SERA BORA PROJECT

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THE TRIPLE IMPACT OF CLIMATE CHANGE, THE POST-COVID-19 PANDEMIC, AND THE RUSSIAN - UKRAINE WAR ON TANZANIA'S FOOD SECURITY

Policy Implications and Recommendations

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1. Introduction

Currently, the Eastern and Southern Africa region is facing climate change threats. This is evidenced by the record high temperatures, delays in rainfall seasons, frequent droughts, and floods. These challenges have been accentuated by locust outbreaks, Covid-19 (rising oil prices, global inflation, and supply chain constraints), and the Russia-Ukraine war, all putting pressure on food prices, inflation, and the fiscal balance. Tanzania's problematic commodities have been petroleum, fertilizer, wheat, and edible oil.

Food contributes the largest share (60%) of the household budget, especially in rural areas (NBS, 2020). The rise in fertilizer and food prices is a major concern to the public and threatens to drive many households into poverty, food insecurity, and malnutrition. Currently, 24% of Tanzanian households have incomes below the national poverty line, and about 32% of under-five children are stunted (TNNS, 2018)[1].

2. Climate Change

2.1 Climate Change Trend

Climate change models for Tanzania have predicted (Luhanga et al., 2018):

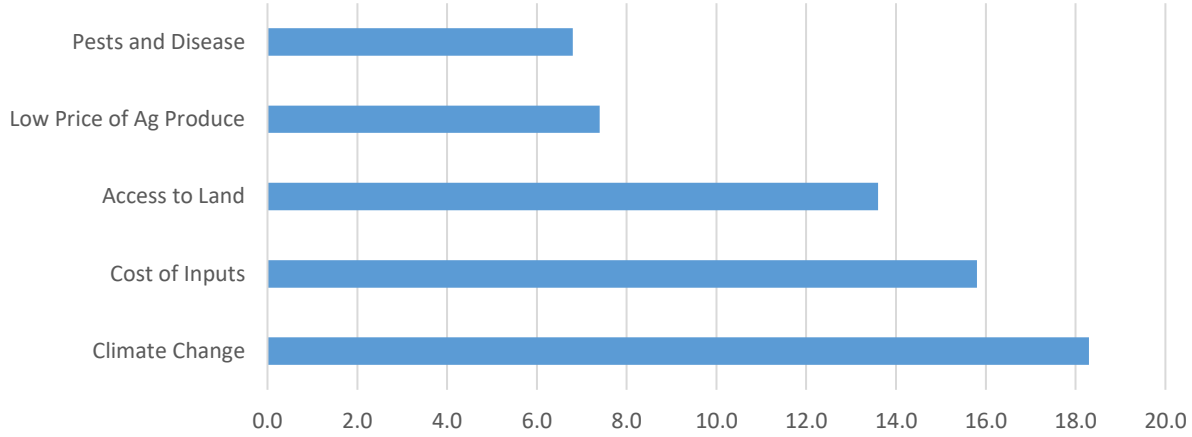
- Increase in maximum temperatures to a range of 2 to 2.4°C in the western parts of the country, southwestern highlands, and the eastern parts of Lake Nyasa
- Increase in minimum temperatures to a range of 1.6 to 2.2 °C on the western side of Lake Victoria basin and parts of northeastern highlands (Ngorongoro), western, central, southwestern, and northeastern highlands
- Increase in countrywide rainfall except in the western regions and southwestern highlands, where the projections are expected to decrease by 0.5 to 1 mm/day

In recent years, Tanzania has witnessed the impact of climate change. For example, in 2019, according to the Tanzania Meteorological Authority (TMA), Tanzania recorded high rainfall that had not been witnessed since 1970, with a mean annual rainfall of 1283.5 mm, which is equivalent to 125% of the long-term average (1981-2010). During the same year, the mean annual temperature was 23.8 °C, which was 0.8 °C warmer than the long-term average. In November 2021, TMA reported average temperatures above 35°C in several parts of the country. Furthermore, the dwindling of Mount Kilimanjaro glaciers and snowcaps has been well documented in various research reports.

[1] Tanzania National Nutrition Survey 2018

In the recent 2019/20 agricultural census, farmers were asked to identify key constraints to agricultural productivity; climate change was the most frequently mentioned constraint (NBS, 2021).

Figure1 :Tanzania Agricultural Census 2019/20: Major Constraints to Agricultural Productivity



2.2 Weather Conditions and Outlook

Weather changes significantly impact the agricultural sector, disrupting food production systems, affecting the quality of food being produced, and ultimately compromising the yield. The TMA recently issued early warnings that long rains for the 2021/2022 season are likely to be below average, with expected prolonged dry spells in most areas. Severe soil moisture depletion is anticipated in many unimodal regions, potentially affecting crop growth (TMA, 2021)[2]. Besides that, high temperatures combined with low humidity create optimal conditions for fire outbreaks, particularly in coastal areas and wind-prone mountain areas.

It is estimated that up to 20 million people in the Horn of Africa (Ethiopia, Somalia, Djibouti, Kenya, and Uganda) will require food assistance by mid-2022. This is due to the impact of drought caused by the Indian Ocean Dipole and La Nina, conflict, insecurity, and economic challenges (FEWS NET 2021)[3].

Despite Tanzania being food self-sufficient for the past two decades and growing conditions for staples being favorable, average yields remain low. For example, maize and rice productivity averages about 2 tons/ha. On the other hand, staple crop consumption in the country has steadily increased over the last decade, owing primarily to population growth and increased use of maize as a raw material for

[2] Seasonal Weather Forecast. |Tanzania Meteorological Authority
[3] Worsening drought threatens Horn of Africa. East Africa - Alert: Wed, 2021-10-27 | Famine Early Warning Systems Network (fews.net)

animal feed. Furthermore, most countries in the East and Southern Africa region import maize and rice from Tanzania, creating intra-regional trade opportunities. It is estimated that approximately 30% of all maize and rice produced in the country is marketed.

A lorry carrying maize to a neighboring country

It is important to note that a 20 – 25% surplus is very menial, and any shock could result in a food shortage. For example, the Ministry of Agriculture's (MoA) Food Security Department indicated that approximately 17 Local Government Authorities (LGAs) in eight regions could face food shortages at various intervals during the 2021/2022 season (MoA, 2021[4]). Additionally, the predictability of food availability has become more complex in recent years because of climate change, which has resulted in droughts and floods, frequently associated with El Nino and La Nina effects. As markets become more regionally integrated (via EAC and SADC), price shocks caused by food deficits in neighboring countries may be transmitted to Tanzanian markets.

3. Food Prices

3.1 Domestic Food Availability and Price Trend

On average, Tanzanians spend over 50% of their incomes on food, making food prices impact their food security, nutrition, and poverty status (Household Budget Survey, 2018). The food budget share for rural areas is 63.2% and 52.6% for urban areas. The dependence ratio for fertilizer (90%), wheat (90%), and edible oil (60%) is relatively high, leading to an increase in the vulnerability of these value

[4] Food Security Report, Ministry of Agriculture (kilimo.go.tz)

chains to the whims of global food prices. Table 2 depicts the CIF value of imports to consumers' expenditure on purchased food.

Table 2: Ratio of CIF Value of Imports to Consumer Expenditure on Purchased Food, by Food Commodity Group by Country (average, 2008-2012)

Commodity Groups	Rwanda	Mozam-bique	Nigeria	Zambia	Uganda	Tanzania	Malawi
	---------- Percentage ----------						
Wheat and Rice	54	74	13	9	52	29	47
All Other Cereals	22	32	3	7	11	6	6
Pulses	4	1	0	8	0	1	0
Roots and Tubers	1	4	0	3		0	1
Oilseeds	43	103		58	128	57	35
Fruit	5	10	4	17	8	3	5
Vegetables	39	21	4	22	9	4	9
Poultry & Eggs	15	19	1		5	2	2
Other Meat	7	12	1	4	1	1	1
Dairy	8	191	18	30	5	5	21
Fish	20	15	1	5	1	1	1
Other Food	45	32	12	20	20	12	8
Overall	22	36	6	13	16	11	11

Source: Andrea Allen et al. (2016), Agri-Food Youth Employment and Engagement Study, MSU/MCF

Table 3 summarizes the statistics on import dependency and the recent 12-month price increase in global and domestic markets.

Table 3: Tanzania's Import Dependency and Global and Domestic Price Increase During the Past One-Year, April 2021- April 2022

Commodity	Import Dependency (%)	Import Volume (in tons) (2020)	Import Value (US $) (2020)	Global Price Increase (%) in One Year 2021 - 2022	Tanzania Price Increase (%) in One Year - 2021 - 2022
Fertilizer	90	530,000	$186 million	80	80
Wheat	90	1.2 million	$220 million	50	Wheat 43 Maize 40 Rice 34
Edible Oil	60	365,000 tons	$270 million	50	30
Oil/Petroleum	100	3.6 billion liters	$ 1.3 billion (2020) Down from $4.2 billion (2013)	80	80

3.1.1 Domestic Wholesale Price Change Over 1-year: April 2021 – April 2022

In April 2022, wholesale prices for major staple food crops rose and fell at varying rates compared to March. For instance, the price of wheat, maize, and rice increased by 10%, 3.4%, and 2.1%, respectively, while the cost of dry beans decreased marginally by 0.5% (Figures 2-5). Staple food prices remained significantly higher than a year ago, in which wheat, maize, rice, and beans prices increased by 43%, 40%, 34%, and 4%, respectively. Similarly, prices remained higher than their five-year April average. Prices are expected to ease slightly due to increased supplies from the June to July harvest. Comparative lower prices in Tanzania are expected to drive more supplies to regional markets where prices are projected to be high.

Furthermore, domestic retail cooking oil prices continued to rise monthly. For example, between March 2021 and March 2022, the average cost of double refined sunflower oil and palm oil increased by about 30% (Figure 6).

The National Bureau of Statistics [5] indicated that rice, sorghum grains, maize, wheat flour, maize flour, bread, cooking oils, fruits, sweet potatoes, and cassava flour were among the foods that contributed to an increase in food inflation[6] between March and April 2022.

Figure 2: Domestic maize price trend, April 2021/2022

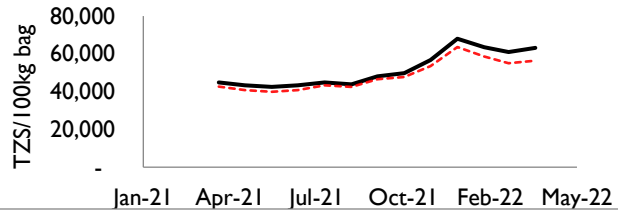


Figure 3: Domestic rice price trend, April 2021/2022

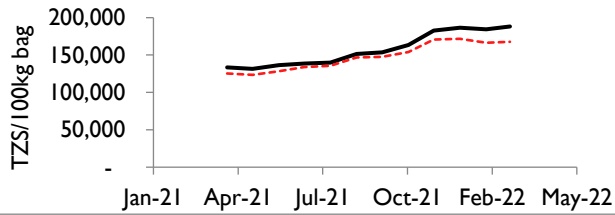


Figure 4: Domestic wheat grains price trend, April 2021/2022

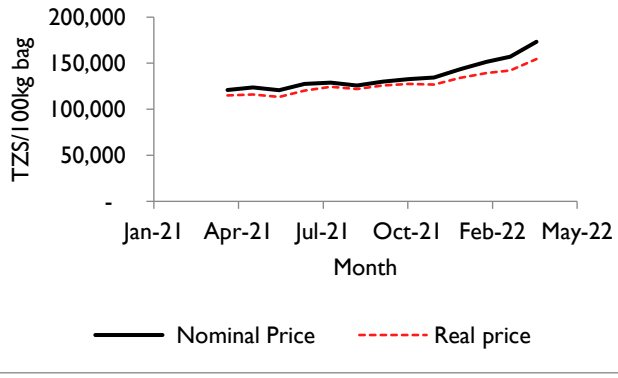
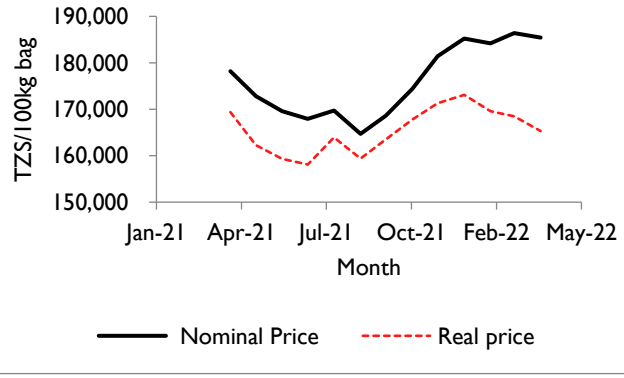


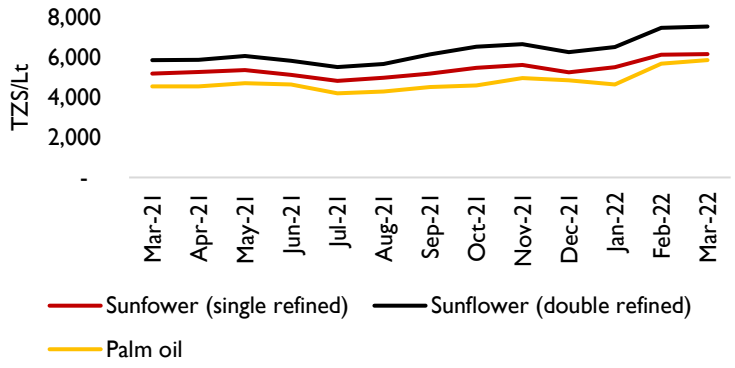
Figure 5: Domestic dry beans price trend, April 2021/2022



[5] National Bureau of Statistics

[6] Figures 2-6: Source: Ministry of Investment, Industry and Trade (MIIT)

Figure 6: Domestic cooking oil price trend, March 2021/2022



Prices for food crops, particularly maize, rice, beans, sorghum, millet, and round potatoes, are still low compared to prices observed last year and over five years. However, these prices rose significantly from October 2021. For example, in March 2022, prices for rice, maize, round potatoes, and dry beans increased by 32, 26, 12, and 5 percent, respectively, compared to March prices in 2021. Below is a ten-year time series data showing the rise in the country's prices of major food crops.

3.1.2 Ten-year Average Wholesale Price Trend of Major Food Crops in Tanzania

Figure 7: Nominal Maize Wholesale Price Trend in Tanzania

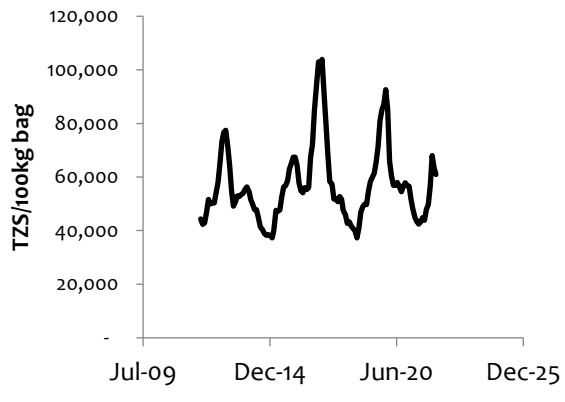
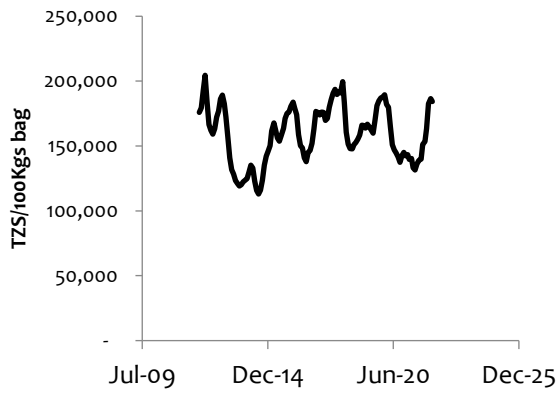
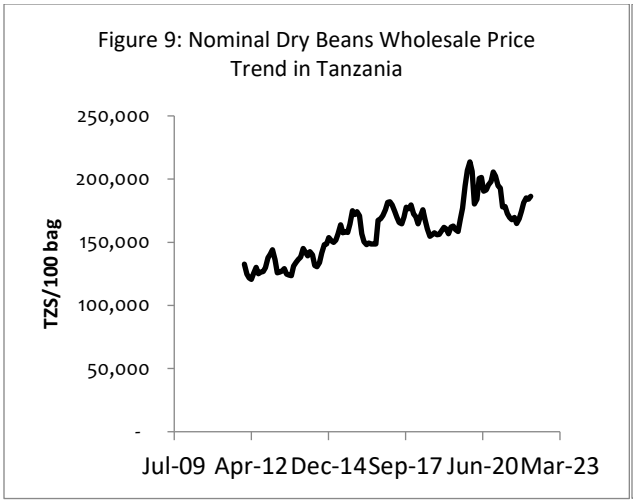
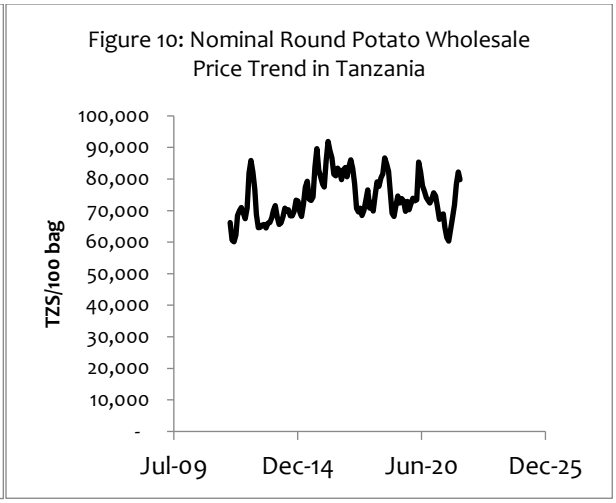


Figure 8: Nominal Rice Wholesale Price Trend in Tanzania







Source: Calculated from MIIT price dataset

3.2 Wheat

Tanzania imports about 1.2 million tons of wheat annually, of which 90% is from Russia. During the past 12 months, the price of wheat has increased by 78%. Wheat contributes 25% of all popular cereals in the market. Other cereals are maize (2 million tons) and rice (1 million tons). Wheat products are widely consumed, even in rural areas. The price increase of wheat is a concern to consumers. During the past 12 months, wheat imports have declined from 1.2 million tons to 1 million tons.

Policy options to mitigate the price increase of wheat:

- Reduce import tariff from 25% to 10 -15%
- Introduce new wheat flour products by blending wheat with cheaper cassava, sorghum, or millet flour
- Promote domestic production in the medium term

3.3 Edible Oil

Tanzania imports over 60% of edible oil (400,000 tons) annually. In 2020 the oil import bill was $270 million. Tanzania imports edible oil from Malaysia. During the past 12 months, the global oil price has increased by 72%. Since 2017, the Government of Tanzania (GoT) embarked on promoting the production of oilseeds, especially sunflower, and providing incentives for oil processors to reduce dependency on edible oil imports. Concurrently, the Government increased import tariffs on refined

and semi-refined oil from 20 to 30%. Currently, the Government is considering reducing the edible oil import tariff to ease domestic prices.

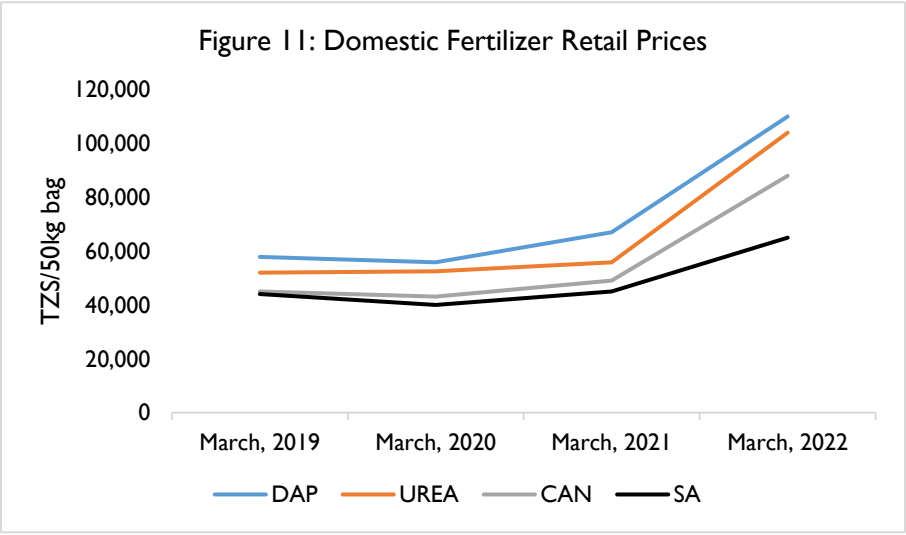
Policy options to mitigate edible oil price:

- Relax import tariff from the current 25-30% to 15%
- Substitute cheaper palm oil for more expensive sunflower oil
- Promote production of the oilseed in the mid-term

4. Fertilizer Prices

The fertilizer price increased dramatically in the past 12 months (Figure 11). The retail prices of Urea and DAP increased by 86% and 64%, respectively, between March 2021 and March 2022. Similarly, the cost of CAN and SA fertilizer increased by 80% and 44%, respectively. Tanzania imports over 90% of its fertilizer. During the past three years, annual fertilizer import was 770,000 tons, of which 530,000 are for the domestic market, and 250,000 are re-exported to land-locked countries. The fertilizer import bill for 2020 was $186 million.

Figure 11: Domestic Fertilizer Retail Prices



Source: TFRA[7]

Only 21% of farmers use chemical fertilizer (2020/21 Agriculture Census). That is 1.7 million farmers out of 8 million. The area fertilized is one million hectares out of 16.5 million hectares (6.25%).

[7] Tanzania Fertilizer Regulatory Authority

Fertilizer is predominantly applied to crops such as maize, rice, tobacco, horticulture, coffee, and a few others. The intensity of fertilizer application in Tanzania is relatively low, with 16.6 kg per hectare reported in 2016. This is far below the Abuja declaration target of 100kg/ha or China (503kg/ha). A subsidy would be a fiscal burden given the current threat to the fiscal balance; however, there is a chance that the rising food prices might offset the cost of fertilizer. Over-reaction might cause more damage than addressing the situation. A communication strategy to prepare farmers and consumers psychologically might help manage expectations.

Overall, climate change seems to be a greater threat to food security than the rising cost of fertilizer.

A proposed mid-term strategy would include:

- Promoting competition in the fertilizer sector
- Positioning Tanzania as a regional hub for fertilizer trade
- Promoting investment in fertilizer manufacturing

ASPIRES is currently assisting the Ministry in drafting the Fertilizer Industry Strategy.

The private sector seems to be holding stocks in expectation that prices will continue to increase; hence we recommend an open public-private partnership dialogue rather than enforcing fees. The government considers providing a 30% subsidy to fertilizer based on Dar es Salaam ex-warehouse prices. The challenge would be the risk of fertilizer being re-exported to neighboring countries and ensuring that the price relief would trickle down to farmers. Another option the Government considers is establishing a revolving fund that would guarantee farm input credit to farmers.

5. Oil and Energy Prices

The global price of oil has increased by over 80% in the past 12 months. The global price increase is reflected in the domestic pump price. An oil price increase has multiple implications on the domestic prices of goods and services. Firstly, in the transport of farm input and secondly in the transport cost for agricultural produce, where transport cost is the major cost item in the supply chain.

The price of fuel and diesel in Dar-es-Salaam, Tanzania (12 May 2022)

Overall, the rise in oil prices has accelerated inflation. For example, Tanzania's annual inflation has currently increased from 3% pre-Covid to 5%. Potentially, the inflation rate might accelerate due to the triple effect of climate change, Covid-19, and the Russian-Ukrainian War.

6. Policy Implications, Recommendations, and Conclusions

Tanzania's food security is critical to the country's economic development. Prolonged global supply disruptions and rising inflation is causing an increase in commodity prices, particularly for import

substitution commodities such as wheat, edible oil, sugar, and farm inputs (fertilizer). Furthermore, the weather forecast warns of potential food shortages that will lead to further price increases in the region. While domestic food security is critical, Tanzania should also consider regional food demand as a market opportunity because of its interdependence with its neighbors.

The Government must remain vigilant and ready to act if any of the above scenarios occur. The following are some of the measures that the Government could take to manage the current situation: First, the Government should continue to support the National Food Reserve Agency (NFRA) in increasing its storage capacity to purchase food crops from farmers. For the time being, NFRA should refrain from selling its stock and instead monitor the regional situation. Second, the Government should keep its borders open by allowing the Cereal and Other Produce Board (CPB) and the private sector to export food crops. Third, in response to the TMA's weather forecast of high temperatures, the responsible Ministry should collaborate with Tanzania Forest Services to raise community awareness about the importance of having firebreaks to reduce the risk of fire on farms and forests.

Table 4: Author's Overall Perception of Food Insecurity Risk in Tanzania is "Moderate" if the Triggers Would Not Persist

Threat	Concerns	Level of Food Insecurity Risk	Reasons	Potential Mitigation Measures
Climate Change	▪ Agriculture rainfed 94% ▪ 61% of the population in agriculture	**Moderate**	▪ In normal years food surplus is about 5-20% (might wipe out the surplus) ▪ Diverse food systems ▪ Uni-modal rain system is stable – two-thirds of the food supply	▪ Scale-up food storage capacity ▪ Reduce post-harvest losses ▪ Improve productivity ▪ Promote irrigation and climate-smart agriculture
Fertilizer Price	▪ Could worsen the existing low productivity (1-1.5 tons/ha for cereals) ▪ Increased vulnerability to market interventions, e.g., fertilizer price fixing ▪ Fertilizer imports $180 mil and 530,000 tons (2021)	**Low**	▪ The fertilizer price increase could be offset by rising food price ▪ Current Agriculture production is not input-intensive (20kg/ha) ▪ Fertilizer adoption rate is low - 21% of farmers; Inorganic fertilizer is applied to 6.25% of cultivated farmland	▪ Fertilizer stabilization fund ▪ Improve enabling environment to position Tanzania as a regional hub for fertilizer trade and manufacturing ▪ Promote investment in fertilizer manufacturing

Food Prices	▪ Could worsen child malnutrition (Stunting 24%; Wasting 35% in 2020) ▪ Households are increasingly dependent on food markets ▪ Highly vulnerable populations living on marginal land and the urban poor ▪ Increased vulnerability to market interventions	**Moderate**	▪ The majority of households spend over 50% of their incomes on food ▪ One of the drivers of inflation ▪ May exacerbate the impact of reduced purchasing power from Covid-19 ▪ Diversified food basket	▪ Promote import substitutions for major imports – wheat, edible oil, sugar ▪ Designate western region cluster – Rukwa, Katavi, and Kigoma for maize, soybean, sunflower, wheat, and barley ▪ Promote safety net - TASAF
Energy Prices	▪ Tanzania is dependent on oil and fertilizer import ▪ Impacts production cost – farm and industrial level ▪ Fiscal pressure	**High**	▪ Impacts both farm input (fertilizer) and transport cost for farm input and agricultural produce ▪ One of the drivers of inflation	▪ Expedite the harnessing of Tanzania's natural gas and hydro energy ▪ Energy diversification - leverage solar and wind energy ▪ Railway and waterways as an alternative transport to road

7. References

1. The cover image: retailer at the Kisutu market wearing a mask and holding a sanitizer bottle.

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