Policy brief
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Staving off the hungry season in Zambia

Testing a simple and cost-effective approach

In brief

- Multiple countries in sub-Saharan African experience seasonal extreme food insecurity, a phenomenon in some cases referred to as the "hungry season." In Zambia, the context of this project, recent studies suggest that between 60-80% of rural households run out of food before the annual harvest.
- Seasonal food insecurity has serious impacts on health and wellbeing. Furthermore, coping strategies have been shown to have negative impacts on farm output.
- This study investigates whether a simple planning exercise with farming households in the Eastern Province of Zambia can help farmers save for the hungry season and impact consumption levels, child nutrition and wellbeing, and farm output and investment.
- Preliminary results show that after undertaking the exercise, households request labels to help them track their expenditures, spend less on "luxury" goods, and forecast that they will have fewer bags of maize in the future. Subsequent rounds of data collection will explore impacts on consumption, savings, and expenditures.

This project was funded by IGC Zambia

Overview of the research

Background

Consumption seasonality is prevalent across low-income countries, particularly those that have large agricultural sectors. The Food and Agriculture Organization estimated that 9.2% of the world's population were exposed to extreme food insecurity in 2018, meaning that they experienced reductions in the quantity of food consumed to the extent that they experienced hunger. Farmers in these countries typically have abundant food after harvest, but struggle to make their harvest last the entire year. This phenomenon has four major implications:

1. **Reductions in the number of meals consumed and caloric intake at certain times of the year.** Calorie drops are consistent with household self-reports of skipping meals and having insufficient food: in one study in Zambia, over 50% of households self-reported food shortages by month 9, and by month 12, this number rose to 99% of households.[1]
2. **Children's weight-for-height fluctuates seasonally in these contexts,**[2] with potential serious long-term impacts. Those exposed to more seasonal dietary fluctuations are shorter as adults and attain less education[3], and as children are more likely to drop out of school in the face of adverse shocks. Further, there is evidence that families give calories preferentially to sons when calories are in limited availability during hungry seasons.[4]
3. **Households sell wage labour at the expense of working on their own-farm[3] and sell assets such as livestock.**[5] Households that experience seasonal hunger also harvest immature crops which reduces crop yield and nutritional value, and may perpetuate hunger.[6]
4. **Coping strategies can have important general equilibrium effects on markets,** compounding the negative effects on individuals by imposing financial externalities on others. Consumption seasonality is generally accompanied by price seasonality, regular intra-annual fluctuations in the prices of commodities.[7] Despite the introduction of policies designed to better integrate agricultural markets, recent evidence suggests that there are still large seasonal swings in prices in agricultural markets, including 33% swings in the price of maize, the local staple in Zambia.[8]

In Zambia, farmers harvest maize once per year. Households consume maize from their stocks for the remaining twelve months, and sell it to finance expected expenditures (i.e. school fees, farm inputs, etc.) and unexpected

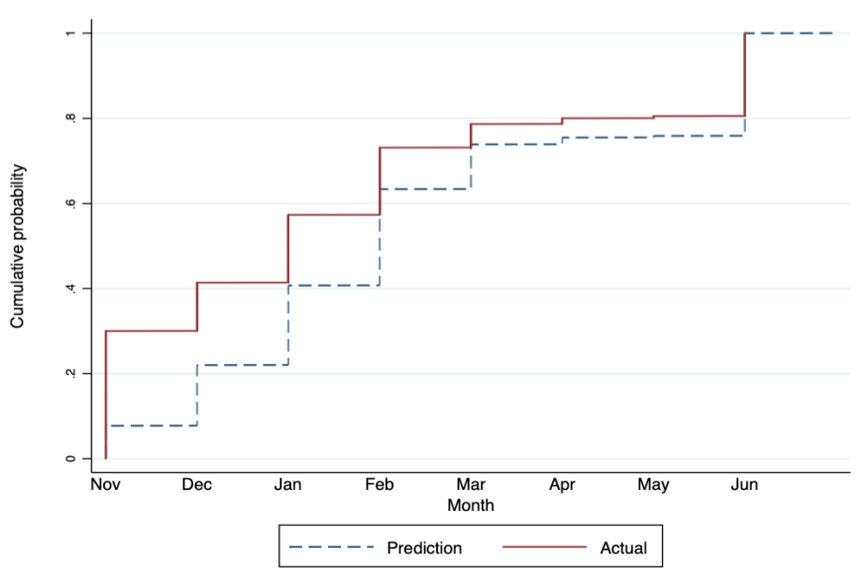
1. Fink, Jack, and Masiye 2018
2. Maleta et al. 2003
3. Christian and Dillon 2018
4. Behrman 1988
5. Mayanja et al. 2015; Rademacher-Schulz et al. 2014; Zug 2006
6. Anderson et al. 2018
7. Kaminski et al. 2014
8. Gilbert et al. 2017

shocks (health shocks) throughout the year. Planning in this context requires the ability to predict expenditure needs of long horizons, as well as track outflows over time. Previous IGC-funded work shows that these households experience substantial seasonal fluctuations in consumption over the course of the agricultural year.[9]

Study design

Evidence from prior IGC-funded work suggests that, at harvest time, farmers are over-optimistic about how long their grain stores will last. When asked to forecast when their maize would run out, they project a date that is late, both relative to how long it actually does last, and relative to their own prior experiences from past years.[10] This is consistent with classic "planning fallacy", which has been robustly shown in psychology across a range of contexts with experienced individuals.

Figure 1: Predictions and realisations of the date that maize would finish (data from Fink, Jack ,and Masiye 2018).



The chart shows the difference between predicted dates of finishing maize, and realizations. Predictions, shown by the dashed blue line, were made after harvest. The red line shows the realizations of when the farmer's maize stock finished. The sample size is 3,139

Evidence from psychology suggests that one way to "debias" individuals is to have them "unpack" elements of their future plan.[10] Our innovation leverages this evidence to introduce planning exercises that one, induces individuals to plan for the upcoming lean season, and two, creates a visual representation of this plan as a reminder to themselves over the year.

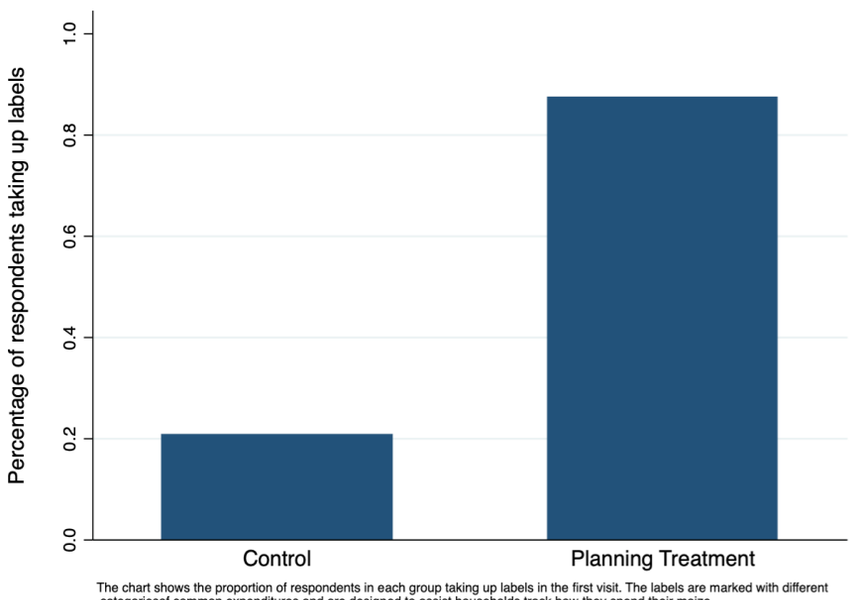
In this project, we introduce a low-cost and easily scalable innovation: planning exercises that incorporate these best practices from the social

9. Fink et al. 2013
10. Kruger and Evans 2004

psychology literature. Specifically, when planning, we encourage individuals to both recall their expenditures from past seasons and unpack the expenditures that they need to make this season. We then create a visual representation of this plan, using labels, as a reminder to these households over the course of the year. To estimate the causal effects of this exercise on subsequent economic outcomes, farmers are randomly assigned to either receive the planning exercise, or to a control condition.

Findings

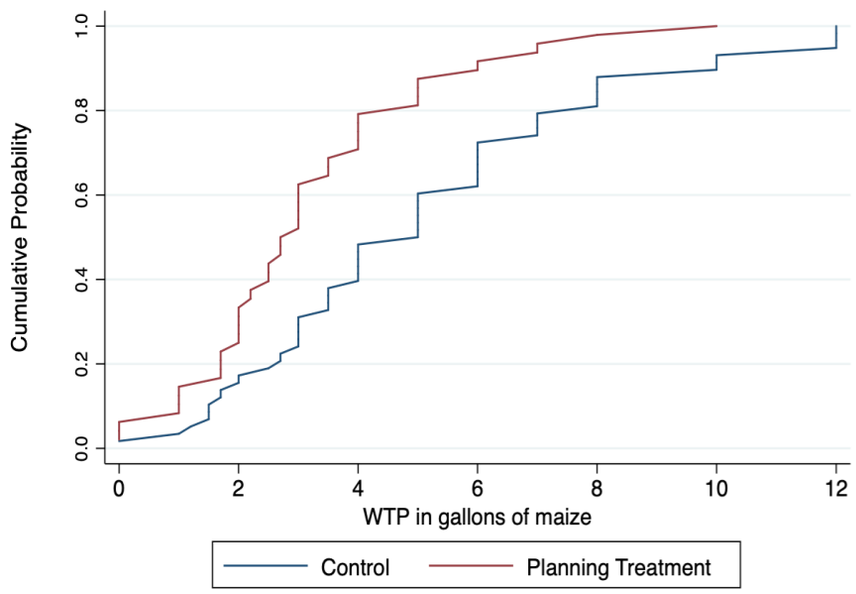
While we are currently continuing to roll out our intervention with farming households, we can document three sets of results at this stage. First, undergoing the planning intervention leads to greater take up of labels to assist with tracking maize expenditures. 87.5% of households take up the labels after the planning process, whereas only 20.6% take up in the control condition (see *Figure 2*).



The chart shows the proportion of respondents in each group taking up labels in the first visit. The labels are marked with different categoriesof common expenditures and are designed to assist households track how they spend their maize.
The sample size is 106 households

Second, households reduce the amount that they are willing to spend on "luxury" household items. As part of our experiment, we elicited households' willingness to pay for small household items that are commonly considered to be "luxury" household items in this context. *Figure 3* shows that our intervention reduces the amount that households are willing to pay for these goods – suggesting that our intervention makes households more cautious about how they spend their income.

Figure 3: Willingness to pay for luxury items in the control and treatment groups.



The chart shows the proportion of respondents in each treatment arm who's maximum willingness to pay for a household luxury item is below a given price. The items offered include radios, chitenge (clothing) and solar panels. The respondent's willingness to pay is elicited using the Becker-Degroot-Marschak method. Valuations for control group are shown by the blue line, and for the planning treatment group by the red line. The sample size is 106

Finally, preliminary evidence suggests that households that undergo the planning intervention forecast that they will have less maize available on future dates. This is consistent with our intervention assisting households to recall all of their future expenditures, and therefore becoming less optimistic about how long their maize will last.

Ongoing work will continue to track individual's valuations of willingness to pay for goods over the course of the year, as well as measuring other economic outcomes including consumption, savings, and farm investment.

Policy motivation for research

Pilot evidence suggests that, at harvest time, farmers are over-optimistic about how long their grain stores will last: when asked to forecast when their maize will run out, they project a date that is late, both relative to how long it actually does last, and relative to their own prior experiences from past years. This project builds upon social psychology and economics literature showing that planning and debiasing interventions are effective at eliminating over-optimism regarding task completion times,[11] such as school project completion,[12] as well as assisting individuals to save for retirement.[13]

11. Buehler et al. 1994
12. Taylor et al. 1998; Koole and Van't Spijker 2000
13. Benartzi and Thaler 2013

Even minimal planning interventions can facilitate important changes to behaviour in large stakes decisions. For instance, individuals asked to plan the date and time they would complete a vaccination were far more likely to attain it.[14] Our approach offers a simple and effective way to increase consumption smoothing if households save more labeled maize bags through the hungry season. This can lead to better payment of school fees and for agricultural inputs, a greater buffer in case of external shocks, and less pressure to engage in casual wage labour, which diverts resources from their own farms.

Our approach is far cheaper and easier to scale than existing approaches to addressing seasonal hunger. For example, prior successful interventions have encouraged seasonal migration,[15] subsidised credit markets,[16] or improved storage.[17] However, seasonal migration is infeasible in our setting since the hungry season coincides with a period of home production, and jobs are scarce in urban Zambia. Credit markets are expensive to set up and difficult to scale, for example they can break down without adequate enforcement[2] and may not be accessible to rural households without generous subsidies. In our setting, storage losses do not appear to be an important factor undermining better smoothing.[2] Furthermore, conversations during our fieldwork suggest that individuals regret not having saved more earlier in the year for consumption, suggesting that individuals themselves think changing behaviour would be beneficial.

While the Zambian government is doing much to focus its rural development policy on productive inputs, none of the current programmes explicitly help address the hungry season or the attendant large swings in resource availability and prices in rural areas. Programmes that have encouraged financial literacy and budgeting among farmers, and the Ministry of Agriculture's current package of training materials delivered by extension workers emphasise farm investments and saving for seeds, fertilisers, and chemicals. However, they do not target the failure to save that exacerbates seasonal consumption smoothing failures, which also has production implications as discussed above.

Our approach, by contrast, delivers two key policy innovations. First, it addresses the challenge of seasonal incomes and consumption, which has been neglected by policy makers in Zambia. Second, it avoids the need to inject additional capital into rural areas, by instead testing whether farmers can be encouraged to save more of what they have. We view our approach as an important complement to other government policies and programmes. Moreover, our hypothesised root of the saving constraint, an overconfidence in budget predictions, is a general behavioural feature, therefore, suggesting

14. Milkman 2011
15. Bryan et al. 2014
16. Fink, Jack, and Masiye 2018; Burke et al. 2019
17. Aggarwal et al. 2018

that our intervention could be applied in similar contexts and markets in the developing world.

Policy recommendations

- **Test this kind of behavioural planning intervention at a larger scale and in different countries that experience similar seasonal food scarcity.**
- **Make all instructional materials available online easily and cost-effectively replicable in a variety of contexts.**
- **Incorporate this kind of planning exercise into the training curriculum provided by extension workers through the Ministry of Agriculture and other organisations.** Extension workers reach tens of thousands of Zambian farmers and simple behavioural interventions such as this could be cheaply integrated into trainings with farmers.
- **Investigate the potential to incorporate lessons and materials from this project into other social service sectors (e.g. working with the Ministry of Education).** For example, school fees are due at the peak of the hungry season, and better planning for these predictable expenses (and the unpredictable expenses that lead households to draw down their savings for school fees) could improve attendance and reduce drop-out rates.