



# **SOCIAL NETWORKS AND AGRICULTURAL INSURANCE**

Learning from the Pula Referral System

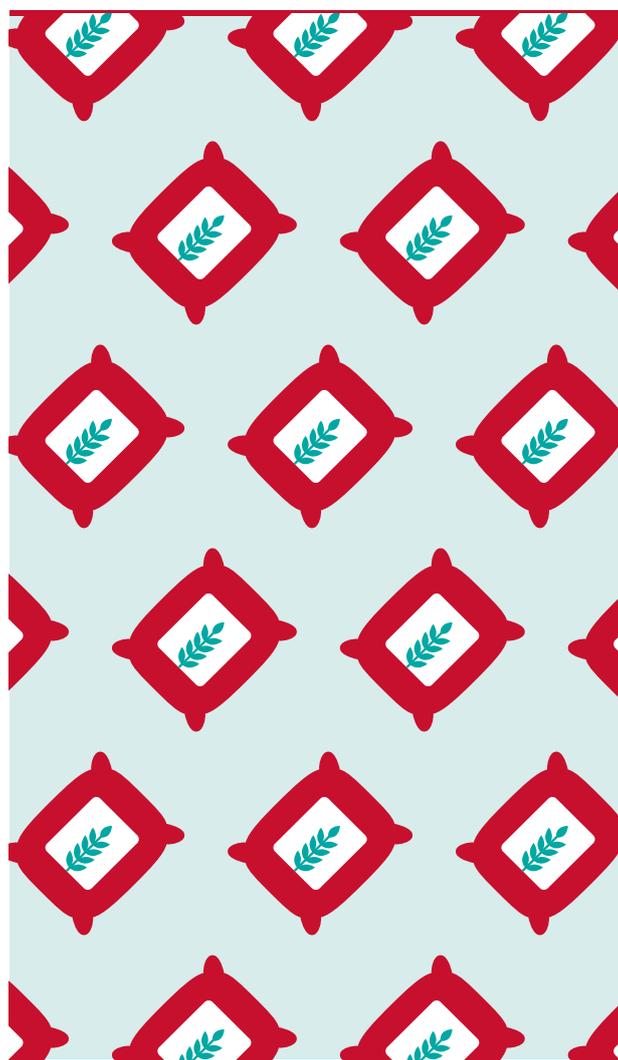
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# EXECUTIVE SUMMARY

Agrifin Accelerate commissioned the Busara Center to review Pula's farmer referral system and provide recommendations.

We found that:

- › Despite a high volume of referrals, the **conversion rate is low**: approximately 3% lead to a sale in either country.
- › Referrals from unknown sources are less likely to lead to a sale, and the likelihood of conversion declines as the number of referrals rise. **Prohibiting non-purchasers from referring** would raise the average referral quality, but it is worth researching who these 'strangers' are.
- › Larger customers are more likely to produce high-quality referrals. Pula should consider **targeting the biggest purchasers** with social incentive schemes.
- › Successful referrals leverage **local networks**. Most sales are in the same district as the referrer, but on average are too far away for face-to-face contact (73km).
- › Timing of referral relative to crop cycle appears to be an important factor for the likelihood of conversion; in Malawi the conversion rate decreases dramatically over the planting season.

# RESEARCH OVERVIEW

# 01



AFA has commissioned the Busara Center for Behavioral Economics to conduct DAI research into Pula's Nigeria operations. The research had two goals:

- Goal 1**  
Analyze data on Pula's farmer referral system in Malawi and Zambia. Gain actionable insights for better engaging farmer social networks and getting high-quality referrals, to be deployed during Nigeria's next planting season.
- Goal 2**  
Explore Pula's Nigerian yield survey data to improve data collection and more accurately anticipate yield. Involve content experts to help design survey modules.\*

\*A separate learning output has been developed focused on this goal. This deck will be primarily focused on research goal 1.



# THE PULA REFERRAL SYSTEM

In the 2018 planting season, Pula created a system to allow farmers to recommend its Pula-insured maize seed to others.



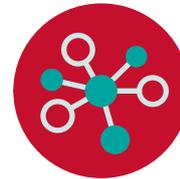
All registered customers from past seasons were sent SMS from "DeKalb" to inform them of the referral process.



Referrals could be processed via USSD or a call center.



Senders received a small airtime incentive and a discount voucher, for any of the 8 varieties insured by Pula.



Referral receivers and even outside parties were also able to refer any phone number.



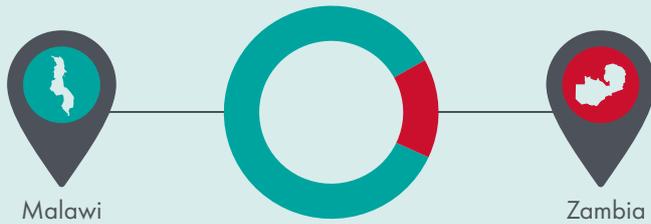
# THE DATA

## 115,169 referrals

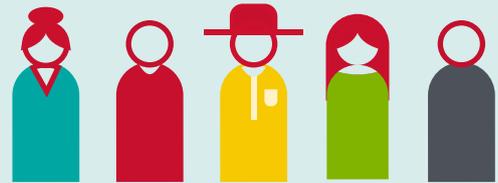
Between October 14 and December 19, 2018, just over halfway through the planting season, **115,169 referrals were initiated across the two countries.** Of these, only 40% (46,541) could be delivered to the phone number provided.



The **median farmer referred 4 others.** Busara excluded people who had referred more than 50 on the presumption that those individuals were spammers (28,979 messages from 170 senders).

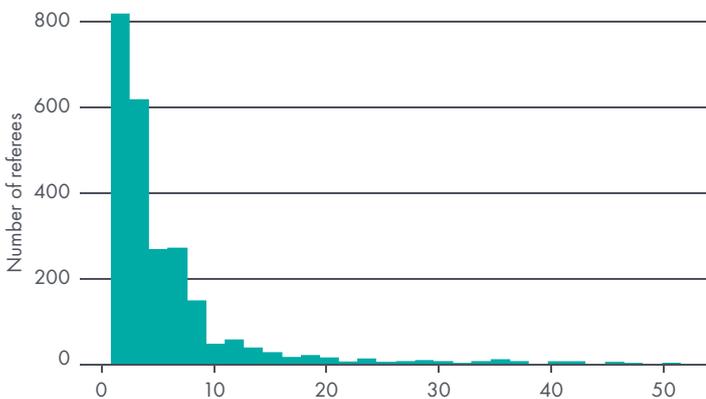


The analysis sample then consisted of **17,562 unique referrals:** 14,940 (85%) from Malawi and 2,622 (15%) from Zambia.

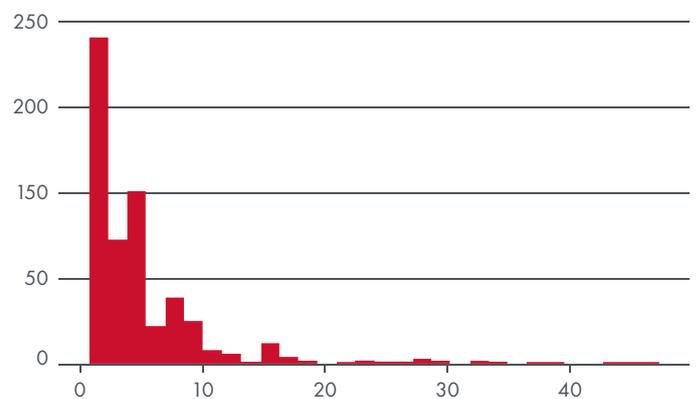


The data contained information about the referral. Demographic and purchase data are available only for those senders or receivers who bought a Pula-insured seed product.

Distribution of referees per referrer in Malawi



Distribution of referees per referrer in Zambia





# KEY INSIGHTS

# 02

- Question 1:**  
How can Pula identify and encourage high quality referrals?
- Question 2:**  
Which factors drive sales conversion?

# INSIGHT 1

## Many refer – but conversion rate is low



**Only 3%**

referrals are converted to a purchase.\*

Even this is an upper bound, since some would have purchased regardless.

Therefore, any interventions are likely to have a small effect at best – but with this volume a small change can meaningfully increase sales.\* \*

\*In the time period of analysis, conversion rates are higher for different subsamples.

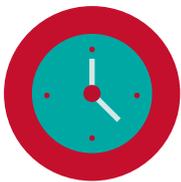
\*\*Pula identified referrals sent too early or too late as a major cause of low conversion rates.

Sales, referrals and conversions by country





# FOUR FACTORS TO CONSIDER



## Timing of referral

The limited data available suggests timing is moderately important.



## Recommendation

Avoid sending SMS at night and as close to the beginning of rains as possible.



## Qualities of referrer

Referrer characteristics closely linked to conversion probability.



## Recommendation

Encourage larger purchasers to refer and reallocate resources away from "stranger referrals."



## System architecture

Call Center vs USSD matters, but depends on system structure.



## Recommendation

Isolate high-potential senders (large purchasers, early in the season) and follow-up with those they referred.



## Applicability of referral

Impossible to tell from the current system if referees are farmers, or have planted already.



## Recommendation

Consider conducting a follow-up survey on sample of referees to determine if referrals are going to correct consumers.

\*Unfortunately, we are limited by the data in answering a lot of these questions:

- No information on age, gender, literacy, or income, collected during Pula onboarding.
- Each person could only be referred by one other. If another farmer attempted to refer somebody who had already received a referral, the referral would fail, and that data is impossible to access.



Timing of referral



Qualities of referrer



System architecture



Applicability of referral

# TIMING MATTERS, BUT HOW?



Based on consultations with AFA and Pula, Busara identified **3 hypothesis about the timing of receiving referrals:**

- Hypothesis 1:**  
Small holder farmers usually wait until right before planting to buy seeds.
- Hypothesis 2:**  
Referral messages increase both knowledge and salience of the products. The salience dissipates over time. Therefore, referral messages are most effective exactly when customers are in a position to purchase.
- Hypothesis 3:**  
Farmers' ability to engage with the message varies throughout the day. The best times to engage farmers is when they are working on the farm, or, even better, on the way to purchase inputs.



Timing of referral



Qualities of referrer



System architecture



Applicability of referral

# INSIGHT 2

## Timing matters, but how?

This evidence suggests that potential **customers are sensitive to when they are given recommendations**, but it is impossible to observe when the referee's season starts until they purchase.

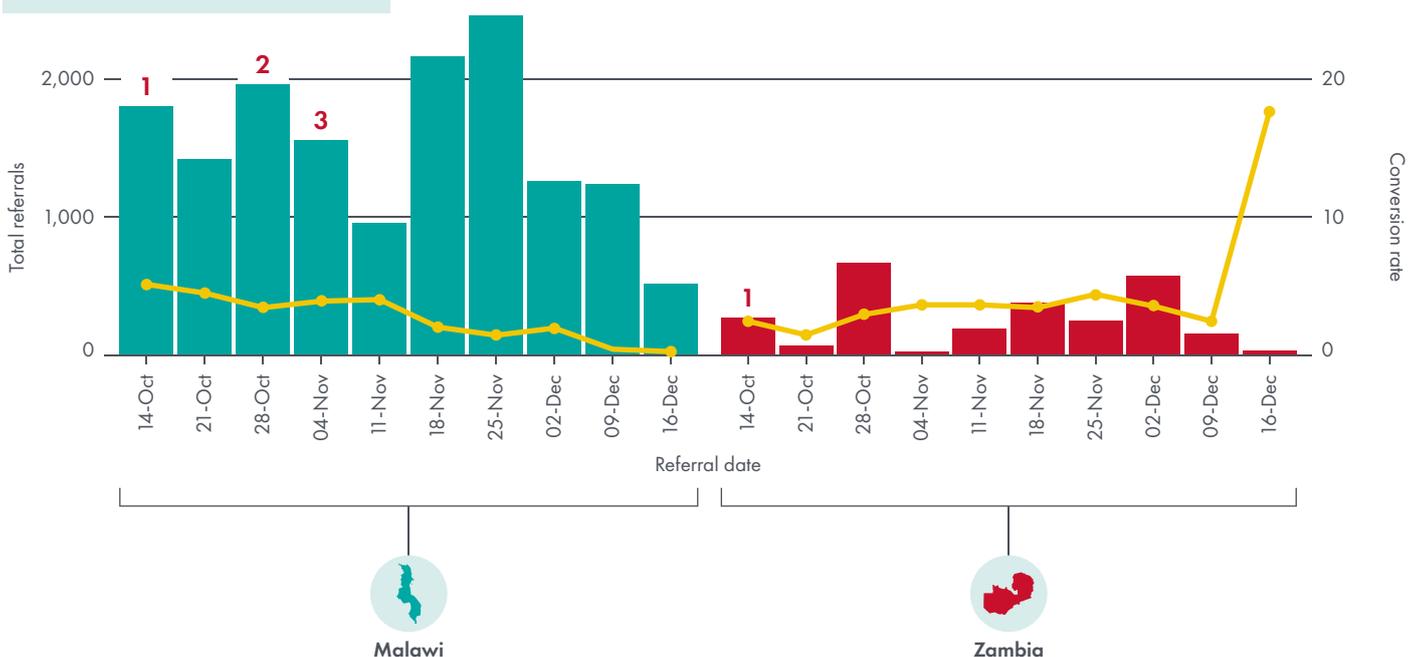
Although the 2018/19 planting season saw above average rainfall in Zambia, the rains began later than usual. November 2018 saw only 10 days of rain, relative to 20 in November 2017, and October was almost completely dry. In Malawi, on the other hand, the rains were both earlier and harder than usual (460mm in January 2019, relative to 69mm in the same month last year).

### Intervention dates

- 1 Lead farmer SMS mobilization
- 2 Wheelbarrow promotion reminder
- 3 Wheelbarrow winner announcement

### Referral and conversion rates trends

October 14 - December 19



\*The teal bars represent referrals in absolute terms, while the yellow line represents conversion as a percentage that converts (i.e. as a proportion of those referrals leading to a sale)



Timing of referral



Qualities of referrer



System architecture



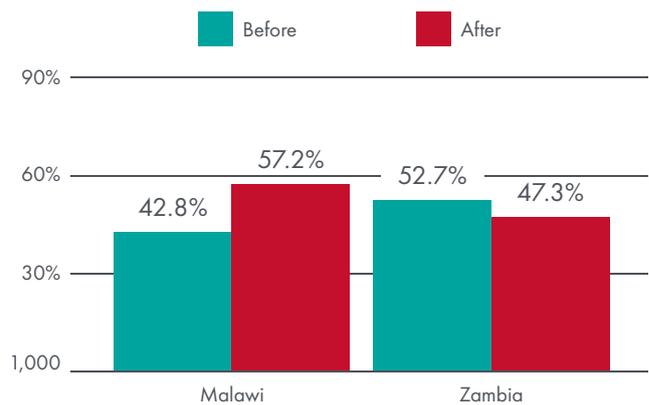
Applicability of referral

# INSIGHT 3

## Farmers purchase seeds before and after harvest, but earlier referrals are more successful

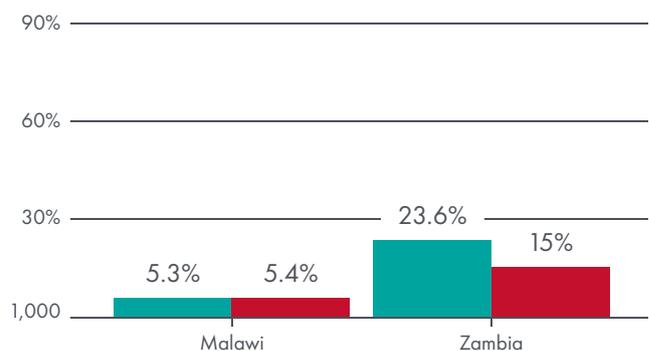
There is large effect of early referrals in Zambia, but less so in Malawi, likely due to the fact that the majority in Malawi plant after the rains begin. **Referrals should therefore be targeted to arrive just before the rains,** to be salient when the majority are making their input choices.

When do receivers purchase, relative to start of rains?



**Note:** We inferred the start of rains (30mm) for referred customers by comparing the purchase date and policy start date. If the contract was activated within 24 hours of the purchase, we assume they purchased after the start of rains.

Is conversion rate affected by when senders refer, relative to start of rains?



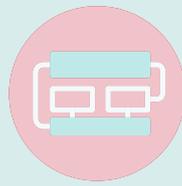
**Note:** Policy start date is only captured for referrers who purchased in that season. Including only these referrals leads to a higher conversion rate.



Timing of referral



Qualities of referrer



System architecture



Applicability of referral

# INSIGHT 4

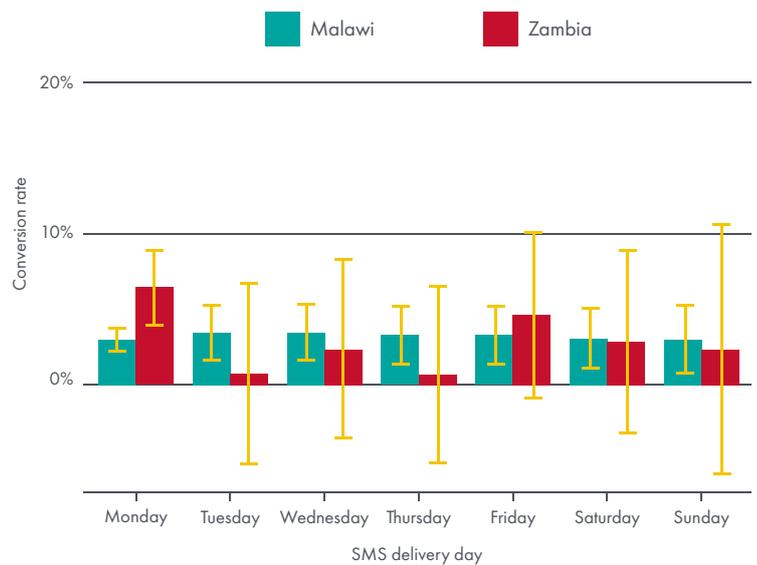
## Time of day and day of week is marginally important

We notice **Monday is a particularly good day in Zambia**, and the middle of the week has low conversion rates, but no consistent pattern in Malawi.

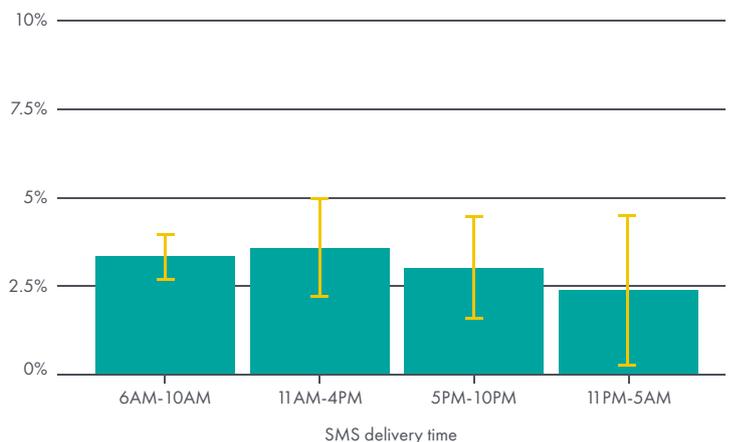
Monday is a market day across much of Zambia \*\*, indicating that targeting farmers when they are most likely to be in town could greatly increase the conversion rates.

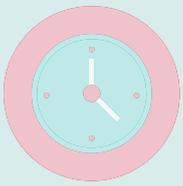
**Messages** that arrive at **night** are **slightly less likely to convert to sales**. Pula programmed SMS to be sent at 9AM, but messages were often delivered much later, due to switched-off phones or lack of network signal.

Effect of day when referral SMS were delivered on conversion



Conversion rate for different SMS delivery time





Timing of referral



Qualities of referrer



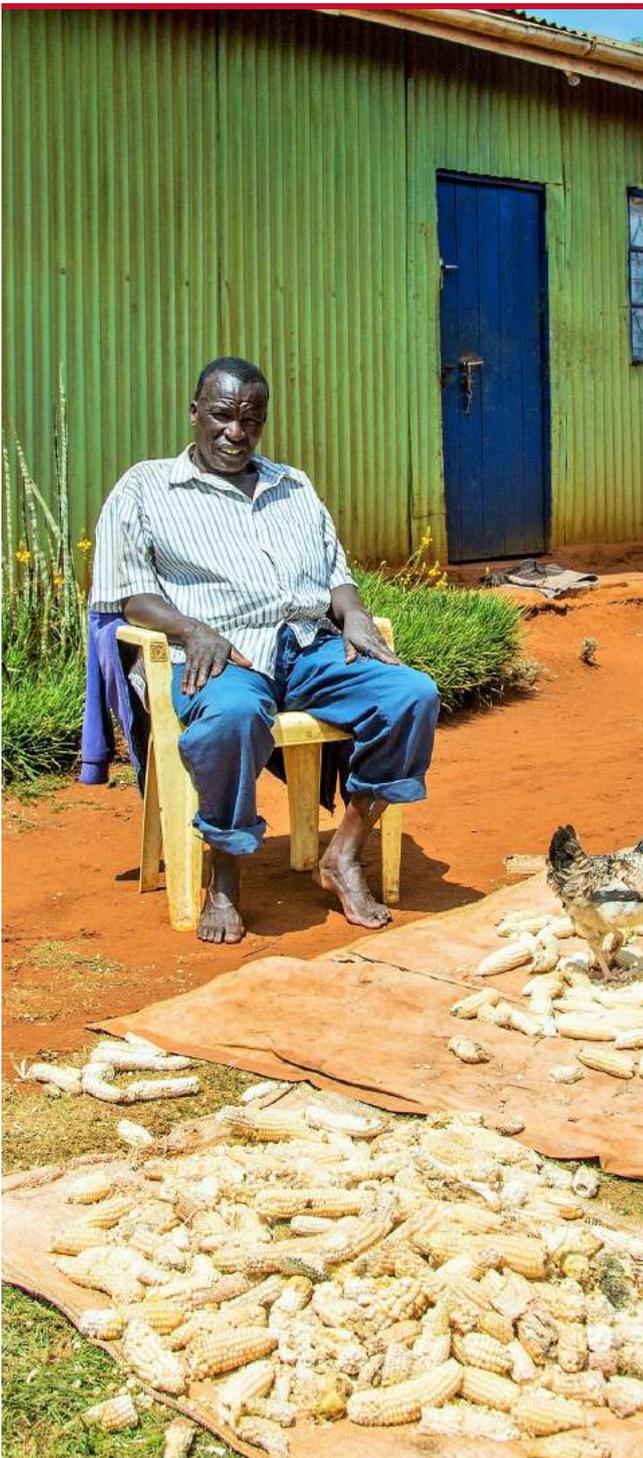
System architecture



Applicability of referral

# INSIGHT 5

## Farmer characteristics



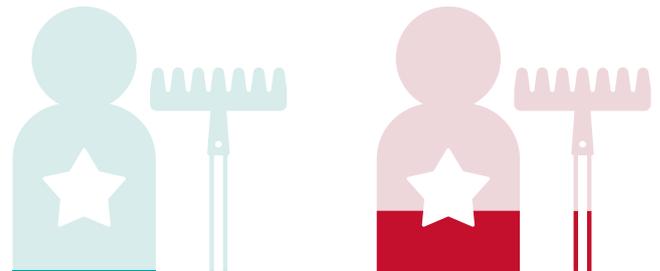
For farmers who have purchased, the following information is recorded:

- Size
- Variety
- Location
- Designated “lead” farmer

### Designated lead farmer

Malawi  
0.4%

Zambia  
23%



Since we do not have this information for receivers who do not purchase, analysis of the match between the sender and receiver is not possible for unsuccessful referrals.

However, we find circumstantial evidence that suggests **receivers are more likely to convert when referrer can be trusted to know what they are referring.**



Timing of referral



Qualities of referrer



System architecture



Applicability of referral

## INSIGHT 6

# Non-purchaser referrals are less likely to convert

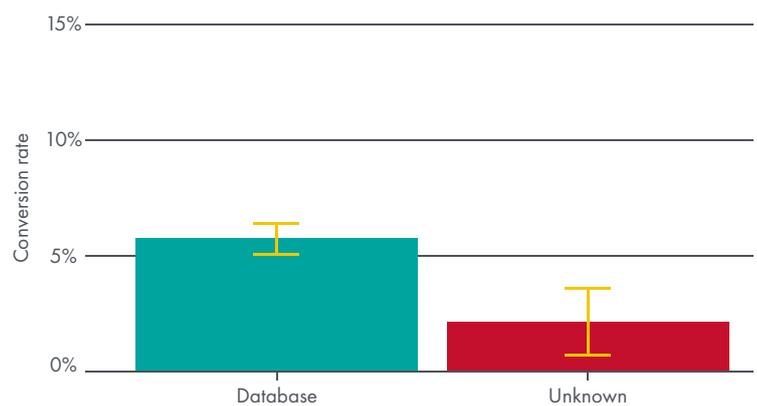
Initially, only farmers who had previously purchased a Pula-insured product or were referred to do so could refer somebody else.

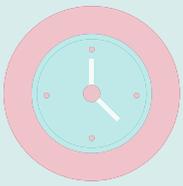
Pula expanded the criteria to **allow referrals from anybody**, even if they were not previously registered in the database (from the start of the sample in Malawi and Oct. 15 in Zambia).

Even excluding obvious spammers, **these referrers are much less valuable.**

Conversion rates are also higher for the **first link in a network chain of referrals.**

Conversion rate for unknown vs. database senders





Timing of referral



Qualities of referrer



System architecture



Applicability of referral

# INSIGHT 7

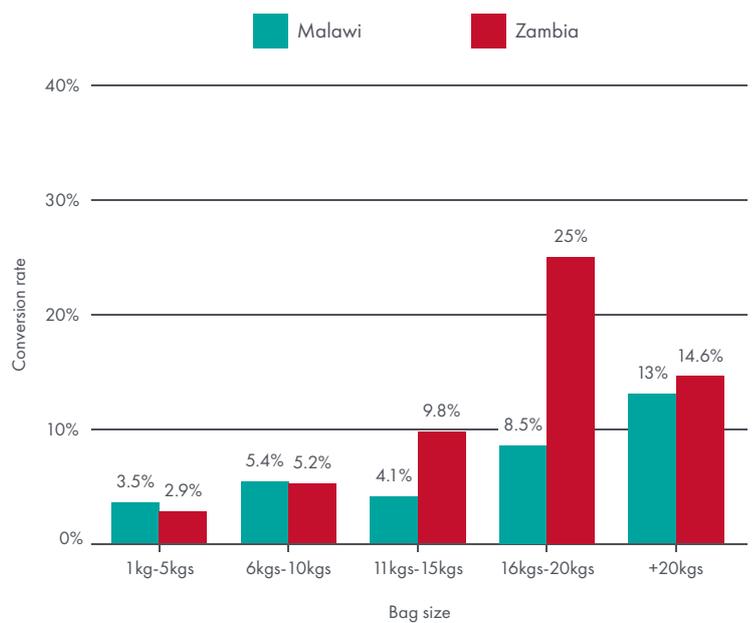
## Referrals from larger purchases are more valuable

We cannot observe income or farm size, but the **size of seed purchase is a good proxy** and observed with no measurement error.

Perhaps wealthier farmers will not waste the time of referrals unlikely to convert, or referees are **more likely to trust recommendations from well-heeled friends**. This could form a hypothesis to test in a follow-up survey.

The seed variety purchased does not affect probability of successful conversion.

Conversion rates across different sizes of seed bag





Timing of referral



Qualities of referrer



System architecture



Applicability of referral

# INSIGHT 8

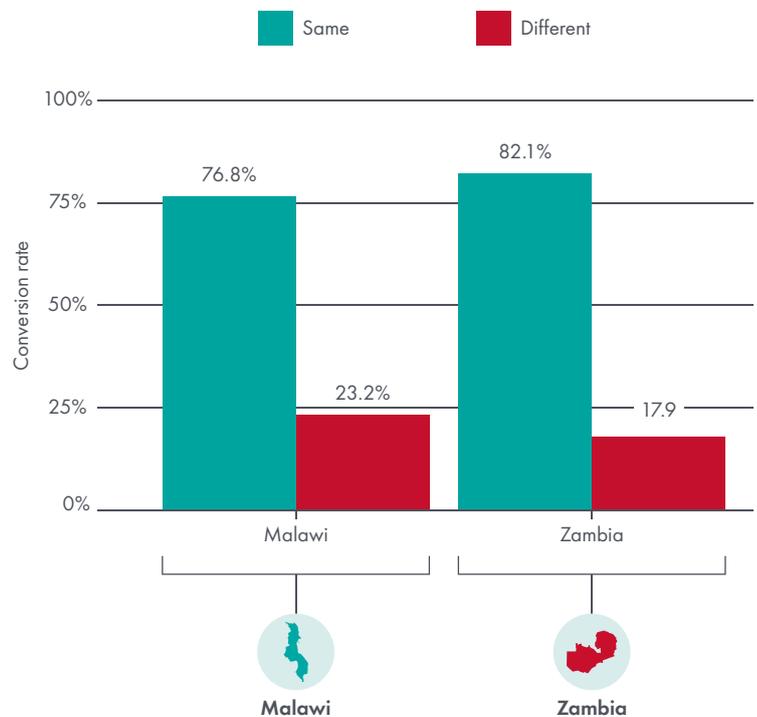
## The best referrals are local

The majority of successful referrals involved somebody in the same district, but **not the same location**. The average distance between referrer and referee is 73 and 79km in Zambia and Malawi, respectively.

This indicates that the most valuable referrals are to **somebody one knows personally**, but that is **not close enough to inform in person**.

Referrals are spread across 26 districts in Malawi and 14 in Zambia, with no large concentrations, suggesting **many local networks for farmer information**.

Percentage of senders and receivers in same district, by county





Timing of referral



Qualities of referrer



System architecture



Applicability of referral

# INSIGHT 9

## Choice architecture is context dependent

**Conversion rate is much higher** for referrals processed **via the call center in Malawi.**

The opposite is true in Zambia.

This is likely due to the fact that the Malawian call center was instructed to call those who had been referred but had not yet purchased. This seems to be an **effective but high-cost way of generating sales.**

Percentage of referees who converted across countries by referral channels





# 04

## LEARNINGS AND RECOMMENDATIONS



Based on the results of this study, Busara recommends the following to improve Pula's referral system:

- Due to the nature of the registration and referral systems, very little data is collected on farmers, and almost nothing on those that did not purchase. A **deeper evaluation** of the referral system requires a survey.
- Despite these limitations, we learn that the **highest quality referrals** come from larger farmers who refer those close to them.
- These results suggest that the referral process could be improved by tailoring incentives by sender segments: de-prioritize referrals from non-purchasers and focus on eliciting referrals from Pula's biggest customers.
- Further intervention plans created during a **co-design workshop** with Pula principals.
  - Replacing monetary with social incentives.
  - Social norms messaging

# KEY FINDINGS

## Successful referrals



Successful referrals from large purchasers are much more likely to convert



Successful referrals are those delivered on Monday in Zambia



Successful referrals are within the same district, but not same location



Lead farmers submit **23% of referrals in Zambia** (negligible in Malawi), but **not** more likely to convert than regular farmers

## Unsuccessful referrals



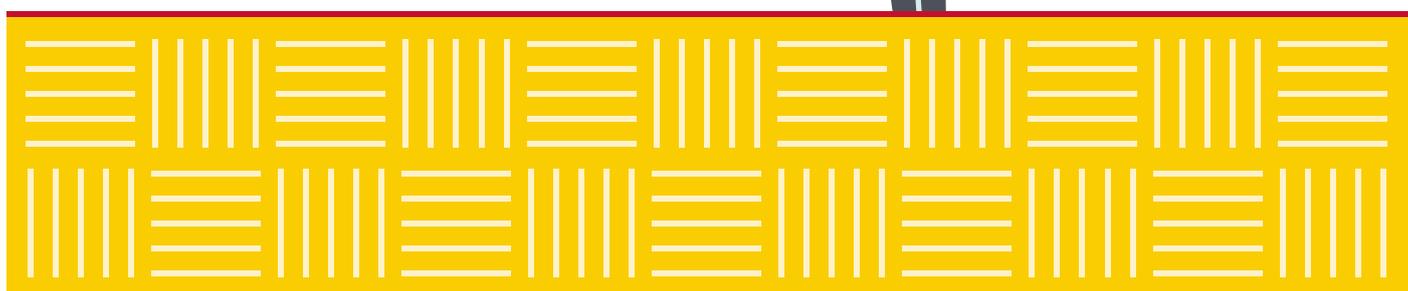
Unsuccessful referrals are delivered at night



Unsuccessful referrals are from senders who did not



Unsuccessful referrals purchase the product themselves





# KEY RECOMMENDATIONS

## Referral Journey

Tiny monetary incentives are unlikely to motivate large purchasers who provide the highest quality referrers. Pula should implement special targeting systems for them:

- Consider a social ranking system (e.g. crown "most influential farmer" in each location)
- Target them with messaging emphasising the good they're doing for the community



Sender is invited to refer



Sender submits referral

Deliver referrals 1 week \*note: this is arbitrary\* before the predicted start of rains in sender's district, to ensure the recommendation is salient at the right time.

Continue A/B testing message content for the receivers

Pula should implement a KYC process for lead referrers



Referral is delivered to receiver

Conduct a follow-up with a sample of receivers who did and did not convert to identify motivations and barriers to uptake.



Receiver purchases and registers product



# EVALUATION OPPORTUNITIES

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Based on the results of this study, Busara recommends the following to evaluation options for the Pula's referral system:

## › **On Timing**

We recommend that Pula conduct qualitative research to find common market days in different regions of the countries they operate in and implement a system to wait until a likely market day to deliver referral messages.

## › **On Referral Identity**

Lead farmers are known to be an impactful mechanisms for spreading information to SHFs\*\* in Zambia. Several organisations keep lists of lead farmers, but may have different criteria, recruitment systems and communication strategies. To know their customer, Pula should reach out to other organisations that enlist the help of lead farmers, to learn about recruitment and best practices for engaging this group.

## › **On Targeted Referrals**

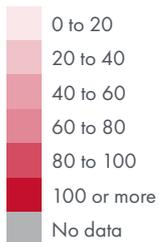
Develop a return on investment (RoI) framework to decide whether and whom to call. This could be done by using experimental testing to estimate the added benefit of calling and comparing to the average cost per call.

# ANNEX

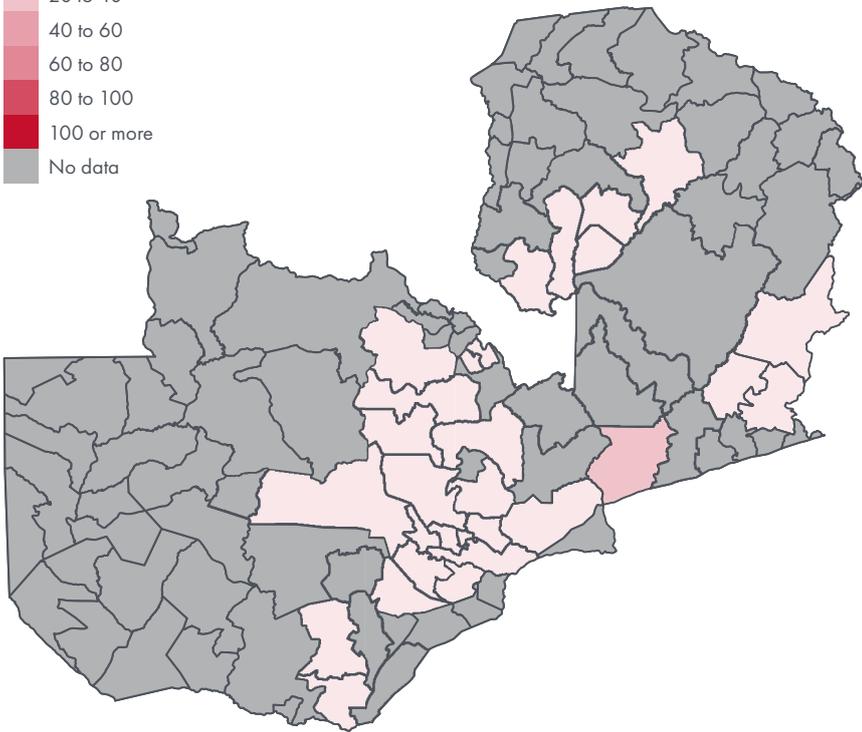
## Geographic distribution of successful referrals

Successful referrals are very **evenly spread** across both countries.

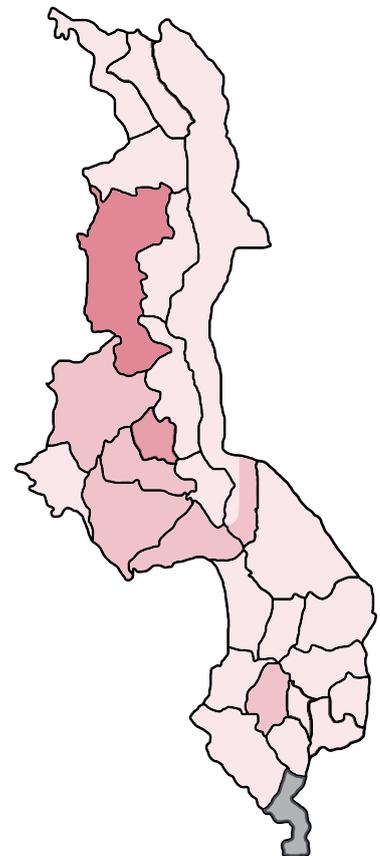
Referral conversions



Zambia



Malawi

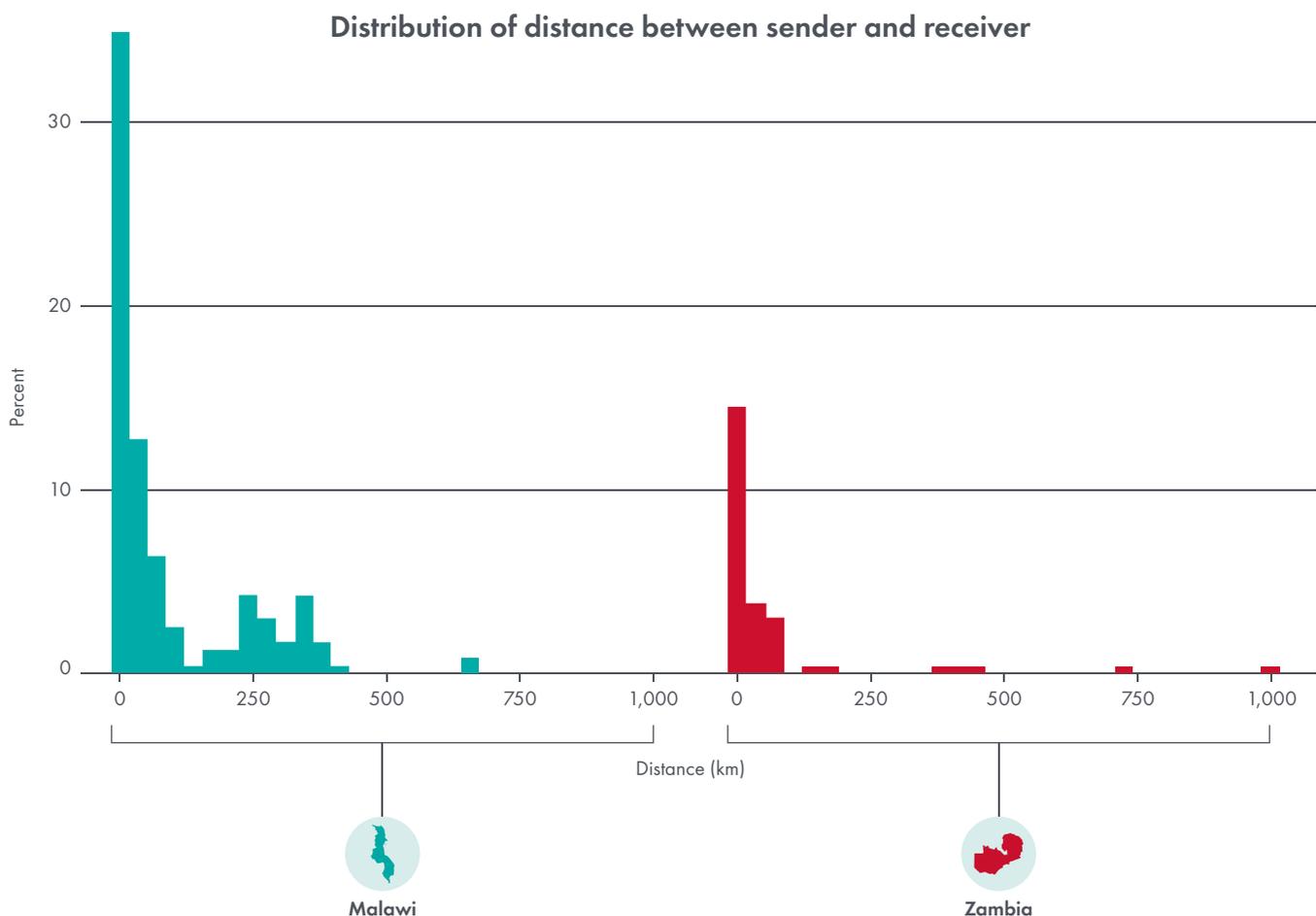


# ANNEX

## Distribution of distance between sender and receiver

We observe that successful referrals are most likely to be close by (modal distance is <50km).

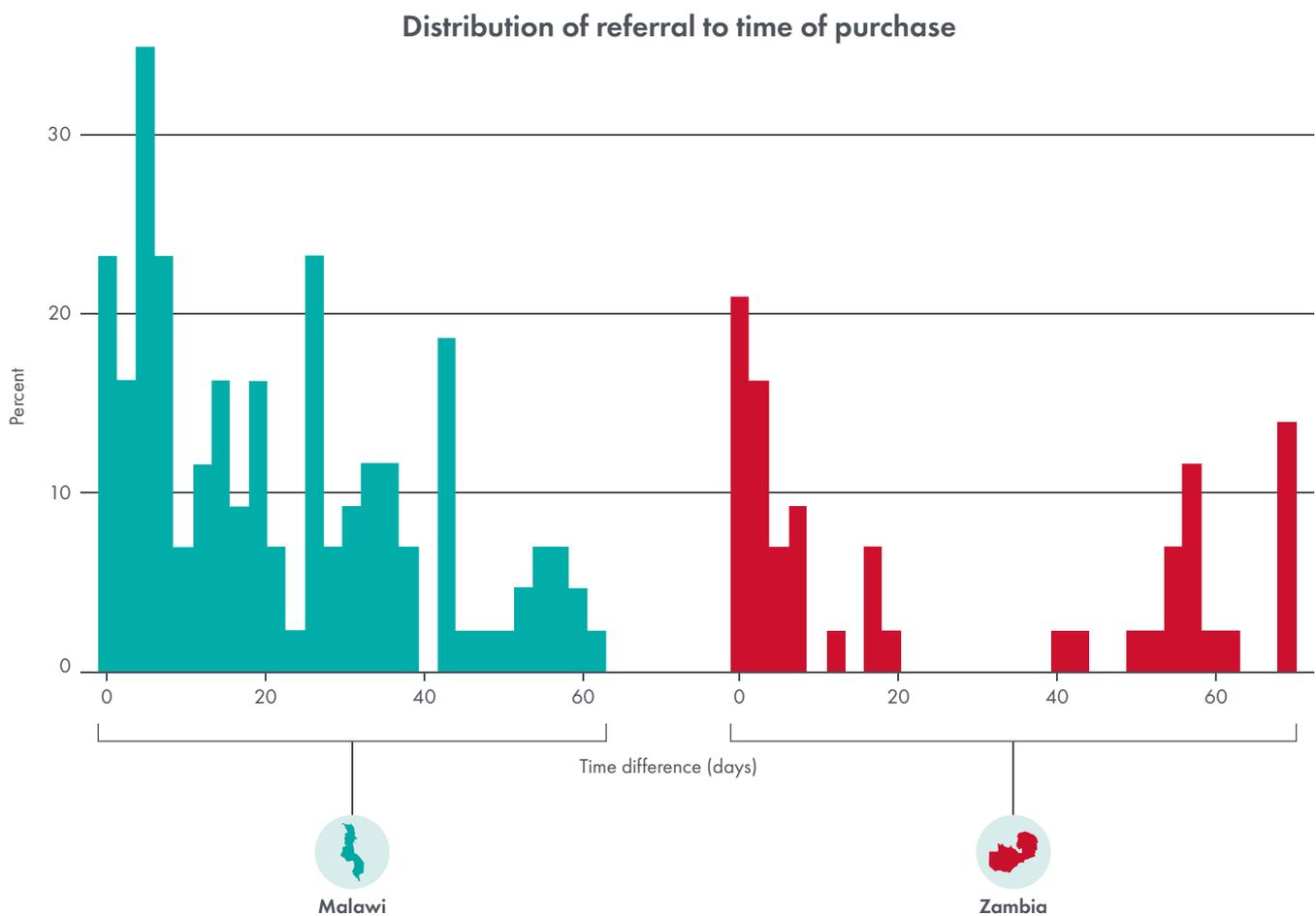
However, there are instances of referrals being successful when sender and receiver are 500km apart or more.



# ANNEX

## Distribution of referral to time of purchase

Mean time between referral and purchase for successful referrals was 27 days in Zambia and 21 days in Malawi



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