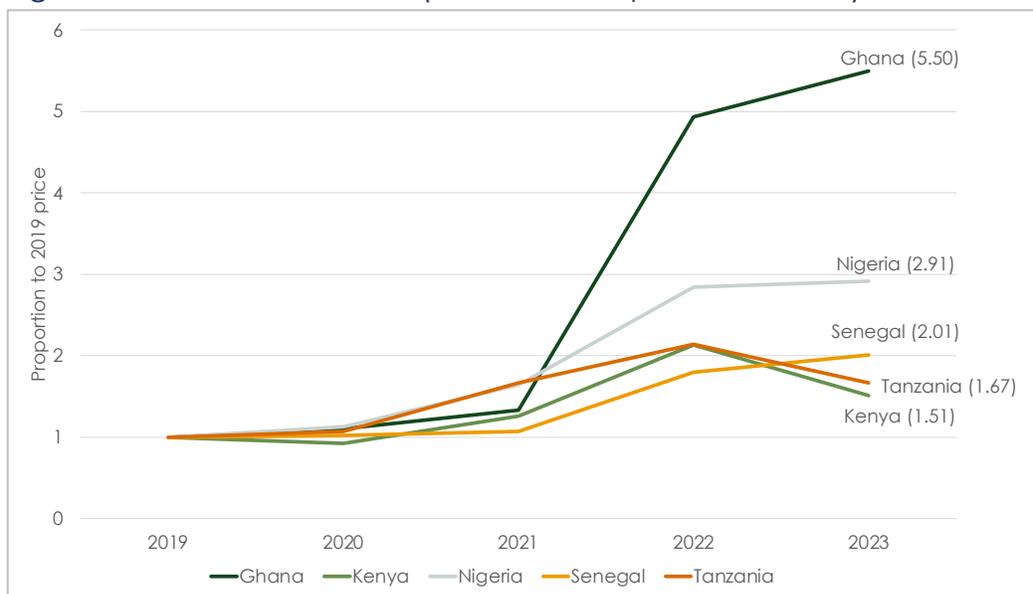
Figure 9. Prices of vegetable oil (ratio to 2019 price, nominal)



Sources: KNBS Economic Survey and the National Cereals and Produce Board Weekly Market Prices Survey Reports (Kenya), NBS (Nigeria), ANSD (Senegal), Ministry of Agriculture Market Intelligent Unit (Tanzania)

Notes: Zimbabwe is not yet shown. Specific products are cooking oil (Kenya), vegetable oil (Nigeria and Senegal), and refined sunflower oil (Tanzania). Where prices were available at a monthly or more granular level, prices were averaged over the year. Values for 2023 are inclusive of the data available as of the time of writing.

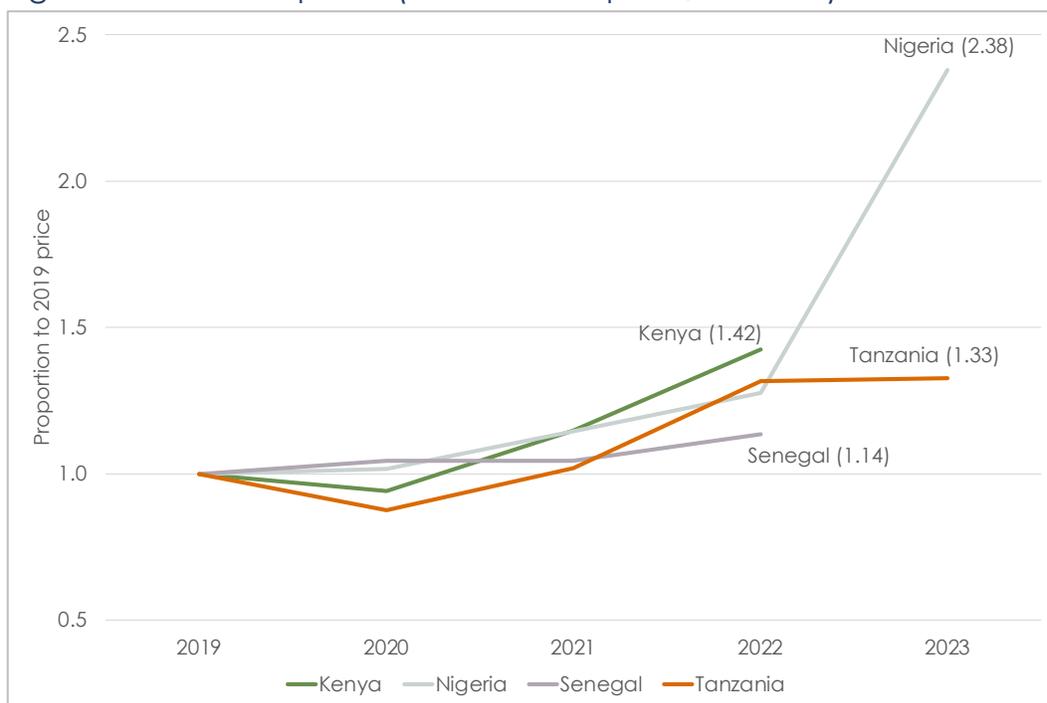
Figure 10. Prices of fertilizer (ratio to 2019 price, nominal)



Sources: AfricaFertilizer (2023) (Ghana, Kenya, Nigeria, Senegal), Tanzania Fertilizer Regulatory Authority (Tanzania)

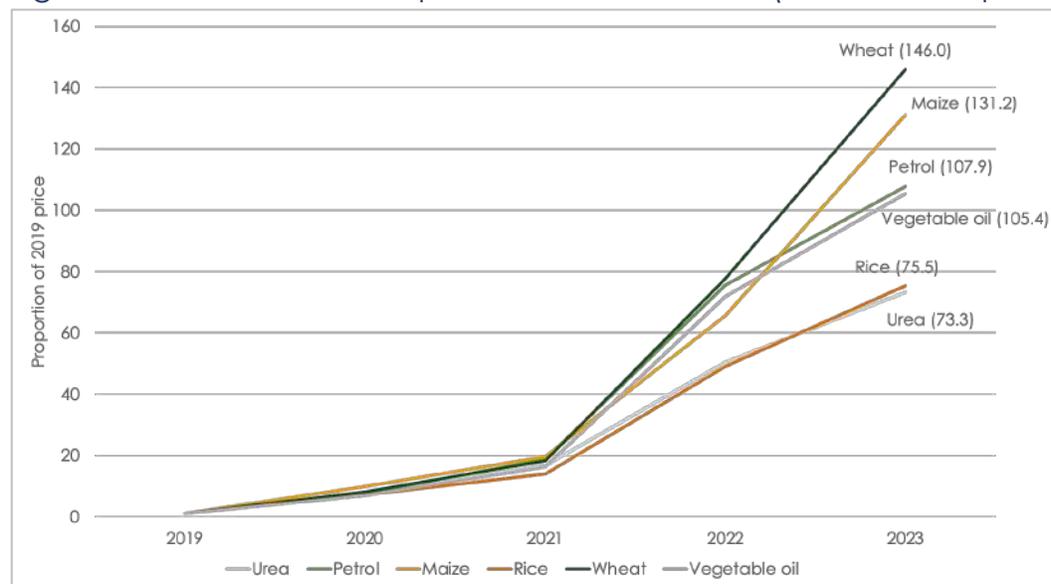
Notes: Zimbabwe is not yet shown. Specific variables are the price of urea FOB (Ghana, Kenya, Nigeria, Senegal), urea (Tanzania). Nominal prices were reported in local currency in all countries. 2023 values reflect the numbers available in each country as of the time of writing (i.e., the first part of the year).

Figure 11. Prices of petrol (ratio to 2019 price, nominal)



Sources: National Petroleum Authority (Ghana), Energy & Petroleum Regulatory Authority (Kenya), Nigeria Bureau of Statistics (Nigeria), Senegalese Agency for Statistics and Demography (ANSD) (Senegal), Energy and Water Utilities Regulatory Authority (Tanzania)
 Notes: Ghana is not shown for reasons of visual clarity; however, by 2023, the price of petrol in Ghana was 6.84 times what it had been in 2019. Zimbabwe is not yet shown. Specific variables are the price of petrol, except in Senegal where the price of “super carburant” is shown. Where prices were available at a monthly or more granular level, prices were averaged over the year. In Nigeria, prices were available at the state level and were averaged to produce a national value. Values for 2023 are inclusive of the data available as of the time of writing.

Figure 12. Prices of various products in Zimbabwe (ratio to 2019 price, nominal)



Sources: Zimbabwe Statistical Agency (ZimStat)

Notes: Where prices were available at a monthly or more granular level, prices were averaged over the year. Values for 2023 are inclusive of the data available as of the time of writing. Zimstat uses the official exchange rate to convert the US\$ to the Zimbabwe dollar; however, prices on the market are calculated using the unofficial exchange rate, resulting in a potential disconnect between the price data above and the prices observed in the market.

4.2 Assessment of Policy Responses

4.2.1 Ghana

The Government of Ghana has implemented several measures to address the impacts of the Covid-19 pandemic, drought, and the Russia-Ukraine war on the agrifood sector (Table 5).

To address the adverse effects of the Covid-19 pandemic, the Ghanaian government formulated three new policies to mitigate the associated health, economic, and social challenges. (1) The Coronavirus Alleviation Programme (CAP) was announced in April 2020, at the onset of the pandemic, and was comprised of various economic stimulus measures. Key initiatives included GH¢579.5 million for the Covid-19 Emergency Preparedness and Response Plan (EPRP), which was used to buy personal protective equipment and also to provide insurance packages and tax relief for frontline workers; GH¢200 million relief for the provision of water and sanitation for households for three months; and GH¢1,028 million as a three-month subsidy for electricity use in households and businesses. (2) The Coronavirus Alleviation Program Business Support Scheme (CAPBuSS) was targeted at micro, small, and medium enterprises (MSMEs) whose operations and sales were severely affected by the pandemic. Specifically, the government made available GH¢600 million for MSMEs to revamp operations. Unfortunately, as noted by key informants, other businesses such as private school operators and

hoteliers that saw their institutions close during the period of lockdown were not covered in this program. (3) The Ghana Covid-19 Alleviation and Revitalization Enterprise Support (CARES) Obaatanpa Programme was a two-phase program: The first phase was aimed at reducing the cost of basic services, ensuring food security, protecting businesses and workers, and strengthening the health system. With the second phase, the government accelerated implementation of the Ghana Beyond Aid agenda by providing support to the private sector in targeted sectors to accelerate competitive import substitution (for rice, poultry, cassava, sugar, and tomato) as well as export expansion in light manufacturing.

Two major policies, both long term in nature, were employed to mitigate the adverse effects of the 2021 drought. First, the One Village One Dam policy, which was initially introduced in 2017, was revamped in light of the 2021 drought. This pre-existing policy was aimed at year-round agricultural activities in the north of the country to enhance food security under the Infrastructure for Poverty Eradication Programme (IPEP). Following its launch in 2017, dams were constructed in several communities. However, in key informant interviews, it emerged that these dams were merely “dug-outs” without mechanized pumps to draw water for irrigation. In other words, the policy was well-formulated but poorly implemented. Nevertheless, the 2021 incidence of drought rekindled the government’s interest in the One Village One Dam initiative, and since then, some dams have been reconstructed and mechanized to support irrigated farming all year round. Second, drought-tolerant crop varieties have been developed by the Council for Scientific and Industrial Research (CSIR). So far, CSIR and its two subsidiaries, Crop Research Institute and Savanna Agricultural Research Institute, have developed four drought-tolerant maize varieties.

Several policy responses were also enacted in response to the Russia-Ukraine war. Though Ghana has traditionally imported a significant quantity of fertilizer from Russia, disruptions in the supply of fertilizer and fuel from Russia have induced global price hikes. In Ghana, the prices of fuel and fertilizer drastically increased while the quantity of available fertilizer fell. As noted in Figure 11, by 2023, the price of petrol in Ghana was 6.84 times what it had been in 2019. To mitigate these impacts, the government renewed its commitments in the National Fertilizer Policy (NFP), the Planting for Food and Job (PFJ) policy, and the Fertilizer Subsidy Programme (FSP). The government also formulated a new Gold for Oil Programme to temper the sharp increase in fuel prices.

The NFP of 2013 is the overarching policy document guiding all operations of the Ghanaian fertilizer sector. It gave the national fertilizer council the role of overseeing the fertilizer sector, while the Ministry of Food and Agriculture (MoFA) was the lead government agency charged with implementing the policy. As with the One Village One Dam policy, it emerged in key informant interviews that the NFP was well formulated but poorly implemented. However, recent shocks motivated the government to renew its commitments in the NFP and rebrand it as the “Green Ghana Policy.” The Green Ghana Policy raised awareness of the importance of applying organic fertilizers made with local materials and also built capacity of local organic fertilizer manufacturers to produce on a larger scale. Through the soil fertility management strategy, farmers are exposed to sustainable agricultural practices to maintain soil nutrients. However, key informants noted that a major shortcoming of the Green Ghana Policy is that farmers lack the technical know-how to apply organic fertilizer in the right amount or to pursue complementary activities such as composting or cover cropping.

The Planting for Food and Jobs policy of 2017 (another policy that existed prior to the series of shocks that began in 2020) is a subsidy program to provides farmers with seed and fertilizer. In addition, complementary services in extension, assistance with marketing of outputs, and e-agriculture tools

were added to the farmers’ package. The program focuses on three commodity clusters considered to be priority crops because of their short gestation period and ability to be grown in all ecological zones: (1) cereals (maize, rice, and sorghum); (2) legumes (soybean); and (2) vegetables (tomato, onion, and pepper). According to key informants, this program has been characterized by inadequate and untimely supply of agricultural inputs to farmers.

The Gold for Oil Programme is a short-term policy initiative, formulated in January 2023, to respond to increasing prices of petroleum products. Through this program, gold is purchased from local mining firms by the Central Bank of Ghana and is then used to pay for oil products in a direct barter. The implementation of this program has eased pressure on the dollar (the currency used for importation of petroleum products) and averted occasional increases in petroleum prices that result from the depreciation of the Ghanaian cedi against the dollar.

Table 5. Chronology of policy responses to shocks in Ghana

Year(s)	Action taken	Comments
2013, 2022	National Fertilizer Policy (NFP)	Launched in 2013 but not implemented. However, some components on organic fertilizers were implemented in 2022 and rebranded as the Green Ghana Policy.
2017–2021	One District One Dam	Dam reconstruction and mechanization.
2017–2023	Planting for Food and Jobs (PFJ)	Uses an integrated value chain approach. It focuses on three key commodity clusters considered to be priorities (cereals, legumes, and vegetables).
2020	Economic stimulus measures at the onset of the pandemic	These measures consisted of the Coronavirus Alleviation Programme; the Coronavirus Alleviation Programme-Business Support Scheme; the Covid-19 Emergency Preparedness and Response Plan; and the Covid-19 Alleviation and Revitalization Enterprise Support.
2022	Development of drought-tolerant crop varieties	Developed four drought-tolerant maize varieties.
2023	Gold for Oil Programme	Government through this program pays for oil products with gold in a direct barter.

4.2.2 Kenya

The Government of Kenya implemented various policies and programs in response to shocks (Table 6). In May 2020, the Government of Kenya responded to the Covid-19 pandemic by rolling out an eight-point Economic Stimulus Programme (ESP) to cushion citizens and businesses, protect livelihoods, and stimulate the economy. The ESP was comprised of measures aimed at improving road infrastructure and urban renewal; bolstering educational outcomes; enhancing liquidity to business including MSMEs; protecting health outcomes; and ensuring food security, among others. According to key informants, the ESP was considered effective at its goal. The government also implemented a range of fiscal measures in the context of the Tax Amendment Act 2020 and Finance Act 2020 that included removal of PAYE (Pay As You Earn) for those earning KES 24,000 and below; reduction of the corporate and personal income tax rate from 30 to 25%; reduction of the VAT rate from 16 to 14%; and reduction of the turnover rate from 3 to 1%. The government also initiated cash transfer programs under the general economic stimulus to provide financial assistance to vulnerable and low-income households affected by the pandemic. This included tax relief measures to businesses and individuals and provision of grants, loans, and financial support to MSMEs to help them stay

aflot through the economic downturn. Overall, according to key informants, these measures were perceived to effectively contain the spread of the virus; ensure consistent supply and distribution of food and other essential supplies; assist vulnerable populations; and enhance the amount of disposable income for citizens, businesses, and other entities. However, the funds were still perceived to be inadequate to meet the scale of the crisis. Furthermore, the funds that the government used during this period strained the government budget, and, as they were reallocated from other activities and budget lines, this meant that some other activities had to be postponed to a later fiscal year.

In the face of heightened fertilizer prices in Kenya, the main policy intervention has been through fertilizer subsidy programs that have operated since 1960. The subsidy program generally aim to promote improved use of fertilizer and mitigate high fertilizer prices. However, the national fertilizer subsidy program was discontinued in 2018/2019 due to budgetary delays, long distances to the depots, tedious processes for accessing the subsidized fertilizer, and the resultant disruption in the private sector. A revised e-voucher program was then rolled out in 2019/2020, with the farmer paying 60% of the fertilizer cost while the government paid 40% to agro-dealers. In response to global crises, this was scaled up in 2021/2022 by expanding its geographical coverage and the number of farmers reached. Nevertheless, the subsidies have resulted in just marginal increases in yield.

When fertilizer prices crept even higher during the Russia-Ukraine war, the Kenyan government initiated a special Emergency Subsidy Programme in 2022, parallel to the e-voucher program. Fertilizer prices hit a record KES 6,000 per 50 kg bag, which contributed to the highest price of maize ever recorded of KES 6,500 per 90 kg bag. (The high maize price was also due to export bans by neighboring countries from which Kenya imports maize.) The subsidy program was implemented through an emergency tender floated to support the procurement of fertilizer from local distribution. The program is, however, expected to end as the fertilizer price and availability situation normalizes. In addition to the Emergency Subsidy Programme, the Finance Act 2022 amended the VAT status of inputs or raw materials locally purchased or imported by fertilizer manufacturers from 16% to 0%.

In response to drought, the national and county governments and various stakeholders including development partners and non-governmental organizations have been implementing programs which include promotion of drought-tolerant crops, water conservation, irrigation systems, early warning systems, livestock insurance, efforts to strengthen market linkages (e.g., livestock off-take programs), social protection, and food aid/emergency relief. Despite these interventions, households and businesses continue to suffer from the effects of drought, which are likely to become more intense and prolonged in the face of worsening climate change. According to key informants, the government has consistently been reactive in its response to this threat. The establishment of the National Drought Emergency Fund (NDEF) was a step in the right direction towards anticipatory action in drought management and response. It is aimed at providing contingency finance to counties against their plans to ensure that they have the necessary resources to respond to drought. However, non-availability of real time funds to support early action in drought response remains a key challenge.

In 2021, the Stabilization Fund in Kenya's Price Control Policy became operational as a mechanism to cushion the economy from soaring global crude oil prices. This included compensation advanced to oil marketing firms to counter the forces of demand and supply that would otherwise push retail prices beyond the regulatory caps. The compensation was based on a set percentage of fuel costs. Specifically, the facility was to remain operational as long as international crude oil prices were above US\$50 per barrel. The fund came into effect in early 2021 when international crude oil prices had risen to US\$55 per barrel and, thus, KES 5.40 would go towards the stabilization fund from each liter of petrol and diesel sold by oil marketing firms.

Table 6. Chronology of policy responses to shocks in Kenya

Year(s)	Action taken	Comments
2019–2023	Fertilizer Subsidy	Currently being implemented through an e-voucher system. Farmers pay 60% of the fertilizer cost while the government pays 40% to the agro-dealers.
2019–2023	Social protection programmes	Consisted of the Hunger Safety Net Program (HSNP) II and HSNP III.
2019–2023	Livestock insurance and market linkages	The purpose of livestock insurance is to cushion farmers against the vagaries of frequent droughts.
2020	Eight-point Economic Stimulus Programme	Aimed at supporting citizens and businesses, protecting livelihoods, and stimulating the economy after emergence of the Covid-19 pandemic.
2020	Tax Amendment Act 2020 and Finance Act 2020	Removal of PAYE (Pay As You Earn) for low income groups to cope with the effects of Covid-19.
2020–2023	Irrigation systems (The irrigation (general) regulations, 2020)	The purpose of the regulations is to ensure sustainable development, management, financing, provision of support services and effective regulation of the irrigation sector in Kenya.
2021, 2022	National Drought Emergency Fund (NDEF)	A key challenge is non-availability of funds to support early action in drought response.
2021–2023	Water conservation (National Water Policy)	The objective of the policy is to provide an effective framework to re-engineer the water sector.
2021, 2022	Food aid/emergency relief	Response for individuals and families in acute food need, as well as those facing chronic food insecurity.
2021, 2022	Stabilization Fund (Price Control Policy)	Fuel subsidy intended to cushion the economy from unusually high global crude oil prices.
2022	The Fertilizers and Animal Food Stuff (Fertilizers) Regulations, 2022	The objective is to regulate the importation, manufacture, production, distribution and retail of fertilizers and raw materials for fertilizer production.
2022, 2023	Promotion of drought-tolerant crops	Aimed at addressing the effects of climate change.
2022, 2023	Early warning systems	The Drought Early Warning System (DEWS) provides timely and credible information on drought risks.
2022–2023	Finance Act, 2022	Removes the VAT status of inputs or raw materials locally purchased or imported by fertilizer manufacturers.

4.2.3 Nigeria

Responses by the Government of Nigeria to various shocks are shown in Table 7. In response to the Covid-19 pandemic, the Central Bank of Nigeria provided support in the form of loans to many sectors of the economy (including the agricultural sector). Other policy responses included the provision of cash and food benefits to vulnerable households to protect against food insecurity. Furthermore, in response to the pandemic, the Nigerian government supported the Poultry Association of Nigeria (PAN) with 5,000 mt of subsidized maize at ₦90,000 per mt instead of the ₦170,000 market price. Similarly, the Economic Community of West African States (ECOWAS) loaned Nigeria 3.4 mt of assorted grains to address the effects of the Covid-19 pandemic, terrorism, inter-community conflict, and drought. In 2020, the federal government distributed 70,000 mt of grains through the Strategic Grain Reserve to poor/vulnerable households.

In response to the shock of climate change, the 2021 Climate Change Act was enacted by the National Assembly of the Federal Republic of Nigeria. The Act was passed by the Senate in July 2021 and by the House of Representatives in October 2021. This Act provides a framework for mainstreaming climate change actions (such as greenhouse gas emissions (GHG) reduction), sets a system of carbon budgeting, and establishes the National Council on Climate Change. In 2022, the National Emergency

Flood Preparedness and Response Plan was also approved to mitigate the effects of flooding. Social protection was offered through the distribution of relief materials by the National Emergency Management Agency (NEMA) to people displaced by floods.

The Government of Nigeria also responded to the shocks presented by the Russia-Ukraine war. Nigeria had been trading with Russia to obtain muriate of potash (MoP). However, since the Russia-Ukraine war made it impossible for Nigeria to source fertilizer from Russia, the Federal Government through the Presidential Fertilizer Initiative (PFI) operated using the Nigeria Sovereign Investment Authority (NSIA) to source muriate of potash (MOP) from Canada. Diammonium phosphate (DAP) was additionally sourced from Morocco. The rationale was to ensure the availability of raw materials for fertilizer blending in Nigeria. To further cushion the effect of the war on the Nigerian food system, the government approved the importation of drought-resistant GMO wheat from Argentina for animal feed and milling. This was done to ameliorate the stress caused by a shortage of wheat and associated products due to the Russia-Ukraine war and blockage of commodity vessels passing through the Black Sea. In 2022, a Memorandum of Understanding (MoU) on Agriculture was signed between Nigeria and Poland to strengthen collaboration between the two countries in the realms of agriculture, energy, and defense. The MoU addressed the food and energy shocks which stemmed from the Russia-Ukraine war, and focal areas of cooperation include the development of trade in agri-food goods and the strengthening of scientific and research relations.

In response to stresses in the fertilizer sector, the Nigerian government launched a comprehensive fertilizer intervention program in collaboration with key entities such as the Presidential Fertilizer Initiative (PFI) and the Nigeria Sovereign Investment Authority (NSIA). This initiative focuses on revitalizing domestic fertilizer production, reducing import dependency, and ensuring the affordability of fertilizers for farmers. By working closely with these agencies, the government aims to provide farmers with reliable access to quality fertilizers at reasonable prices, thereby bolstering agricultural productivity and national food security. Additionally, in 2023, the government revamped the conditional distribution of agro-inputs and farm machinery to farmers at a subsidized rate through the National Agricultural Growth Scheme and Agro-Pockets (NAGS-AP).

In May 2023, a longstanding fuel subsidy was removed by the Government to address a worrisome budget deficit. Predictably, the removal of fuel subsidies has led to increased fuel prices, affecting transportation costs and food distribution.

Table 7. Chronology of policy responses to shocks in Nigeria

Year(s)	Action taken	Comments
2019–2023	Revitalizing domestic fertilizer production	This is aimed at ensuring the affordability of fertilizers by supporting local fertilizer manufacturers through the Presidential Fertilizer Initiative (PFI) and the Nigeria Sovereign Investment Authority.
2020	Loans and cash handouts	To address the impacts of the Covid-19 pandemic, Government and international organizations gave cash to households to protect lower-income households against shocks and food insecurity.
2020	Grain loan from ECOWAS	ECOWAS loaned Nigeria 3.4 mt of assorted grains to address the effects of Covid-19 pandemic, terrorism, inter-community conflicts, and drought.
2020	Release of grain from the strategic national reserve	Government distributed 70,000 mt of grain.

2020	Release of subsidized maize to the Poultry Association of Nigeria (PAN)	Government supported PAN with 5, 000 mt of subsidized maize.
2021–2023	Climate Change Act 2021	The Act provides a framework for mainstreaming climate change actions.
2022, 2023	National Emergency Flood Preparedness and Response Plan	Aim is to mitigate and reduce the impact of the flood nationwide.
2022, 2023	Finding alternative sources of fertilizer and raw materials	Muriate of potash (MOP) sourced from Canada; and source diammonium phosphate (DAP) sourced from Morocco.
2022, 2023	Importation of drought-resistant GMO wheat from Argentina for animal feed and milling	This was intended to cushion the food system from the effects of the Russia-Ukraine war.
2022, 2023	Input subsidies	Distribution of subsidized farm inputs such as seeds, fertilizers, and farm machinery to farmers.
2023	Removal of fuel subsidy	This was done to address a budget deficit but has had devastating effects on consumers.

4.2.4 Senegal

Responses to various shocks by the Government of Senegal are enumerated in Table 8. In response to the Covid-19 pandemic, the government launched a multi-sectoral Economic and Social Resilience Programme (PRES) in March 2020 which consisted of various subsidy and exemption measures for the most affected sectors of the Senegalese economy. For the agri-food sub-sector, two sub-programmes were rolled out in March and April 2020, namely a food distribution and food security program. For the latter, the goal was to increase cereal production (rice, maize, and millet) by at least 35%. The accompanying measures included subsidies for production equipment and inputs (fertilizers and plant protection products), tax exemptions, the cancellation of outstanding payments and debts, and technical and administrative support. In December 2020, the Government of Senegal then launched the Readjusted and Accelerated Priority Action Programme (PAP2A). The objective was to induce rapid economic recovery in 2021 propelled by reforms and substantial investment in the social, agricultural, fisheries, livestock, housing, digital and industrial sectors.

In 2021, the Government of Senegal partially repealed an earlier law from 1994 when it introduced the Law No. 2021-25 of 12 April 2021 to reform the system of prices and economic litigation. This law regulates the prices of essential foodstuffs and specifically introduced subsidies for products such as wheat, noting that bread is one of the most widely consumed products in the country. Of note, organic fertilizers were included in the set of subsidized fertilizers. This new measure was not only a response to crisis. Rather, according to key informants, it was a product of longer campaign of advocacy on the part of DYTAES (Dynamics for an Agroecological Transition in Senegal) to promote an agroecological transition.

In 2022, in response to the Russia-Ukraine war, the Government of Senegal implemented policies to distribute income to poor households, with a target of 500,000 households, and to support livestock farming by subsidizing the price of livestock feed. However, on the recommendation of the International Monetary Fund (IMF), the government simultaneously lifted subsidies on the price of diesel fuel, effectively increasing prices for a much-needed commodity. As will be discussed in section 5, this was perceived by some as an example of policy incoherence, where the government's different policies effectively offset one another.

In July 2022, Senegal launched an emergency food production program (2PAU-SN/AEFPPF-Senegal) aimed at reducing the country's dependence on food imports in the short and medium term by increasing the production and productivity of basic cereals (rice, maize, millet) and horticultural products. Along the same lines, in January 2023, Senegal launched the multi-sectoral programme (agriculture, livestock, and fisheries) for food sovereignty. The aim of this program was to ensure food and nutrition security for the Senegalese people, develop greater resilience in the face of various hazards, and boost economic and social development by 2035.

Table 8. Chronology of policy responses to shocks in Senegal

Year(s)	Action taken	Comments
2020–2023	Fertilizer Subsidy Programme	Aim is to make fertilizer more affordable.
2020	Multi-sectoral Economic and Social Resilience Programme (PRES)	Consisted of subsidy and exemption measures for the most affected sectors of the Senegalese economy.
2020	Price regulation and microfinance policies	Developed to support the livestock, fisheries, and horticultural produce marketing sub-sectors.
2021–2023	Readjusted and Accelerated Priority Action Programme (PAP2A)	Aimed to induce rapid economic recovery.
2021	Emergency programme for the socio-economic integration and employment of young people	Promoted apprenticeship, vocational training, employment, self-employment, and entrepreneurship for young people.
2021	Law No. 2021-25 of 12 April 2021	Aimed to reform the system of prices and economic litigation.
2022, 2023	Fertilizer blending	Aimed at making fertilizer without importing from Russia or Ukraine.
2022	Distribution of income to poor households	Aimed to cushion 500,000 households from the impacts of the Russia-Ukraine war.
2022	Subsidy for livestock feed	Aimed to support livestock farming.
2022	Emergency food production programme (2PAU-SN/AEFPF-Senegal)	Aimed to reduce the country's dependence on food imports in the short and medium term.
2023	Multi-sectoral programme (agriculture, livestock, and fisheries) for food sovereignty	Aimed to ensure sustainable food and nutrition security for the Senegalese people.
2023	Subsidy on fertilizers and agricultural equipment	This subsidy increased for the 2023 season.

4.2.5 Tanzania

Policy responses undertaken by the Government of Tanzania are shown in Table 9. The government sought to protect the welfare of consumers and farmers during the Covid-19 pandemic through tax reforms, import quotas, strategic grain reserves, and domestic production enhancement. Tax reforms mainly targeted imported commodities, namely wheat and edible oils. This reduced import duties to ensure that wheat and edible oils were imported at a lower cost, resulting in lower prices in domestic markets. A VAT exemption was also applied to domestically produced sunflower oil to promote increased domestic production.

Fuel prices and shipping costs spiked due to the Russia-Ukraine war, and this was exacerbated by the dollar appreciation against the Tanzanian shilling. The main policy response was to subsidize petrol and diesel, especially from June to December 2022. The government also continued to regulate prices through bulk fuel procurement. According to key informants, these initiatives were regarded as short-run solutions.

As of 2021, Tanzania imported over 70% of its wheat from Russia, with the rest coming from Western Europe and Argentina. This put Tanzania in a precarious position when wheat prices soared due to the Russia-Ukraine war. Policy responses to the higher price of wheat have included support for domestic wheat production (encompassing new wheat production areas and improved wheat seed availability) and duty remission on imported wheat grain granted at a rate of 10% instead of 35% to reduce the cost of production for domestic processors of wheat flour. The wheat flour companies have also been required to source part of their wheat domestically before importing from abroad to encourage domestic wheat production.

In response to high fertilizer prices, the main policy response taken by government was the continuation of a fertilizer subsidy. As of 2022, the program reduced the price of fertilizer by about 37%. However, according to key informants, the subsidy policy faced various challenges, including a scarcity of agents and consequent limited availability of subsidized fertilizer, and there were delays in payments to the agents. Smuggling, hoarding, and corruption also impede the implementation of the fertilizer subsidy program. To curb smuggling, a fertilizer registry is maintained, and all regional commissioners are required to supervise distribution; distribution companies are likewise registered; and a special label is used to denote subsidized fertilizers. The government also abolished the fertilizer bulk procurement system (FBPS), which had yielded disappointing results. This effectively opened fertilizer import to any individuals or entities.

The Government of Tanzania has also promoted domestic fertilizer production by zero-rating domestic fertilizers and materials used in fertilizer manufacturing. Along the same lines, the government is also prioritizing investment in urea production using gas from offshore deposits. Supporting the domestic production of fertilizer is viewed as a long-term response to this shock; in other words, benefits are expected in the more distant future.

Table 9. Chronology of policy responses to shocks in Tanzania

Year(s)	Action taken	Comments
2019–2022	Trade policy reforms	Import tariffs applied to enhance competitive domestic production of cooking oil; tariff reforms introduced to reduce the cooking oil shortage through importation to complement to domestic production.
2019–2023	Fertilizer subsidy with various distribution modalities	Aim is to increase affordability of fertilizers and increase fertilizer use.
2020	Tax reforms, import quotas, strategic grain reserves, and domestic production enhancement	Aimed at cushioning consumer and farmer welfare during the Covid-19 pandemic.
2021	Abolish bulk procurement scheme	Aim was to ensure farmers' access to affordable fertilizers and increase the availability of fertilizers in the market.
2022, 2023	Government promotion of domestic fertilizer production	A long-term solution to cushion the food system from shocks related to fertilizer prices.
2022	Subsidize petrol and diesel	Aim is to address the affordability of fuel.
2022	Tax reforms and support for domestic wheat production	Aim is to offer relief from high prices of wheat products.

4.2.6 Zimbabwe

The Government of Zimbabwe responded to shocks through various policies and programs (Table 10). In response to the Covid-19 pandemic and associated economic shocks, for the 2020/21 agricultural season, the government contracted CBZ Bank as its agent for the input support program named the Command Agriculture Programme. Farmers had to apply for loans or inputs to a division of the bank called CBZ Agro Yield (Pvt) Ltd and repay the loans after harvesting. The Government's Pfumvudza/Intwasa conservation farming program from 2020 to 2021 also distributed agricultural inputs to 1.8 million smallholder farmers. Just over half (51%) of all households have participated in the Pfumvudza program. (The program mostly operates in rural and peri-urban areas, though it also engages in urban areas where feasible). Of these beneficiary households, 84% received extension services and training and 80% reported higher yields.

Food aid was distributed to some households in August-September 2020, and by October 2020, the government had provided cash transfers to 202,077 beneficiaries throughout the country. However, there was a strong urban bias, with a concentration of beneficiaries in Harare (45%) and Bulawayo (15%). Although transfers rose from ZWD 180 (\$0.49) to ZWD 300 (\$0.82), this was widely considered inadequate, remaining substantially below the Consumer Council's reported value of ZWD 14,438 (\$39.89) to meet a family's monthly needs.

In May 2020, the government unveiled a ZWD 18.2 billion (\$50.3 million) Covid-19 Economic Recovery and Stimulus Package, valued at 9% of GDP. The aim of the package was to provide relief, ensure recovery from Covid-19-induced shocks, and improve the country's overall economic performance. The package of assistance included food aid, cash transfers, facilitating and financing healthcare interventions, pension support, cushioning allowances, and funding state institutions for Covid-19 research and manufacturing of personal protective equipment.

In response to the Russia-Ukraine war, Zimbabwe's wheat input support program aims to make the country self-sufficient in wheat supply. The Wheat Input Support Program saw Zimbabwe producing a record of 375,000 tons of wheat in 2022—a value in excess of the roughly 360,000 tons of wheat that are required for national consumption annually. Looking forward, key informants noted that this positions Zimbabwe to reach national self-sufficiency and potentially even export the surplus. This intervention was able to stabilize bread prices in U.S. dollars, which remained at US\$1. Nevertheless, the price of bread bought using local currency continued to increase based on the parallel market rate. According to key informants, an additional strength of the Wheat Input Support Program is that the government brought in the private sector to help finance the program. On the other hand, the government did not position adequate marketing mechanisms to buy the wheat from farmers in foreign currency, as had been promised.

Due to rising costs of basic goods, in May 2023, the Government of Zimbabwe announced a six-month suspension of import licenses, import duties, and import taxes on several basic commodities, including cooking oil, maize meal, toothpaste, bath soap, rice, and others. As this policy response was implemented with immediate effect, stakeholders were unprepared. This policy move reduced agricultural production costs, translating into a positive impact for farmers. However, it had negative impacts for local manufacturers who must compete with cheap imports.

In 2020, the Government began implementation of the Five-Year Fertilizer Import Substitution Roadmap (2020-2024) with the objective to reduce fertilizer imports and increase local production of phosphates and ammonium nitrate. Accordingly, the Industrial Development Corporation of Zimbabwe (IDC) invested in the local fertilizer value chain, from the extraction of phosphates to the granulation of basal fertilizers. Following the revival of dolomite mining in Rushinga, Zimbabwe had sufficient agriculture lime for the 2023/2024 agricultural season. However, fertilizer production capacity in the country remains low, and funding capacity to invigorate domestic production is limited. In addition, some raw materials required for fertilizer manufacturing are not available in the country, such that the country cannot completely replace these imports with locally produced materials.

The Government of Zimbabwe has been responsible for providing inputs (seeds, fertilizers, etc.) to the farming community for years. The Presidential Input Scheme, called Pfumvudza, is a “climate-proofed” program that was launched in 2020. The program has aimed to support 1.6 million vulnerable households to produce maize with a standardized input package of 5 kg seed and 50 kg basal and 50 kg top dressing fertilizer. Thirty-two kilograms of both basal and top dressing are to be applied to two standardized 0.06 ha plots (equal to 0.125 ha). In this program, beneficiaries are

expected to strictly adopt Conservation Agriculture Principles (CAP) as a climate change adaptation strategy.

In the short term, to address rising fuel prices, the government has implemented the blending of petrol and ethanol from E5 to E10. This benefitted consumers when petrol prices became lower than diesel fuel. However, in the medium term, the decrease in petrol prices has been overshadowed by the unstable exchange rate which resulted in a dramatic increase in the petrol price when consumers receive their salaries in Zimbabwean dollars but must purchase petrol in U.S. dollars. In addition, most industrial processes require diesel that is not blended.

Table 10. Chronology of policy responses to shocks in Zimbabwe

Year(s)	Action taken	Comments
2020, 2021	Vaccination program; food aid; education programs; input support program; financing for farmers	Aimed at cushioning consumers' and farmers' welfare during the Covid-19 pandemic.
2020–2023	Presidential Climate-Proofed Input Scheme (Pfumvudza)	In 2020 and 2021, this program distributed agricultural inputs to 1.8 million smallholder farmers.
2020–2023	National Enhanced Agriculture Productivity Scheme (CBZ Agro-Yield)	Through this program, farmers applied for bank loans which they then had to repay.
2020–2021, 2023	Petrol/ethanol blending from E5 to E10	Aim is to make petrol more affordable.
2022, 2023	Government capacitating local manufacturers	Aim was to enable the country to become self-sufficient in wheat supply.
2022, 2023	Farmers accessing cheaper fertilizers through subsidized fertilizers in the Pfumvudza	Aim was to make fertilizer affordable.
2021–2023	Import duty removal on fertilizer imports and raw materials	Aim was to cushion farmers from rising prices of basic goods.

5. Discussion

A survey of the six countries' experiences in recent years reveals several noteworthy themes regarding policy responses to shocks. These are discussed in turn below.

Countries exhibit an intensifying emphasis on self-sufficiency in food and fertilizer.

A prominent theme across our six focus countries has been a progressive shift towards prioritizing self-sufficiency to safeguard against price shocks of imported products. While a desire for national self-sufficiency has always been salient, this has evidently deepened in recent years. This shift is also mirrored in the academic literature. As Silva et al. (2023, p. 1) wrote, “in view of the uncertainties revealed by the global COVID-19 pandemic, extreme weather events, and world security issues, national policies in Africa should re-consider the value of self-sufficiency in production of staple food crops, specifically wheat.” Bentley et al. (2022) similarly promoted wheat self-sufficiency.

In terms of food self-sufficiency, the Ghana Covid-19 Alleviation and Revitalization Enterprise Support (CARES) *Obaatampa* Programme partly aims to accelerate implementation of the “Ghana Beyond Aid” agenda by supporting the private sector to accelerate competitive import substitution (Ministry of Finance, 2020). The Government of Senegal also launched an emergency food production program in July 2022 aimed at reducing the country's dependence on food imports by increasing the production and productivity of cereals (rice, maize, and millet) and horticultural products. In January 2023, Senegal then launched a multi-sectoral program for food sovereignty. The Government of Tanzania similarly responded to price shocks in edible oils and wheat by introducing new wheat

production areas, improving wheat seed availability, and supporting the sunflower seed system by breeding high-yielding sunflower varieties and subsidizing sunflower seeds. Wheat companies in Tanzania were also required to source some wheat domestically before importing to encourage farmers in the country to produce wheat. The Government of Zimbabwe implemented the Wheat Input Support Program, which was inclusive of financial services, private partnership financing, ensuring the availability of inputs and electricity for irrigation, and the Presidential Inputs Scheme which targeted small-scale farmers to produce winter wheat. This program capacitated Zimbabwean farmers to produce enough wheat to meet national demand and sharply reduce wheat imports by 2022.

As noted in section 2.1, wheat and baked goods have assumed an increasingly large place in the diets of Africa's urbanizing populations. Skyrocketing prices for wheat, as illustrated in Figure 8 and Figure 12, place unprecedented stress on bakeries and wheat consumers. However, it is possible to use lower-cost cereals or other products in flour blends to bring down the cost of flour (Bentley et al. 2022). Consequently, several governments have mandated the blending of wheat flour to reduce the need for imported wheat. In Nigeria, we heard of efforts to incentivize inclusion of cassava flour in bread. In Zimbabwe, the focus is on partially substituting sweet potato flour for wheat in baked goods as part of a Buy Zimbabwe strategy. In Senegal, there are policy measures to incrementally compel bakers to substitute local grains for wheat. Also in Kenya, a key strategy already in place is the "Flour Blending Initiative". According to key informants, it is expected that millers in Kenya would produce blended flours beginning November 2023 (Mwangi 2023). Nevertheless, much needs to be learned regarding how blending affects the functional properties of bread and whether consumers are accepting of foods made with blended flours (Bentley et al. 2022).

In terms of fertilizer self-sufficiency, we heard in Ghana that the Ministry of Food and Agriculture (MoFA) and the National Fertilizer Council have expedited discussions on the establishment of a local fertilizer manufacturing plant. In Tanzania, domestic production of fertilizer increased by 70% from 2021 to 2022, and the share of imports in total fertilizer supply slipped from 96% in 2020 to 89% in 2022 (authors' analysis of data from the Tanzania Ministry of Agriculture). The Nigerian Government also launched a comprehensive fertilizer intervention program with the Presidential Fertilizer Initiative (PFI) and the Nigeria Sovereign Investment Authority (NSIA). This initiative focuses on revitalizing domestic fertilizer production, reducing import dependency, and ensuring fertilizer affordability (NSIA, 2021a). In Zimbabwe, the government has supported local fertilizer production through the acquisition of inputs for fertilizer companies and resulting in a sustained increase in NPK fertilizer production (and concurrent decrease in imports) from 2018 to 2023. The Five-Year Fertilizer Import Substitution Roadmap (2020-2024) aims to increase local production of phosphates and ammonium nitrate to reduce fertilizer imports, and a new fertilizer blending plant which uses phosphate from Dorowa Mine is expected to enable Zimbabwe to meet half of the current national demand for basal fertilizer. Similarly, dolomite mining has been revived in Rushinga, Zimbabwe, enabling the country to cut its lime imports.

Though subsidies and tariff reductions are a readily available policy response, the fiscal burden can be quite high.

Across all countries in this study, subsidies and other expenditure-based assistance were employed extensively within the policy response to various shocks. In Ghana, the Coronavirus Alleviation Programme (CAP) included (among other features) three months of free water and sanitation for households and a three-month subsidy for electricity in households and businesses (Government of Ghana 2021). In Senegal, the Economic and Social Resilience Programme (PRES) was launched in

March 2020 in response to the Covid-19 pandemic; this included (among other features) subsidies for production equipment and inputs (fertilizers and plant protection products), tax exemptions, and the cancellation of outstanding payments and debts. Later, in response to the Russia-Ukraine war, the government of Senegal introduced subsidies for livestock feed and baguettes, the latter in response to rising wheat prices. Meanwhile, the government of Kenya responded to the energy price crisis by introducing a petrol and diesel subsidy for fiscal year 2021/22; this was administered under the Petroleum Development Levy Fund (EPRA 2023). The government also responded to high flour prices by offering a short-term maize flour subsidy in mid-2022, scaled up the fertilizer subsidy program in 2021/2022, and introduced a parallel Emergency Subsidy Program in 2022 that was not targeted (i.e., available to all farmers) (Kilimo News 2022; AGRA 2022). The government of Tanzania also maintained a fertilizer subsidy and subsidized petrol and diesel from June to December 2022. In Zimbabwe, the Government's Pfumvudza/Intwasa conservation farming program from 2020 to 2021 distributed agricultural inputs, including seed and fertilizer, to 1.8 million smallholder farmers (ZIMSTAT, 2021).

Similarly, governments utilize reductions in tariffs, duties, and taxes to alleviate price shocks. The government of Senegal waived the value-added tax (VAT) and other customs duties. Similarly, the government of Kenya temporarily waived import duties for rice and maize grain in the first half of 2023 and amended the VAT status of inputs or raw materials locally purchased or imported by manufacturers of fertilizer from 16% to 0% (The East African 2023). In 2020, the government also temporarily removed the PAYE (Pay As You Earn) tax for those earning below a certain threshold, reduced the corporate and personal income tax rate from 30 to 25%, reduced the VAT rate from 16 to 14%, and reduced the turnover rate from 3 to 1% (Rödl and Partner 2022). The government of Tanzania reduced excise duties on gasoline, diesel and kerosene, and lowered customs duties for cooking oil. In Tanzania, the government granted a duty remission of 10% rather than 35% on imported wheat grain, removed import duties for rice, reduced the customs duties on imported cooking oil, and setting aside the VAT for double refined edible oil from locally grown seeds by local manufacturers. The government of Zimbabwe suspended duties on various commodities including cooking oil, maize meal, rice, toothpaste, bath soap, ammonium nitrate fertilizers, fertilized eggs for hatching, and powdered raw milk, and others.

Across multiple countries, key informants noted that developing countries can only forgo revenues or offer expenditure-based assistance for a limited time. Notably, these tools are generally not sustainable for the aggregate duration of current-day crises which arrive in quick succession. In both Senegal and Nigeria, subsidies on diesel have been rolled back in an effort to manage government spending and direct assistance in a more targeted manner. Particularly in Nigeria, removal of the subsidy has become a prominent theme in national discourse. In Kenya, the emergency fertilizer subsidy program, which was un-targeted, proved to be a rather burdensome fiscal outlay. Although the fuel subsidy was put in place before the Russia-Ukraine war, according to key informants, high international prices have made the subsidy unsustainable and resulted in the crowding out of public resources in other sectors. In response, the fuel subsidy was removed. Key informants noted the disadvantages of these subsidies as straining government budgets; inadequately addressing inequality due to a lack of beneficiary targeting; market distortions and crowding out private sector investment; generating dependency on subsidies; and corruption and rent-seeking. In Tanzania, key informants noted several challenges with the fertilizer subsidy, including a lack of engagement of the private sector in policy design, limited number of agents, and delays in government payments.

Countries sometimes exhibit a troubling lack of policy coherence in response to shocks.

Across the various countries in this study, we sometimes observed situations in which multiple policies within a country were oriented toward divergent goals, essentially offsetting the other's impacts. In Senegal, for example, even as the government introduced various policies and programs to cushion the impact of global shocks, it also responded to pressure from technical and financial partners, such as the International Monetary Fund, to raise the regulated price of fuel. Specifically, in January 2023, Senegal revised upward the ceiling prices of refined hydrocarbons for both premium and diesel fuel, raising the price at the pump by FCFA 100 per liter (Ministère du Pétrole et des Energies 2023). Along the same lines, Tanzania recently increased fuel tolls for diesel and petrol by 100 TZS/liter. Given the centrality of fuel costs in many industries and value chains, this was understood by key informants to worsen the cost-of-living crisis in the country. Similarly in Kenya, food prices have remained high despite the implementation of a scaled-up fertilizer subsidy and a good harvest in 2023. This is because, at the same time, fuel prices (which are strongly correlated with food prices) have dramatically increased due to exchange rate fluctuations as well as tax reform, with fuel subsidies removed and higher taxes introduced. The rising costs of fuel have perfectly offset the positive effects of fertilizer subsidies (Ayalew et al. 2023).

In Ghana, the government's policy response to the Covid-19 pandemic was perceived as effective in the short term in terms of mitigating public health, economic, and social challenges. However, it was accompanied by the introduction of a Covid-19 health recovery levy to cover the cost of the initial assistance package (Government of Ghana 2021). According to key informants, this levy has increased the cost of production, which itself has brought about an increase in the prices of food and non-food commodities. Calls by civil society organizations and the general public for the levy's cancellation have intensified, though so far, it remains in place.

There are various reasons a country may opt to remove a market-distorting subsidy, including pressure from external partners, a need to limit government expenditures, or a desire to redistribute benefits to different subpopulations. Each case is likely unique, meriting consideration of who bears the burden of revenue measures and who is targeted for assistance. However, the perception of policy incoherence seems to be problematic.

While recent shocks have triggered some trade realignment, they have not stimulated increased within-Africa (intra-regional) trade.

Across the six countries of this study, we heard of some instances of trade realignment, with governments forging new relations when old trade routes were obstructed. For example, Nigeria had been importing potash from Russia when that supply source was abruptly cut off in 2022. Through the Presidential Fertilizer Initiative (PFI), Nigeria was able to pivot in its trade relations to access potash from Canada (even though this longer route also meant higher prices) (Reuters 2022). In 2022, Nigeria also signed a Memorandum of Understanding (MoU) with Poland to enhance food and energy security, thereby strengthening this trade relationship (Business Day 2022). In Tanzania, most of the exported sunflower seedcake is typically sold to Kenya. However, during the lockdowns introduced in response to the Covid-19 pandemic, Tanzanian traders did not have access to the Kenyan market. They instead had to search for alternative options, such as selling to local double refinery processors. At the same time, in Kenya, the introduction of lockdown measures by trading partners had a positive effect on exports but a negative one on imports. Weekly exports to countries that introduced lockdown measures increased by an average of 13%, while imports from those countries decreased by

23% (Lashitew and Socrates 2021). For a time, it seems lockdown policies reshuffled existing trade patterns.

Just 17% of the total food imported in Africa takes the form of intra-African trade (Nhlengethwa et al. 2023). To increase trade within Africa, the African Continental Free Trade Area (AfCFTA) aims to create a barrier-free trade zone among members with the removal of tariffs and the harmonization of trade rules (Morsy et al. 2020). The AfCFTA was launched in July 2020 and became operational in January 2021. However, across the countries in this study, shocks that disrupted global supply chains did not prompt an increase in within-Africa (intra-regional) trade. One exception would seem to be a new trade relationship between Nigeria and Morocco, in which Morocco provides diammonium phosphate (DAP) and Nigeria provides natural gas. However, this trade arrangement was set in motion in 2018 (NSIA 2021b), prior to the shocks covered in our study and also prior to the AfCFTA. Overall, it does not seem the AfCFTA has played a role in how countries responded to these shocks.

Countries exhibit an increasing appreciation for organic fertilizer and related tools to promote soil health and increasingly recognize climate change and associated environmental stress.

While far greater resources are directed towards promoting inorganic fertilizer use, as through fertilizer subsidies and efforts to facilitate domestic fertilizer production, it seems countries are increasingly interested in pairing this with organic fertilizer promotion. In Ghana, the “Green Ghana” project, with cooperation from the Ministry of Food and Agriculture (MoFA) and the National Fertilizer Council, has advocated for the complementary use of both imported inorganic fertilizers and locally produced organic fertilizer. Moreover, through the Planting for Food and Jobs (PFJ) initiative, the Government of Ghana has encouraged fertilizer companies to shift attention to manufacturing organic fertilizers and has aimed to build capacity among local organic fertilizer manufacturers to produce on the larger scale. In response, organic fertilizer companies such as Zoomlion, Safisana, and Juspong have scaled up their production. In key informant interviews, this was viewed as an effective response to the scarcity of inorganic fertilizers sparked by the Russia-Ukraine war. In 2021, the Government of Senegal also included organic fertilizers in the set of subsidized fertilizers. This decision was not only a response to recent crises, but also due to the advocacy of the Dynamics for an Agroecological Transition in Senegal (DYTAES) to promote agroecology. In Kenya, key informants noted that subsidies for inorganic fertilizer (in existence since the 1960s) have resulted in just marginal increases in yield; consequently, the policy discourse now gives more serious attention to soil health management beyond the application of inorganic fertilizers. In Ghana, the government has also been encouraging farmers to practice no-till farming and practice crop rotation to best preserve soil nutrients.

Across the six countries, some policy responses address climate change in increasingly sophisticated ways. In Nigeria, the Climate Change Act of 2021 established a legal framework for sustainable agriculture and resilience to climate change (NCCP 2021). This Act provides a framework for mainstreaming climate change actions, sets up a system of carbon budgeting, and establishes the National Council on Climate Change. The latter is vested with significant authority to coordinate national efforts on climate change, oversee the newly created Climate Change Fund, raise funds to support climate initiatives, and collaborate with the Nigerian Sovereign Green Bond to meet Nigeria's Nationally Determined Contributions (NDCs). Nigeria was highly affected by floods in 2019, and in 2022, the National Emergency Flood Preparedness and Response Plan was approved to mitigate and reduce the impact of floods (Voice of Nigeria 2022). Efforts to address the risk of floods include measures for the aftermath of flood occurrences, construction of high-quality infrastructure and road

networks, and broadly building farmers' resilience. The Presidential Input Scheme in Zimbabwe, launched in 2020, sets an expectation that beneficiaries will adopt Conservation Agriculture Principles (CAP) as a climate change adaptation strategy.

In Ghana, which experienced a major drought in 2021, the National Climate Change Policy and the National Drought Management Plan both aim to improve water management, promote sustainable farming practices, and help farmers cope with drought. In response to the drought of 2021, the government distributed drought tolerant maize varieties through the Planting for Food and Jobs initiative, and further revived the One Village One Dam initiative, through which it intends to invest in irrigation infrastructure across the country. The One Village One Dam initiative was initiated in 2017 but had not been truly implemented in its first few years.

6. Conclusion

Taken together, these results point to several steps that ought to be taken. First, the urgency with which countries are aiming to limit their exposure to global shocks is noteworthy. African countries have long aimed for adequate food production to meet their needs. Nevertheless, currents of trade liberalization have also shaped national policies, with programs of import substitution often viewed by international entities, such as the World Bank, as counterproductive (Cooksey 2003). The intensity with which African governments now strive for national self-sufficiency (also referred to as food sovereignty) suggests a need for thoughtful discourse on the proper balance between national self-sufficiency and participation in international trade. This may also tie into the theme of within-Africa (intra-regional) trade. Specifically, more attention might be given to the potential role of intra-regional trade and regional (not national) value chains to promote continental self-sufficiency and thereby ameliorate economic vulnerability to such shocks. It does not seem that countries currently view this as a viable response to global shocks, which suggests a need to understand why intra-regional trade is not viewed more favorably and whether relevant obstacles and bottlenecks can be addressed.

Second, as noted by Galanakis (2023, p. 2), “systemic events are neither unlikely nor infrequent anymore, and disruptions are becoming the new norm in the world.” Many of the policy responses noted in this study have been reactive and have especially taken the form of spending or revenue measures. However, these approaches tend to be financially unsustainable for resource-constrained countries over the protracted duration and compounding nature of present-day crises. Wherever possible, it is advisable that support be allocated in a targeted manner rather than in the form of broad-based and untargeted subsidies that are assumed to reach the entire population (Amaglobeli et al. 2023). A broader lesson, however, is that more attention ought to be allocated to proactive (rather than reactive) measures aimed at making national economies more resilient to future shocks. Examples of proactive measures include establishing diverse trade portfolios with a wide set of trading partners, improving the climate resilience of domestic food production, and, where appropriate, thoughtfully implementing private sector-driven programs to build capacity of domestic industry. Future research efforts to disentangle the effects of shocks on national economies and the role of policy responses should fully account for pre-existing policies that, although not immediately recognizable as a “policy response” to the shocks, nevertheless played a role in the country's experience.

Finally, the impacts of recent crises are refracted through each country's unique production and trade patterns, among other factors. Across the six countries in this study, we did not observe an obvious correlation between each country's cereal dependency ratio (Table 1) and the rate of increase in nominal prices of maize, rice, or wheat (Figure 6). Country experiences and economic outcomes over the study period were driven in part by economic underperformance and/or a consequent

deteriorating exchange rate (Ghana, Kenya, and Zimbabwe), an unpredictable invasion of desert locusts (Kenya), and a currency redesign that inadvertently brought about a “cash crunch” which influenced the overall context in which food, fertilizer, and fuel prices fluctuated (Nigeria). These factors make it difficult to predict how global shocks will play out in any particular setting, underscoring the importance of context- and situation-specific measures to address global shocks.

References

- Abay, K. A., C. Breisinger, J. Glauber, S. Kurdi, D. Laborde, and K. Siddig. 2023. The Russia-Ukraine war: Implications for global and regional food security and potential policy responses. *Global Food Security*, 36, 100675. <https://doi.org/10.1016/j.gfs.2023.100675>
- Africa Fertilizer. 2022. Database on Fertilizer Use by Crop for African Countries. Accessed at: <https://africafertilizer.org-last>
- AGRA, 2022. Price & Policy Africa Bi-Weekly Monitor, Food Trade And Resilience Initiative. Edition 04, July 2022. <https://agra.org/archive/wp-content/uploads/2022/08/Price-and-Policy-Monitor-July-edition-4.pdf>
- Agyei-Holmes, A., A. Wineman, J. Olwande, E. Mwakiwa, O. T. C. Vilanculos, A. Faye, I. Ogunbayo, T. Kapuya, and T. S. Jayne. 2021. Impacts of the Covid-19 pandemic and associated policy responses on food systems in sub-Saharan Africa: A synthesis of evidence. ReNAPRI Working Paper. Accessed at: https://cpeel.ui.edu.ng/sites/default/files/publication/Covid-19_Impacts_on_Food_Systems_in_SSA-Evidence_Synthesis.pdf.
- Alexander, P., A. Arneeth, and R. Henry, J. Maire, S. Rabin, and M. D. A. Rounsevell. 2022. High energy and fertilizer prices are more damaging than food export curtailment from Ukraine and Russia for food prices, health, and the environment. *Nature Food*, 4, 84–95. <https://doi.org/10.1038/s43016-022-00659-9>
- Alliance for a Green Revolution in Africa (AGRA). 2022. The impacts of the Russia-Ukraine conflict on food prices, food and nutrition security in Africa. Accessed at: <https://agra.org/wp-content/uploads/2022/04/Impacts-of-the-Russia-Ukraine-conflict-2.pdf>
- Amaglobeli, D., M. Gu, C. Thevenot, E. Hanedar, and G.H. Hong. 2023. *Policy Responses to High Energy and Food Prices*. Working Paper WP/23/74: 1–70. International Monetary Fund (IMF): Washington, D.C. Accessed at: <https://www.imf.org/-/media/Files/Publications/WP/2023/English/wpica2023074-print-pdf.ashx>
- Arndt, C., X. Diao, P. Dorosh, K. Pauw, and J. Thurlow. 2023. The Ukraine war and rising commodity prices: Implications for developing countries. *Global Food Security*, 36, 100680. <https://doi.org/10.1016/j.gfs.2023.100680>
- Ayalew, H., J. Karugia, J. Olwande, and C. Breisinger. 2023. How is Kenya’s National Fertilizer Subsidy Program working? Washington DC: International Food Policy Research (IFPRI). <https://www.ifpri.org/blog/how-kenyas-national-fertilizer-subsidy-program-workin>
- Ben Hassen, T., and H. El Bilali. 2022. Impacts of the Russia-Ukraine war on global food security: Towards more sustainable and resilient food systems? *Foods*, 11(15): 2301. <https://doi.org/10.3390/foods11152301>
- Bentley, A.R., Donovan, J., Sonder, K., Baudron, F., Lewis, J.M., Voss, R., Rutsaert, P., Poole, N., Kamoun, S., Saunders, D.G.O., Hodson, D., Hughes, D.P., Negra, C., Ibbas, M.I., Snapp, S., Sida, T.S., Jaleta, M., Tesfaye, K., Becker-Reshef, I., Govaerts, B., 2022. Near- to long-term measures to stabilize global wheat supplies and food security. *Nature Food*, 3: 483–486.
- Business Day (2022). Nigeria and Poland sign MoU on agriculture. <https://businessday.ng/news/article/nigeria-poland-sign-mou-on-agric/> Accessed 10/10/23.

- Clapp, J. 2023. Concentration and crises: Exploring the deep roots of vulnerability in the global industrial food system. *The Journal of Peasant Studies*, 50:1, 1–25. <https://doi.org/10.1080/03066150.2022.2129013>.
- Cooksey, B. 2011. Marketing reform? The rise and fall of agricultural liberalisation in Tanzania. *Development Policy Review*, 29 (s1): s57-s81.
- del Villar, P.M., and F. Lancon. 2015. West African rice development: Beyond protectionism versus liberalization? *Global Food Security*, 5: 56–61.
- Devereux, S., and P. White. 2012. Social Protection in Africa: Evidence, Politics and Rights. *Poverty and Public Policy*, 2 (3): 53-77. <https://doi.org/10.2202/1944-2858.1078>
- Dillon, B., and C. Barrett. 2016. Global oil prices and local food prices: Evidence from East Africa. *American Journal of Agricultural Economics*, 98 (1), 154–171. <https://doi.org/10.1093/ajae/aav040>
- Energy and Petroleum Regulatory Authority (EPRA). 2023. Press Release on Petroleum Pump Price Stabilization. December 11. <https://www.epra.go.ke/press-release-on-petroleum-pump-price-stabilization-11-12-2023/>
- Food and Agriculture Organization (FAO). 2022. “The Importance of Ukraine and The Russian Federation for Global Agricultural Markets and the Risks Associated with the War in Ukraine.” June 10, 2022. <https://www.fao.org/3/cb9013en/cb9013en.pdf>.
- FAO, IFAD, UNICEF, WFP and WHO. 2023. The State of Food Security and Nutrition in the World 2023. Urbanization, agrifood systems transformation and healthy diets across the rural–urban continuum. Rome, FAO. <https://doi.org/10.4060/cc3017en>
- Ferrero, E. M., A. Wineman, and A. Mitchell. 2023. Changes in school feeding operations during the COVID-19 pandemic: Evidence from 139 countries. *Food Security*. <https://doi.org/10.1007/s12571-023-01393-1>
- FSIN and Global Network Against Food Crises. 2023. GRFC 2023 Mid-Year Update. Rome. Accessed at: <https://www.foodsecurityportal.org/sites/default/files/2023-09/GRFC2023-MYU.pdf>
- Galanakis, C. M. 2023. The “vertigo” of the food sector within the triangle of climate change, the post-pandemic world, and the Russian-Ukrainian War. *Foods*, 12, 721. <https://doi.org/10.3390/foods12040721>
- Glauber, J., and A. Mamun. 2023. “Global rice markets face stresses from El Niño, India export restrictions”. Accessed at: <https://www.ifpri.org/blog/global-rice-markets-face-stresses-el-niño-india-export-restrictions>.
- Government of Ghana. 2021. The Budget Statement and Economic Policy of the Government of Ghana for the 2021 Financial Year. 1, 1–292.
- Hebebrand, C., and J. Glauber. 2023. The Russia-Ukraine war after a year: Impacts on fertilizer production, prices, and trade flows. March 9, 2023. Accessed at: <https://www.ifpri.org/blog/russia-ukraine-war-after-year-impacts-fertilizer-production-prices-and-trade-flows>

- Hebebrand, C., and D. Laborde. 2022. High Fertilizer Prices Contribute to Rising Global Food Security Concerns. International Food Policy Research Institute, Washington D.C. Accessed at: <https://www.ifpri.org/blog/high-fertilizer-prices-contribute-rising-global-food-security-concerns>
- Human Rights Watch (2022). “Ukraine/Russia: As War Continues, Africa Food Crisis Looms.” Accessed at: <https://www.hrw.org/news/2022/04/28/ukraine/russia-war-continues-africa-food-crisis-looms>
- International Food Policy Research Institute (IFPRI). 2023. Food and Fertilizers Export Restriction Tracker. Accessed at: <https://www.foodsecurityportal.org/tools/COVID-19-food-trade-policy-tracker>
- International Monetary Fund (IMF). 2023. Macroeconomic and Financial Data. Accessed at: <https://data.imf.org>
- International Trade Centre. Trade Map database. Accessed at: <https://www.trademap.org/>
- Jagtap, S., H. Trollman, F. Trollman, G. Garcia-Garcia, C. Parra-López, L. Duong, W. Martindale, P. E. Munekata, J. M. Lorenzo, and A. Hdaifeh. 2022. The Russia-Ukraine conflict: Its implications for the global food supply chains. *Foods*, 11 (14): 2098. <https://doi.org/10.3390/foods11142098>
- Jayne T., Mason N., Burke W., and Ariga J. 2018. Review: Taking stock of Africa’s second-generation agricultural input subsidy programs. *Food Policy*, 75: 1–14.
- Kakpo, A., Mills, B. F., & Brunelin, S. (2022). Weather shocks and food price seasonality in Sub-Saharan Africa: Evidence from Niger. *Food Policy*, 112, 102347.
- Kilimo News. (2022, July 25). Kshs 8 Billion set aside for cheap maize flour <https://kilimoneews.co.ke/agriculture-policy/kshs-8-billion-set-aside-for-cheap-maize-flour/>
- Lashitew, A and Socrates, M.K. (2021, March 9). How have lockdown policies affected international trade? Evidence from Kenya. <https://www.brookings.edu/articles/how-have-lockdown-policies-affected-international-trade-evidence-from-kenya/>
- Lin, F., X. Li, N. Jia, F. Feng, H. Huang, J. Huang, S. Fan, P. Ciaisi, and X. Song. 2023. The impact of Russia-Ukraine conflict on global food security. *Global Food Security*, 36: 100661. <https://doi.org/10.1016/j.gfs.2022.100661>
- Liverpool-Tasie, L., T. Reardon, and B. Belton. 2020. "Essential non-essentials": COVID-19 policy missteps in Nigeria rooted in persistent myths about African food value chains. *Applied Economic Perspectives and Policy*, 43(1): 205–224.
- Liverpool-Tasie, L.S.O., T. Reardon, C.M. Parkhi, and M. Dolislager. 2023. Nigerians in poverty consume little wheat and wheat self-sufficiency programmes will not protect them from price shocks related to the Russia-Ukraine conflict. *Nature Food*, 4(4): 288–293. <https://doi.org/10.1038/s43016-023-00722-z>
- Lokot, M. 2021. Whose voices? Whose knowledge? A feminist analysis of the value of key informant interviews. *International Journal of Qualitative Methods*. 20: 1609406920948775. <https://doi.org/10.1177/1609406920948775>

- Maredia, M., A. Adenikinju, B. Belton, A. Chapoto, N.F. Faye, S. Liverpool-Tasie, J. Olwande, T. Reardon, V. Theriault, and D. Tschirley. 2022. COVID-19's impacts on incomes and food consumption in urban and rural areas are surprisingly similar: Evidence from five African countries. *Global Food Security*. 33: 100633, <https://doi.org/10.1016/j.gfs.2022.100633>.
- Mason, N., T. S. Jayne, and B. Shiferaw. 2015. Africa's rising demand for wheat: Trends, drivers, and policy implications. *Development Policy Review*. 33 (5): 581–613. <https://doi.org/10.1111/dpr.12129>
- McDermott, J., and J. Swinnen, eds. 2022. *COVID-19 and Global Food Security: Two Years Later*. International Food Policy Research Center: Washington, DC. <https://doi.org/10.2499/9780896294226>
- Ministère du Pétrole et des Energies. 2023. Fixant les prix plafonds des hydrocarbures raffinés à la consommation pour du 7 Janvier 2023. Dakar: République du Senegal.
- Ministry of Finance, Ghana. 2020. Ghana Covid-19 Alleviation and Revitalization of Enterprises Support: CARES “OBAATANPA” Programme. Accra: Republic of Ghana. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/<https://mofep.gov.gh/sites/default/files/news/care-program.pdf>
- Morris M., V. Kelly, R. Kopicki, and D. Byerlee. 2007. Fertilizer use in African agriculture: Lessons learned and good practice guidelines. World Bank, Washington, DC.
- Morsy, H., A. Salami, and A. Mukasa. 2020. Opportunities Amid COVID-19: Advancing Intra-African Food Integration. Africa Economic Brief, Issue 11, No. 4. Abidjan, Côte d'Ivoire: African Development Bank.
- Mottaleb, K.A., G. Kruseman, and S. Snapp. 2022. Potential impacts of Ukraine-Russia armed conflict on global wheat food security: A quantitative exploration. *Global Food Security*, 35: 100659. <https://doi.org/10.1016/j.gfs.2022.100659>
- Mwangi, B. (2023, September 3). Blended flour hit the shelves in November. <https://nation.africa/kenya/business/seeds-of-gold/blended-flour-to-hit-the-shelves-in-november-4356058>
- NASA Earth Observatory. 2022. “Worst Drought on Record Parches Horn of Africa.” Accessed at: <https://earthobservatory.nasa.gov/images/150712/worst-drought-on-record-parches-horn-of-africa>.
- NCCP (2021). National Climate Change Policy for Nigeria. https://climatechange.gov.ng/wp-content/uploads/2021/08/NCCP_NIGERIA_REVISIED_2-JUNE-2021.pdf Accessed on 21/9/2023.
- Nhlengethwa, S, P. Thangata, D. Muthini, A. Djido, D. Njiwa, and A. Nwafor. 2023. Review of Agricultural Subsidy Programmes in Sub Saharan Africa: The Impact of the Russia – Ukraine War. AGRA Hub for Agricultural Policy Action Policy Brief 3.
- NSIA (2021a). Nigeria Sovereign Investment Authority. <https://nsia.com.ng/portfolio/presidential-fertilizer-initiative-pfi/> Accessed on 21/7/2023
- NSIA (2021b). Nigeria Sovereign Investment Authority. <https://nsia.com.ng/nsia-signs-landmark-agreements-with-ocp-of-morocco-others-2/> Accessed on 2/10/2023

- Pauw, K., and Thurlow, J. (2022). “COVID-19 impacts on food systems, poverty, and diets: Lessons learned from country-level analyses,” in COVID-19 and Global Food Security: 2 Years Later, eds J. McDermott, and J. Swinnen (International Food Policy Research Institute (IFPRI)). doi: 10.2499/9780896294226_02
- Reed, C., Anderson, W., Kruczkiewicz, A., Nakamura, J., Gallo, D., Seager, R., & McDermid, S. S. (2022). The impact of flooding on food security across Africa. *Proceedings of the National Academy of Sciences*, 119 (43), e2119399119. <https://doi.org/10.1073/pnas.2119399119>
- Reuters (2022). Nigeria buys emergency Canadian potash to replace lost Russian supply <https://www.reuters.com/world/africa/exclusive-nigeria-buys-emergency-canadian-potash-replace-lost-russian-supply-2022-05-03/> Accessed on 2/2/2024.
- Rödl and Partner. (2022, March 27). COVID-19: Kenya’s Tax and Economic Measures <https://www.roedl.com/insights/covid-19/corona-kenya-tax-economic-measures>
- Rose, A., Z. Chen, and D. Wei. 2023. The economic impacts of Russia–Ukraine War export disruptions of grain commodities. *Applied Economics Perspectives and Policy*, 45: 645–665. <https://doi.org/10.1002/aep.13351>
- Silva, J. V., M. Jaleta, K. Tesfaye, B. Abeyo, M. Devkota, A. Frija, I. Habarurema, B. Tembo, H. Bahri, A. Mosad, G. Blasch, K. Sonder, S. Snapp, and F. Baudron. 2023. Pathways to wheat self-sufficiency in Africa. *Global Food Security*, 37, 100684. <https://doi.org/10.1016/j.gfs.2023.100684>
- Strand, J. 2013. “Political Economy Aspects of Fuel Subsidies: A Conceptual Framework.” Policy Research Working Paper 6392, World Bank, Washington, DC.
- The East African. (2022, December 16). Kenya waives import duty on maize, rice for six months to avert crisis. <https://www.theeastafrican.co.ke/tea/business/kenya-waives-import-duty-on-maize-rice-4056898>
- United Nations Statistics Division. 2022. “UN Comtrade Database.” <https://comtrade.un.org/data/>.
- Voice of Nigeria, (2022). National Flood Emergency Response Plan for Nigeria. <https://von.gov.ng/nigerian-government-approves-national-flood-emergency-response-plan/> Accessed on 28/8/2023.
- Wineman, A., N. Mason, J. Ochieng, and L. Kirimi. 2017. Weather extremes and household welfare in rural Kenya. *Food Security*, 9 (2): 281–300.
- World Bank. 2023a. Atlas of Social Protection Indicators of Resilience and Equity (ASPIRE). Accessed at: <https://www.worldbank.org/en/data/datatopics/aspire>
- World Bank. 2023b. Commodity Prices: Pink Sheet Data. Accessed at: <https://www.worldbank.org/en/research/commodity-markets>
- World Bank. 2023c. World Development Indicators. Accessed at: <https://databank.worldbank.org>
- World Economic Forum. 2023. *Global Risks Report 2023*. Geneva. Accessed at: https://www3.weforum.org/docs/WEF_Global_Risks_Report_2023.pdf
- World Meteorological Organization (WMO). 2023. State of the Climate in Africa 2022. WMO-No. 1330. Accessed at:

https://library.wmo.int/viewer/67761/download?file=1330_State+of+the+Climate+in+Africa+2022_en.pdf&type=pdf&navigator=1

Annex

Annex 1: Country-Level Technical Reports

- Agyei-Holmes, A., N. A. Asante-Poku, D. A. A. Ankrah, and O. Boapeah. 2023. Experiences and Policy Responses in Ghana to Price Shocks Stemming from the Russia-Ukraine War and Other Global Crises. Accra: Institute of Statistical Social and Economic Research.
- Fall, M. G., C. S. Fall, and O. Diouf. 2023. Review of political responses in Senegal to global crises (Covid-19 & Russo-Ukrainian War). Dakar: Bureau d'analyses macro-économiques (BAME) de l'Institut sénégalais de recherches agricoles (ISRA).
- Kirimi, L., J. Langat, and J. Olwande. 2023. Experiences and Policy Responses in Kenya to Price Shocks Stemming from the Russia-Ukraine War and Other Global Crises. Nairobi: Tegemeo Institute of Agricultural Policy and Development, Egerton University.
- Mpenda, Z., R. N. Kayaga, J. Kangile, V. Mpunde, and A. Aku. 2023. Experiences and Policy Responses in Tanzania to Price Shocks Stemming from the Russia-Ukraine War and Other Global Crises. Morogoro: College of Economics and Business Studies (CoEBS), Sokoine University of Agriculture.
- Mutandwa, E., S. Siziba, and E. Mwakiwa. 2023. Experiences and Policy Responses in Zimbabwe to Price Shocks Stemming from the Russia-Ukraine War and Other Global Crises. Harare: Department of Agricultural Business Development and Economics, University of Zimbabwe.
- Ogunbayo, I., A. Adekoya, O. Akano, B. Oyelami, N. Olutegbe, E. Enya, P. Aburime, M. Adediran, M. Fawole, and B. Olorunkoya. 2023. Experiences and Policy Responses in Nigeria to Price Shocks Stemming from the Russia-Ukraine War and Other Global Crises. Ibadan: Innovation Lab for Policy Leadership in Agriculture and Food Security, University of Ibadan.

Annex 2: Key Informants

Country	Ministry/Organization/Affiliation	Category
Ghana	MoFA (Directorate of Crop Services)	National government*
	MoFA (District Crop Officer)	Regional or local government
	West Africa Centre for Crop Improvement (WACCI), UG	Research/Academia
	Crops Research Institute (CSIR)	Research/Academia
	Ayawaso West Municipal Assembly	Regional or local government
	Dizengoff Ghana	Development partners
	Agromonti	Private sector
	Peasant Farmers Association, Ghana (PFAG)	Private sector
	Ghana Fertilizer Platform	Development partners
	African Fertilizer and Agribusiness Partnership (AFAP)	Development partners
Kenya	State Department of Crops	National Government
	Policy consultant	Private sector
	Kenya National Farmers' Federation (KeNAFF)	Civil Society
	Cereal Trader - Kenya-Uganda border	Private Sector
	Mitumba (Secondhand clothes) trader/Tailor	Private sector
	Cereal trader - Kenya-Tanzania border	Private Sector
	Cereal Trader Kenya-Uganda border	Private Sector
	Cereal traders of one cross border Sacco	Civil society
	Fish traders Kenya-Uganda border	Private Sector
	Mitumba traders of Cross border traders Sacco. Kenya-Uganda border	Civil society
	Fresh fruits traders - Kenya-Uganda border	Private Sector
	Fresh food traders Kenya- Uganda border	Private Sector
	Trader (One cross border group member) Kenya-Uganda border	Private Sector
	Orange Fruits wholesaler - Kenya-Tanzania border	Private Sector
	Rice Trader - One cross border trade. Kenya-Tanzania border	Private Sector
	Watermelon trader. Kenya-Tanzania border	Private Sector
	Poultry trader - Kenya-Uganda border	Private Sector
	Onion wholesaler. Kenya-Tanzania border	Private Sector
	Cereal trader. Kenya-Tanzania border	Private Sector
	Broker. Kenya-Tanzania border	Private Sector
Transporter. Kenya-Tanzania border	Private Sector	
Fish trader. Kenya-Uganda-Congo border points	Private Sector	
Nigeria	Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	Nigeria Customs Service	National government*
	Central Bank of Nigeria	National government*

Country	Ministry/Organization/Affiliation	Category
	Weights and Measures, Federal Ministry of Industry, Trade and Investment (FMITI)	National government*
	Weights and Measures, Federal Ministry of Industry, Trade and Investment (FMITI)	National government*
	Weights and Measures, Federal Ministry of Industry, Trade and Investment (FMITI)	National government*
	Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	Farm Input Support Services Department / Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	Farm and Infrastructure Foundation (FIF)	Civil society
	Doing What Works Initiative (DWWI) a National Assembly Based NGO	Civil society
	All Farmers Association of Nigeria (AFAN)	Private sector
	Potato Farmers, Association of Nigeria (PoFAN)	Private sector
	Agricultural Research Council of Nigeria (ARCN)	National government*
	Agricultural Research Council of Nigeria (ARCN)	National government*
	Food and Strategic Reserve Department, Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	Sorghum/Millet Association of Nigeria	Private sector
	Nigerian Agricultural Insurance Corporation (NAIC)	National government*
	Nigeria Institute of Soil Science (NISS)	National government*
	Federal Ministry of Finance, Budget & National Planning	National government*
	Department of Agric. Extension, Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	All Farmers Association of Nigeria/ Farmers First Initiative	Private sector
	Fertilizer Producer Suppliers Association of Nigeria (FEPSAN)	Private sector
	International Fertilizer Development Centre (IFDC)	Development partners
	Standards Organization of Nigeria (SON)	National government*
	National Agency for Food, Drugs Administration and Control (NAFDAC)	National government*
	Department of Chemical and Non-Petro Chemical, Federal Ministry of Industry, Trade and Investment (FMITI)	National government*
	Federal Department of Agriculture, Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	Department of Agricultural Land and Climate Change Management Services, Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
	International Fertilizer Development Centre (IFDC)	Development partners
	National Agricultural Land Development Authority (NALDA)	National government*

Country	Ministry/Organization/Affiliation	Category
	Private Consultant on Fertilizer Use by Crops in Nigeria (FUBC)	Private sector
	Federal Department of Agriculture, Federal Ministry of Agriculture and Food Security (FMAFS)	National government*
Senegal	Conseil National Interprofessionnel de la Pêche Artisanale au Sénégal (CONIPAS)	Civil society
	Conseil National de Concertation et de Coopération des Ruraux (CNCR)	Civil society
	Sahélienne d'Entreprise de Distribution en Agro Business (SEDAB)	Private sector
	Association des Consommateurs	Civil society
	Agence de Régulation des Marchés (ARM)	National government*
	Ministère de l'Agriculture	National government*
	Ministère Élevage	National government*
	Ministère Économie	National government*
Tanzania	Ministry of Agriculture (MoA)	National government*
	Ministry of Energy (ME)	National government*
	YARA Fertilizer Tanzania	Private sector
	AMSONS Group Limited	Private sector
	Agriculture Council of Tanzania (ACT)	Civil society
	Tanzania Fertilizer Regulatory Authority (TFRA)	National government*
	Camel Wheat Flour Limited	Private sector
Zimbabwe	Fertilizer and Farm Feeds Remedies Institute	Research/Academia
	Chemistry and Soil Research Institute	Research/Academia
	Chemistry and Soil Research Institute	Research/Academia
	Agricultural Advisory and Rural Development Services	Private sector?
	Strategic Policy Planning and Business Development	National government*
	Ministry of Lands, Agriculture, Fisheries, Water and Rural Development (MLAFWRD)	National government*
	Agricultural Engineering, Mechanization and Soil Conservation	Private sector?
	Policy Planning	National government*
	Zimbabwe Farmers Union	Private sector
	Policy Planning	National government*
	Commercial Farmers' Union	Private sector
	Business Development, Markets and Trade	National government*
	Business Development, Markets and Trade	National government*
	Policy Planning Unit	National government*
	University of Zimbabwe	Research/Academia
	Policy Planning	National government*
	Consumer Council of Zimbabwe	Civil society
	Ministry of Industry and Commerce	National government*
	Consumer Council of Zimbabwe	Civil society

*National government is inclusive of representatives of government agencies.

Annex 3: Interview Guide

The following interview guide was used in semi-structured interviews with policy makers and other key stakeholders to gauge their understanding of, and perspective on, their country's policy responses to recent shocks.

- In your view, what have been the most important policies and policy responses to the recent crises, including the Russia-Ukraine War?
 - Confirm that our list is comprehensive.
 - Probe for both new policies formed in response to the crises, and for pre-existing policies that were relevant for how the country fared when faced with these shocks.
- For each policy noted:
 - What was the timeline?
 - What was the rationale or motivation for the policy response?
 - Can you describe the process of designing and introducing this policy response? [*May not be relevant for all interviewees.*]
 - Who pushed for this policy response? Who opposed it?
 - Can you describe the experience of implementing this policy response? [*May not be relevant for all interviewees.*]
 - What have been the impacts/effects of this policy response (both positive and negative)?
 - Who do think were the winners and losers of the indicated policy? (e.g., consumers, farmers, workers, importers, exporters, retailers, etc.)
 - Can you describe the experience of interacting with this policy response? How has it affected your work and your livelihood? [*May not be relevant for all interviewees.*]
 - Would you describe it as a short-, medium-, or long-term response?
 - What are the policy's strengths, and what are its limitations?
 - Overall, would you characterize it as a success?
- What do you think the country could have done differently to better prepare for shocks such as the Russia-Ukraine War?
- Have these shocks brought any positive outcomes in this country? In what way?