

## Welfare impacts of seasonal maize price fluctuations in Malawi

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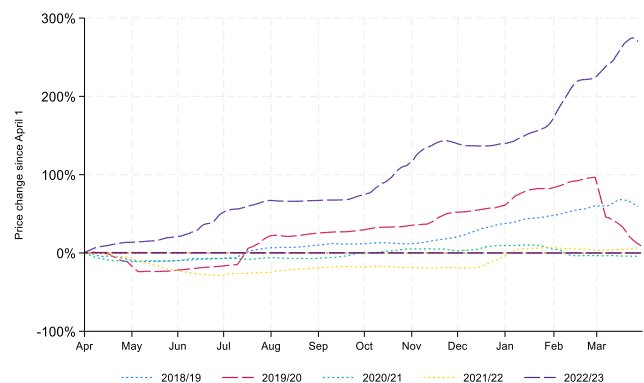
### Key Messages

- Maize prices fluctuate significantly throughout the year in Malawi, creating winners and losers depending on who is selling and who is buying the staple at what times of the year.
- This research links maize market price data to nationally and temporally representative household survey data on maize sales and purchases to quantify welfare gains and losses from price changes throughout the year.
- Our analysis shows that fully stable maize prices would result in a modest overall economic benefit over a year but would significantly reduce hunger in the lean season by about 185 million person-days.
- The study recommends that the government should ensure that maize market interventions are guided by predictable rules and procedures to build the confidence of farmers, traders, and investors in the functioning of the markets, which in turn would promote production, trade, and investment.
- The government should also improve the timing of purchases (after harvest) and sales (during the lean season) to stabilize prices and save public funds.
- Promoting off-farm income-generating activities at harvesting time will address cash shortages in farming households and encourage home storage of maize which can potentially stabilize maize prices.

### Introduction

In Malawi, the price of maize, the staple food, varies greatly throughout the year (Figure 1). This seasonal fluctuation affects different groups in various ways, creating winners and losers depending on who benefits and suffers from high and low prices. These variations are not just random occurrences but are deeply rooted in the natural cycle of rainfed agricultural production, which dominates the farming landscape in Malawi.

**Figure 1: Maize price seasonality (2018/19-2022/23)**



Source: Authors' computations using IHS data

This research links data on maize market prices with comprehensive household survey data, to assess the impact of intra-year maize price fluctuations on the welfare of Malawians. We found that these regular price changes lead to about 185 million person-days of hunger annually, which implies an average of 10 days of hunger per person per year. Remarkably, if maize prices were stabilized throughout the year, not only would the overall economic surplus in Malawi increase modestly, but more importantly, there would be a significant reduction in hunger, especially during the lean season.

### **Data**

We utilized two primary data sources for this analysis. The main source was the fifth Malawi Integrated Household Survey (IHS5), conducted by the National Statistical Office from April 2019 to April 2020. This comprehensive survey covered 11,434 households, ensuring national representation across various regions, urban and rural areas, and districts. The timing of data collection was spread throughout a calendar year, which allows for detailed insights into seasonal consumption patterns of Malawian households. Specifically, IHS5 collected data on household consumption of various food items over the past week, including the total quantity of each food item obtained through purchases, own production, or gifts. For each food item consumed by the household, we know the total quantity consumed from three sources: from purchases, from own production, gifts, or other sources.

### **Methods**

We combined the market price data with survey data that represented national and seasonal patterns of maize sales and purchases. To analyze how stabilizing maize prices might impact food security in Malawi, we impose a scenario where maize prices are held fixed (at the median price for the year) and then estimate changes in sales values and maize consumption and expenditures for each month at the fixed price. This allows us to calculate the monetary welfare gains and losses for households resulting from the seasonal changes in maize prices using the 'net benefit ratio' method, which measures the difference between what people earn from selling maize and what they spend on buying it throughout the year, relative to their household expenditures. We also estimate how changes in maize prices could translate into changes in the amount of food (in terms of energy intake) that households could afford. Thereby estimating seasonal changes in hunger from consumers' ability to purchase maize at lower (fixed) prices during the lean season.

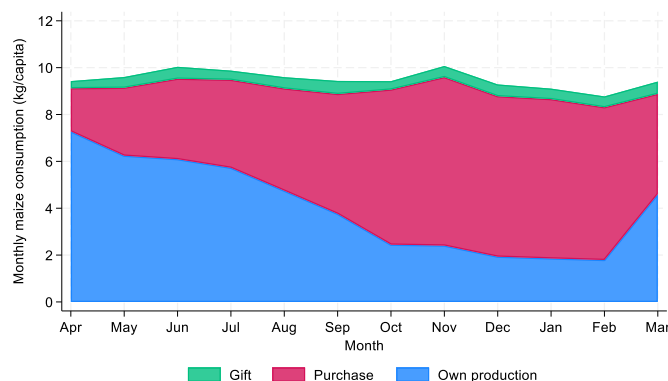
### **Results**

#### *Seasonality in maize consumption*

Malawian households consume between 9 to 10 kilograms of maize per person each month, translating to an average daily intake of about 1100 calories from maize alone. This fact underscores the central role of maize in the Malawian diet and its importance for daily energy needs. Yet, maize consumption from different sources varies across the year (Figure 2).

Overall consumption, reaches its lowest point during the lean season, which starts in December and lasts until February, dropping by approximately 10% from the levels maintained between June and November.

**Figure 2: Seasonality in maize consumption by source**



Source: Authors' computations using IHS data

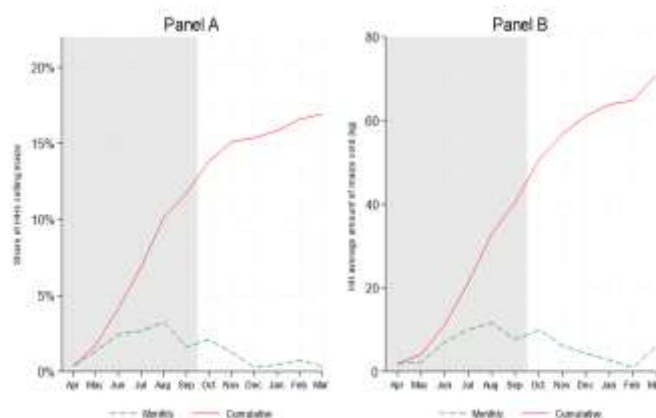
Following the harvest in April, a large portion of maize consumed is self-produced, with households consuming about 7.2 kilograms of their own maize per person per month. However, this amount decreases to just 1.9 kilograms per person during the lean season. Conversely, maize purchased from markets increases substantially during the lean season, peaking at 6.8 kilograms per person, then decreasing to 1.8 kilograms post-harvest. Maize obtained through gifts or other means remains a minor and constant contribution throughout the year.

### *Seasonality of maize sales and purchases*

While a large majority of Malawian households consume maize, and 74% grow it, only 16% sell any of their maize production. The sale of maize by

Malawian farmers begins in April, increases until November, and then plateaus (Figure 3).

**Figure 3: Maize sales by Malawian households by month in 2019/20**



Source: Authors' computations using IHS data

This pattern indicates that the welfare impacts of maize sales are limited to a small proportion of households. However, the significant number of households that are net buyers of maize means that the broader impacts of maize price fluctuations are substantial. The large volume of maize purchases in total consumption and the limited number of households selling maize suggest that price fluctuations can have significant effects, particularly on households that rely on buying maize.

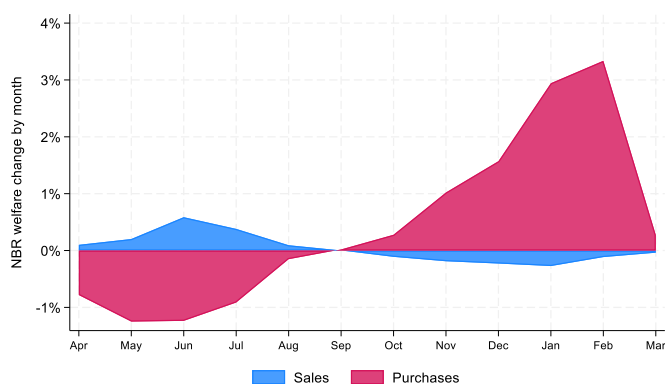
### *Welfare impacts of seasonal maize price fluctuations*

Figure 4 plots the NBR for each month. We see that at the peak of the lean season, a lower price of maize would result in just over 3% monetary welfare gain, on average. For the poor, who start from a lower consumption base, the welfare gain

from stable prices reaches a peak of 6% in February.

Hunger is a recurrent phenomenon in Malawi. During the 2023 lean season, after a harvest that was neither particularly good nor bad<sup>1</sup> predicted that 20% of the Malawian population would require assistance to avert hunger. Ensuring sufficient calorie intake during the lean season is therefore a primary concern.

**Figure 4: NBR welfare changes from price stability by month, maize sales and purchases**



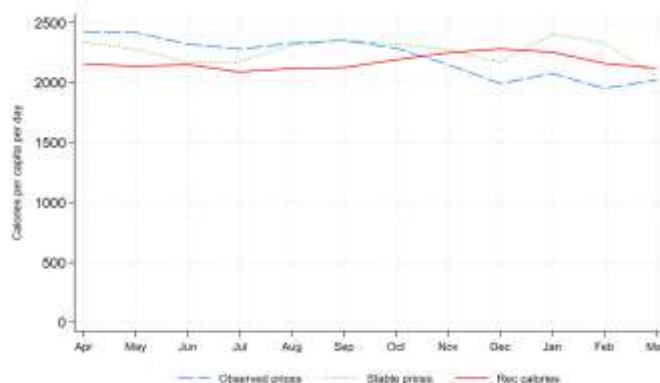
Source: Authors' computations using IHS data

The blue dashed line in Figure 5 represents the status quo or baseline situation for the average Malawian. This line lies 97 to 282 kcal per person per day above average caloric requirements (indicated by the red line) between April and October. It dips under the red line in November and stays about 98 to 290 kcal per person under requirements until March.

The green dotted line in Figure 5 represents a counterfactual scenario where household-level maize expenditures are held fixed at observed levels, but quantities are adjusted to the amount of maize they could buy at the assume fixed price.

Under this counterfactual scenario, we see a smoothing of consumption over the season, resulting in more optimal spread of calorie intake across the year.

**Figure 5: Mean daily calorie consumption by month, observed and stable prices**



Source: Authors' computations using IHS data

We estimate that, in total, this would avoid 185 million person-days of consumption under the calorie threshold in the lean season. In the same season, an estimated 1.9 million people were food insecure in Malawi between November and March<sup>2</sup>, which is equivalent to 289 million person-days of consumption under the calorie threshold assuming that all food insecure people consumed below the optimal energy intake for the full duration of the 5 months, and fewer if at least some people consumed at or above the optimum at least some of the time during the 5 months. Full price stabilization would therefore have helped reduce the incidence of hunger by at least 64 percent.

### Discussion and Policy Implications

Our study shows that stabilizing maize prices in Malawi would modestly increase the overall

economic benefits for the country but have a profound impact on reducing hunger, especially during the lean season. The persistency of maize price seasonality suggests opportunities for traders to buy maize at low prices and sell at higher prices later. However, the fact that arbitrage does not smooth prices more suggests that maize markets are not functioning well in Malawi.

Several factors hinder the effective functioning of Malawi's agricultural markets. These include inadequate infrastructure like poor transportation and communication systems, which require significant capital investments to improve. On the policy side, government interventions in the market are often arbitrary and unpredictable, undermining the confidence of farmers, traders, and investors, which in turn restricts production, trade, and investment. There's a need for clearer, more predictable rules and procedures to enhance market functioning and encourage investment in crop storage.

Government actions, including export regulations and Strategic Grain Reserve (SGR) operations, often worsen maize price volatility. For example, export bans at times of low prices and delayed SGR releases exacerbate hunger and depress prices. Timely SGR use could be cost-neutral, while purchasing maize for the SGR earlier, when prices are lower, could save public funds.

Promoting home storage of maize by smallholder farmers is another option, potentially equalizing income effects of price stabilization. However, the feasibility and cost of widespread household maize storage remain uncertain.

Promotion of off-farm income generation activities during the harvest time would reduce distress selling of maize by easing the cash stress, thereby encouraging home storage of maize.

Lastly, medium-scale private storage by larger traders – currently limited in Malawi – could increase if the government minimizes market interference or sets clear intervention rules and objectives.

Thanks to its ability to strengthen trade and investment, a predictable, rules-based market environment seems to be the best way of reducing maize price volatility and thus improving food security in Malawi.

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