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Mindset or economics: what explains the dominance of maize in Malawi?

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Malawi's policy ambitions increasingly emphasize the need for greater crop and diet diversity. Despite these stated goals, the country's food system continues to revolve around maize, both in production and consumption. This brief discusses the economic imperatives that drive low-income, land-constrained Malawians to prioritize maize. Only by addressing these underlying incentives can policy effectively reduce maize dominance and support the diversification agenda it seeks to advance.

Understanding the dominance of maize in Malawi

Maize stirs up a lot of debate in Malawi. Malawians love their main staple, but experts worry about its supremacy in consumers' diets and on farmers' fields. Average consumption is 2.8 kg per person per week, roughly one 50 kg bag per month for a typical household (Benson, 2021). Maize also dominates Malawi's cultivated cropland (Benson and De Weerdt, 2023). Nutritionists fret about its limited nutritional value, agronomists about the negative impact of climate change on yields, and soil scientists about its intensive soil nutrient requirements that smallholder farmers cannot readily replenish. Furthermore, such dependence on a single crop makes the entire food system vulnerable to harvest failures triggered by weather, pest, or disease shocks.

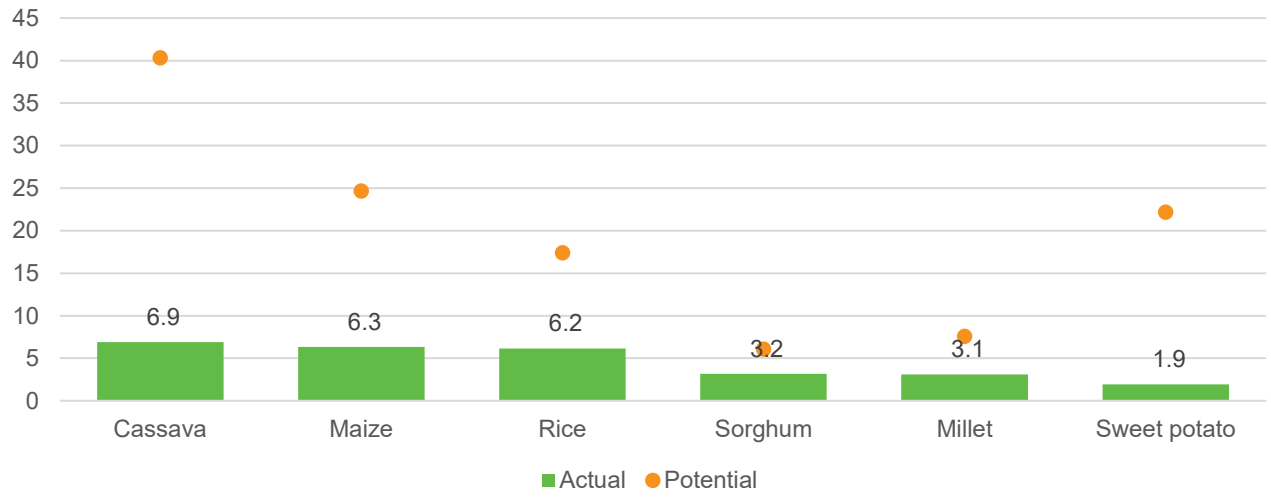
These concerns have led most experts, including the authors of this brief, to agree that Malawi must diversify beyond maize. But how? A mindset shift is frequently called for in this debate, suggesting that the solution lies solely in changing people's attitudes toward food. The purpose of this brief is to highlight the economic imperatives that push smallholder farmers to grow and eat maize. Without changes to the food system that alter those economic realities, attempts to change mindsets are unlikely to work.

To understand why, let's first point out that Malawi is a country where many people are unable to obtain sufficient calories for an active and healthy life. Households struggling to grow or purchase sufficient food to fulfill their basic energy requirements will prioritize calories before turning to other macronutrient or micronutrient needs. With that in mind, let's consider the choices a farmer with low income and small landholding would make to secure the best outcomes for their family.

When every acre counts

Small and shrinking land sizes mean that every acre of land counts for our smallholder farmer. Figure 1 shows how many calories can be obtained from crops grown on one hectare of land, based on average smallholder yields and nutrient content of six major staples. Cassava, maize and rice yield between 6.2 and 6.9 million kilocalories per hectare – barely enough to satisfy the annual energy needs of the average household with 4.4 members and 0.7 ha of cropland.[1] A land-constrained subsistence farmer trying to feed their family will choose to grow one of these staples over sorghum, millet, or sweetpotatoes, which yield two to three times fewer calories per hectare.

Figure 1. Energy yield from major staples, million kcal/ha



Source: Authors' calculations based on yield data from Benson (2021) and nutritional data from MAFOODS (2019)

From our farmer's perspective, maize offers some clear advantages over rice and cassava. Rice has strict water requirements, which are difficult for most farmers to meet. Cassava is drought tolerant, but its short shelf life is a major drawback. Once harvested, the roots must be consumed or processed within days as physiological deterioration of cassava, including discoloration and fermentation, commonly occurs within 24 - 72 hours (Uchechukwu-Agua and Opara, 2015).[2] Processing is also labor intensive, typically involving peeling, soaking, fermenting and drying. While cassava's perennial nature allows for incremental harvesting for immediate consumption, this is laborious and limits cooking options, since the fresh roots cannot be milled into flour. These constraints likely offset cassava's yield advantage, making maize the logical staple of choice.

The math would change if our farmer could achieve the potential yields indicated by orange dots in Figure 1, but the shelf-life limitations of cassava would remain a problem. Sweetpotatoes could also surpass the current energy yield of maize but face similar post-harvest issues. Sorghum and millet produce only half the calories per hectare compared to maize, and even their potential yield barely matches the current yield of maize. Despite notable gains – including new hybrids[3] and biofortified[4] varieties – sorghum and millet will only become viable alternatives to maize at scale when locally

[1] Based on 2019/20 data on household composition, the average Malawian needs 2,412 kcal per day when accounting for age- and sex-specific energy requirements for a moderately active lifestyle (NSO, 2020; WHO, 2004). A typical household with 4.4 members therefore requires 10,610 kcal per day or close to 3.9 million kcal per year. To meet this annual energy requirement on 0.7 ha of land, a crop would need to yield more than 5.6 million kcal per hectare.

[2] Cassava roots can be classified as either sweet or bitter depending on their cyanide concentration. The bitter type with high cyanide concentration cannot be consumed safely fresh or boiled. It requires further processing to detoxify the root (Uchechukwu-Agua and Opara, 2015).

[3] https://pressroom.icrisat.org/icrisat-co-releases-first-pearl-millet-and-sorghum-hybrids-in-zimbabwe

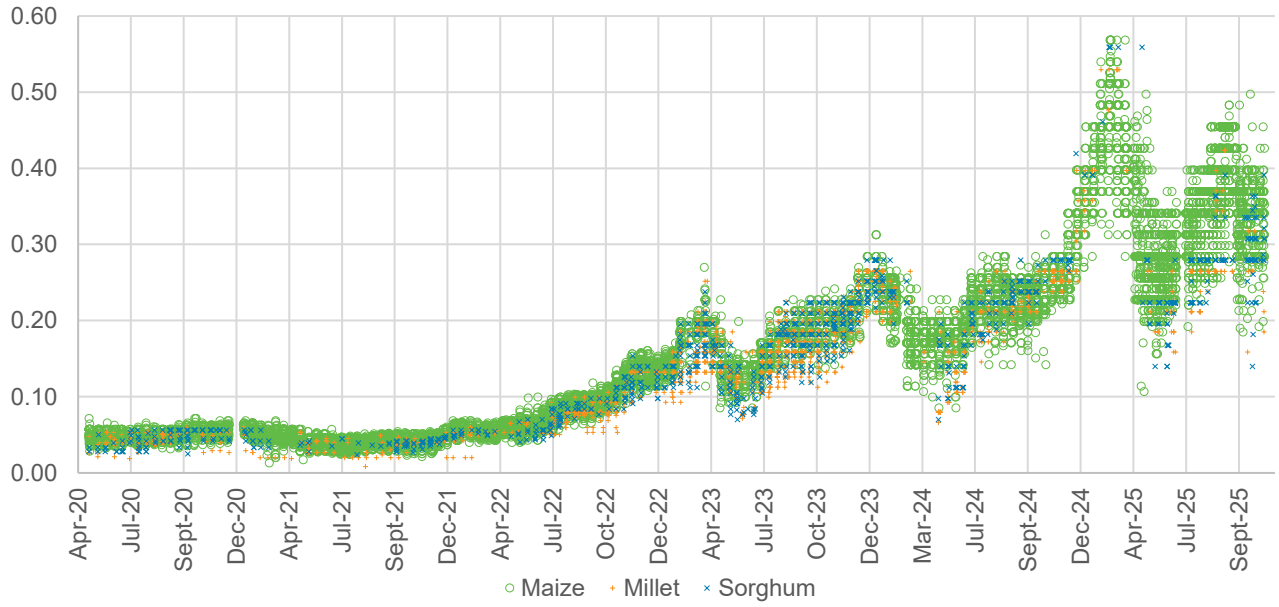
[4] https://pressroom.icrisat.org/hybrid-pearl-millet-brings-new-hope-to-nigerias-drylands-boosting-productivity-and-nutrition-amid-climate-challenges

acceptable, high-yielding varieties are accessible through functioning seed systems, production is supported through a robust extension system, and farmers can sell on reliable output markets.

When every kwacha counts

Despite the centrality of smallholder subsistence farming in Malawi, the majority of households will purchase their food at some point in the year, either because they do not grow it at all, or because they produce less than they consume. This reliance on markets is especially pronounced among the poorest segments of the population.[5] Low income levels mean that for most households, every kwacha counts. Using price information collected bi-weekly from 99 markets across the country since April 2020, Figure 2 plots the cost of a kilocalorie of energy from the cheapest staple available at that market at the time. Figure 3 shows the share of markets in which each crop was the cheapest source of energy at a given time. Overall, maize was the cheapest source of calories in 79 percent of cases. In the remaining 21 percent of cases, either millet (13 percent) or sorghum (8 percent) provided a cheaper source of energy. Other staples (cassava, rice, sweetpotato) were never the cheapest source of calories. Figure 2 and Figure 3 therefore show that buying maize gives most consumers more kilocalories per kwacha than buying other crops. For consumers on tight budgets, maize is the rational staple choice.

Figure 2. Price of energy from cheapest staple, K/kcal

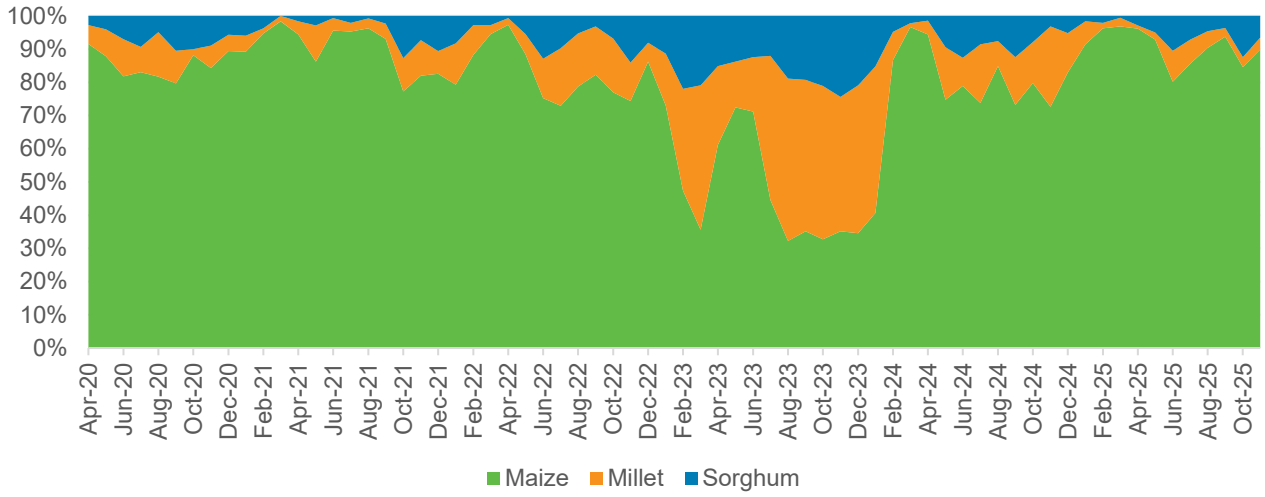


Source: Authors' calculations based on data collected by the World Food Programme in Malawi

However, Figure 3 also shows that the predominance of maize as the cheapest source of caloric energy is not absolute. There are at least some markets where maize was not always the cheapest source of energy in the past five years. For example, for a full nine months in 2023, staples other than maize were the cheapest source of energy in the majority of Malawian markets. It is unclear what precipitated this development, and it was probably too short-lived to alter people's long-term consumption patterns. But it does suggest that the predominance of maize is not an inevitability.

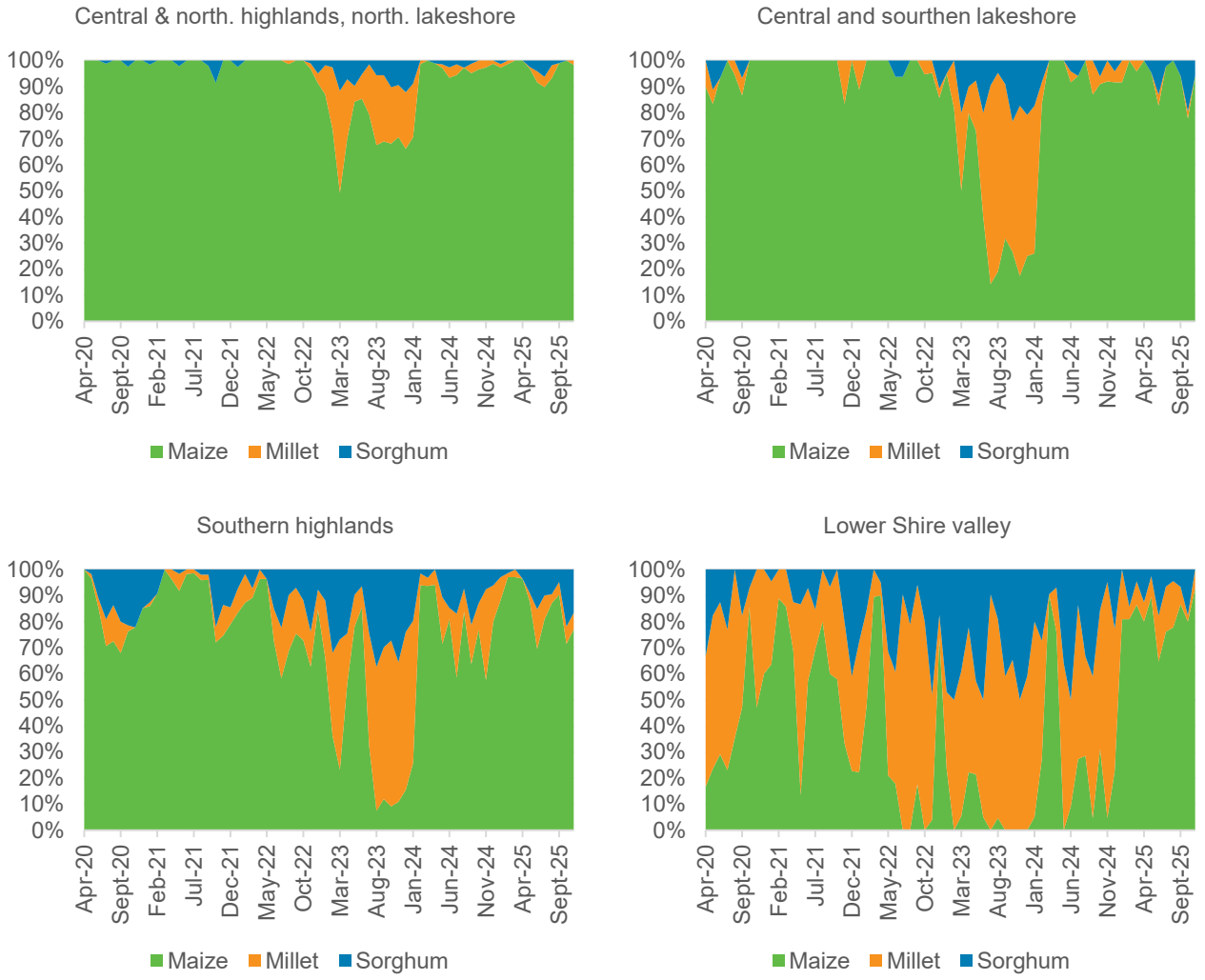
[5] Benson et al. (2024) show how 83% of Malawian households buy maize at some point in the year, either because they do not grow it at all (25%), or because they produce less than they consume annually (58%). Maize market dependence is especially pronounced among the poorest segments of the population.

Figure 3. Source of cheapest energy



Source: Authors' calculations based on data collected by the World Food Programme in Malawi.

Figure 4. Source of cheapest energy by agroecological zone



Source: Authors' calculations based on data collected by the World Food Programme in Malawi.

There are pronounced regional patterns in these relative price comparisons (Figure 4). Maize tends to dominate as the cheapest staple in districts in the central and northern highlands and northern lakeshore (93 percent) and in the central and southern lakeshore districts (85 percent), as well as in the southern highland districts (74 percent). In the lower Shire valley (Chikwawa and Nsanje districts), however, maize is the cheapest source of calories in only 43 percent of cases, with millet or sorghum offering the cheapest source of purchased energy in 57 percent of cases.

Unsurprisingly millet and sorghum are a much more important source of energy in the lower Shire when compared to other districts in Malawi (Table 1) and it is the only location where the average household consumes meaningful amounts of these crops – highlighting again the close interaction between prices and staple choice.

Table 1. Energy consumption by source and agroecological zone, kcal/person/day

	Maize	Millet	Sorghum	Rice	Cassava	Sweetpotato
Central and northern highlands, northern lakeshore	1,089	2	0	62	30	42
Central and southern lakeshore	1,018	1	9	99	142	48
Southern highlands	1,207	2	15	110	58	54
Lower Shire valley	1,039	99	219	49	12	47

Source: Authors' calculations based on the 2019/20 Integrated Household Survey (NSO, 2020).

Reducing the dominance of maize: what needs to change?

While growing and purchasing maize is currently an economically rational choice for most Malawian households, this dominance of maize is not inevitable. Changes in several policy domains could help shift the economic incentives that currently favor maize production and consumption.

Agricultural research priorities and policy: rebalancing the innovation agenda

For decades, global and national research systems have disproportionately focused on maize. This includes investments in the development of high-yielding hybrid varieties, agronomic trials, fertilizer response studies, and extension services. These efforts have produced remarkable gains in maize productivity, but they have also unintentionally widened the performance gap between maize and alternative staples that offer potential advantages in terms of climate resilience and nutrition.

The low potential yields of sorghum and millet shown in Figure 1 are not inherent to the crops but reflect longstanding underinvestment in them. These crops have received only a fraction of the research funding allocated to maize, both globally and locally. Investments in agricultural research on nutritionally important non-staple crops have been even more limited (Pingali and Sunder, 2017; Pixley et al. 2023; Guarin et al. 2025). This underpins the following policy options:

- The global agricultural research system needs a strategic rebalancing, with increased funding for breeding climate-resilient, high-yielding, farmer-preferred varieties of alternative staple crops such as sorghum and millet, alongside greater investments in research on nutrient-rich non-staple crops. Malawi can help champion this rebalancing internationally, while also investing in research to ensure local relevance, such as adaptive trials that connect promising new varieties developed elsewhere to real farming conditions in Malawi.
- Research should address post-harvest constraints for cassava and sweetpotatoes through investment in improved processing technologies and storage innovations.

- Public–private partnerships, for example with seed companies, can accelerate the development of commercial seed systems for non-maize staples, which currently lag far behind hybrid maize adoption. Recent research on integrated seed system innovations highlights how blended public–private approaches can improve smallholder access to quality seed of improved varieties (de Boef et al., 2024).
- Extension services should broaden their focus from maize-centric approaches to multi-crop agronomy, especially in zones where alternative crops are economically viable.

Without reorienting the research agenda, farmers in Malawi and elsewhere will continue to face a constrained and distorted choice set in which maize remains the safest agronomic investment.

Government policy: removing the maize bias

Government policy in Malawi has long reinforced maize dominance. The country's fertilizer subsidy programs have been overwhelmingly focused on maize, with fertilizer blends tailored to maize production, and the provision of high-yielding maize seeds (Benson et al., 2024). This policy bias does more than subsidize maize: it crowds out alternatives by lowering the cost of maize production relative to other crops.

Furthermore, it frames maize self-sufficiency as the key benchmark for food security. Yet food security requires stable access to sufficient, nutritious foods that meet all dietary needs, not just maize. In addition to ignoring several key dimensions of food security, such messaging further entrenches the primacy of maize in policy discourse and farmers' decision making. Policy options therefore include:

- The Farm Input Subsidy Programme (FISP) should become genuinely crop-neutral or even explicitly promote a wider variety of crops. Past experience with the integration of legume seeds in FISP had well-documented positive effects (Khonje et al., 2022; Matita et al., 2022).
- National food security goals should be redefined beyond maize self-sufficiency, and policy practice should match stated goals.

As long as policy prioritizes maize, farmers will align their crop choices with that incentive.

Markets: creating reliable alternatives to subsistence

Even if yields improve and subsidies stop focusing on maize, for farmers to grow alternative crops at scale, they must trust two markets simultaneously: an agricultural output market where they can sell at stable, predictable prices, and a consumer market with stable food prices. At present, both markets in Malawi are fragile.

Frequent government interventions – like export bans, import bans, minimum prices, licensing requirements – create uncertainty, which discourages private-sector investment in production, aggregation, storage and processing (Duchoslav et al., 2023). Although such interventions are typically intended to stabilize prices, they often instead contribute to price volatility, which in turn increases the actual and perceived risk of relying on the market for food, pushing households toward subsistence-oriented production (Chiwaula et al., 2023).

In short, predictability determines whether households can rely on markets for food security, which in turn motivates the following policy options.

- Transparent and rules-based government interventions in food markets would build confidence among both farmers and traders.

- More predictable trade and price policies are essential for attracting private investment in alternative value chains.
- Investments in storage and marketing infrastructure can reduce the risk farmers face when producing non-maize staples.

Diversification beyond maize cannot thrive in a system where markets are unreliable and risky for both producers and consumers.

Mindset change: a complement, not a substitute

Mindset change is often framed as a primary lever, but when calories are scarce and incomes low, food choices are shaped by necessity, not just preferences and habits alone. Available evidence suggests that behavioral change communication, nutrition education, and similar interventions, often have only modest effects. Their impact is likely to be especially limited when they operate against strong economic incentives. Once the economics shift, complementary interventions aimed at changing food choices can be explored. Although the evidence is still scarce, Malawi's youthful population and the tendency for long-term food preferences to develop early in life suggest that school-based programs could play a key role in shaping dietary preferences across generations (Headey et al., 2023; Gelli et al., 2018). In any case, mindset change is more likely to follow economic change than to lead it.

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