



An Ali Baba for Farmers: Linking Buyers & Sellers in Ugandan Agricultural Markets

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Poor Integration in African Markets:

- Lack of market integration is a major issue.
 - Imperfect co-integration over space (Rashid and Minot 2010)
 - In Uganda, some improvement in major market integration since market liberalization, but distant markets remain disconnected (Rashid 2004)
- Major implications for farmer income and food security (e.g. Ethiopian famine of 1984)
- While poor roads and infrastructure often get much of the blame, increasing attention paid to other transaction costs (Fafchamps 2004)
 - Search costs
 - Credit constraints
 - Contractual risk



Barriers to Market Integration:

- Search costs:
 - Reducing search costs dampens price dispersion (Jensen 2007, Aker 2010)
 - Simply providing price information often insufficient to raise farmer income (Aker & Fafchamps 2015, Fafchamps & Minten 2012)
 - Necessary to fundamentally shift intermediary power/actors in order to change prices (Goyal 2011, Svensson & Yanagizawa 2009)
- Credit & scale constraints
 - Need to aggregate output of many small farmers
 - Sellers themselves often lack the credit to do this aggregation.
- Contractual risk:
 - Buyers must terms will be as promised when they arrive
 - In the absence of contract enforcement, this leads to relational contracting (Fafchamps and Minten, 1998; Gabre-Madhin, 2001)

How to make markets more efficient?



Our solution:

- Multipronged intervention providing:
 - Creation of new private-sector **intermediaries** with direct links to large buyers, including forward contracts for specific cash crops.
 - Implementation of **Kudu**, new digital trading platform for agricultural crops, allows farmers or agents to post lots
 - Use of quality/bulking certification by agents and randomized **transport cost guarantees** to promote digital platform.
 - Creation of large-scale SMS-based **Market Survey** in 241 markets, collecting price data every two weeks.
 - Creation of '**SMS Blast**' system that broadcasts price data from Kudu + Market Survey to traders and farmers in treatment markets.
- **Large-scale RCT covering 12% of Uganda.**

Our Team:

- Policy Design & Evaluation Lab at UCSD.
 - AgriNet: large private-sector ag intermediary.
 - Kudu: new software platform from Makerere
 - IPA Uganda
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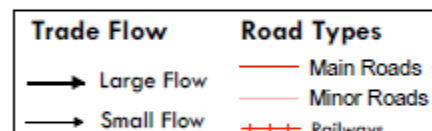
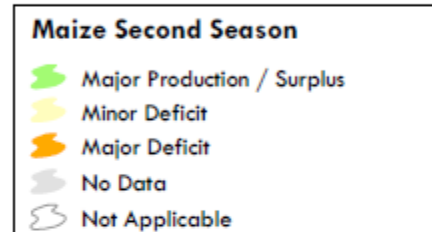
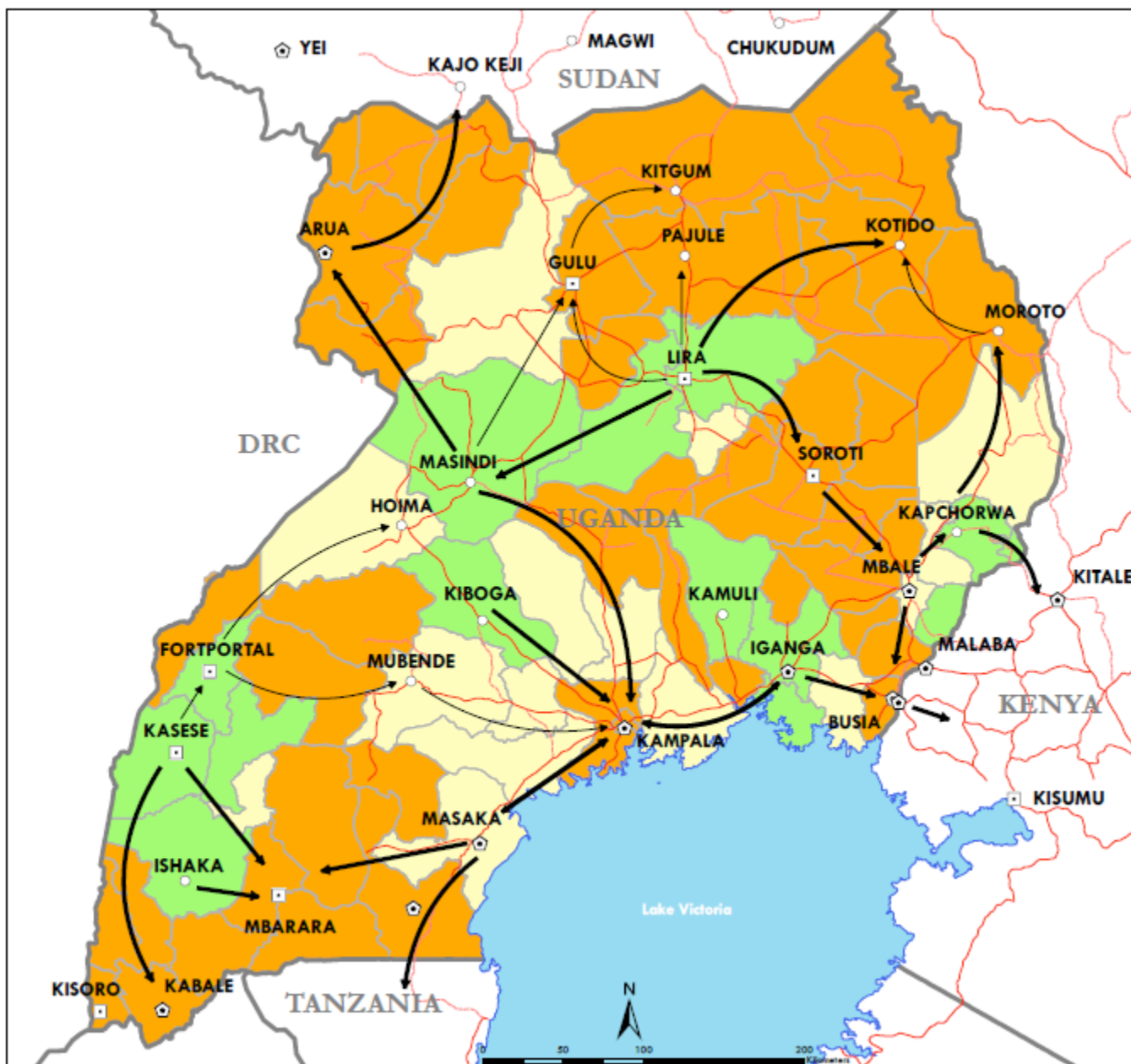


Research Design:

	Treatment	Control
Unit of randomization:		
Subcounties:	55	55
Trading Centers:		
Hub Markets	15	15
Spoke Markets	115	115
Traders:		
All	550	550
AgriNet Cas	220	
Farming Households:	1500	1500

- Randomization conducted at sub-county level.
 - Pick 2-3 largest trading centers in each sub-county; become PSUs.
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- maize surplus
- relatively remote
- deemed by Agrinet to be attractive commercial candidates for expansion.



Building Blocks of the Project (1):

- AgriNet
 - Largest private-sector brokerage firm in Uganda
 - 164 Commission Agents recruited by AgriNet
 - CAs are existing agricultural traders in the treatment communities
 - given training on how to bulk and quality grade,
 - how to use Kudu
 - get additional contacts to buyers through AgriNet
 - Randomized access to COB loans
 - Randomized transport guarantees to buyers

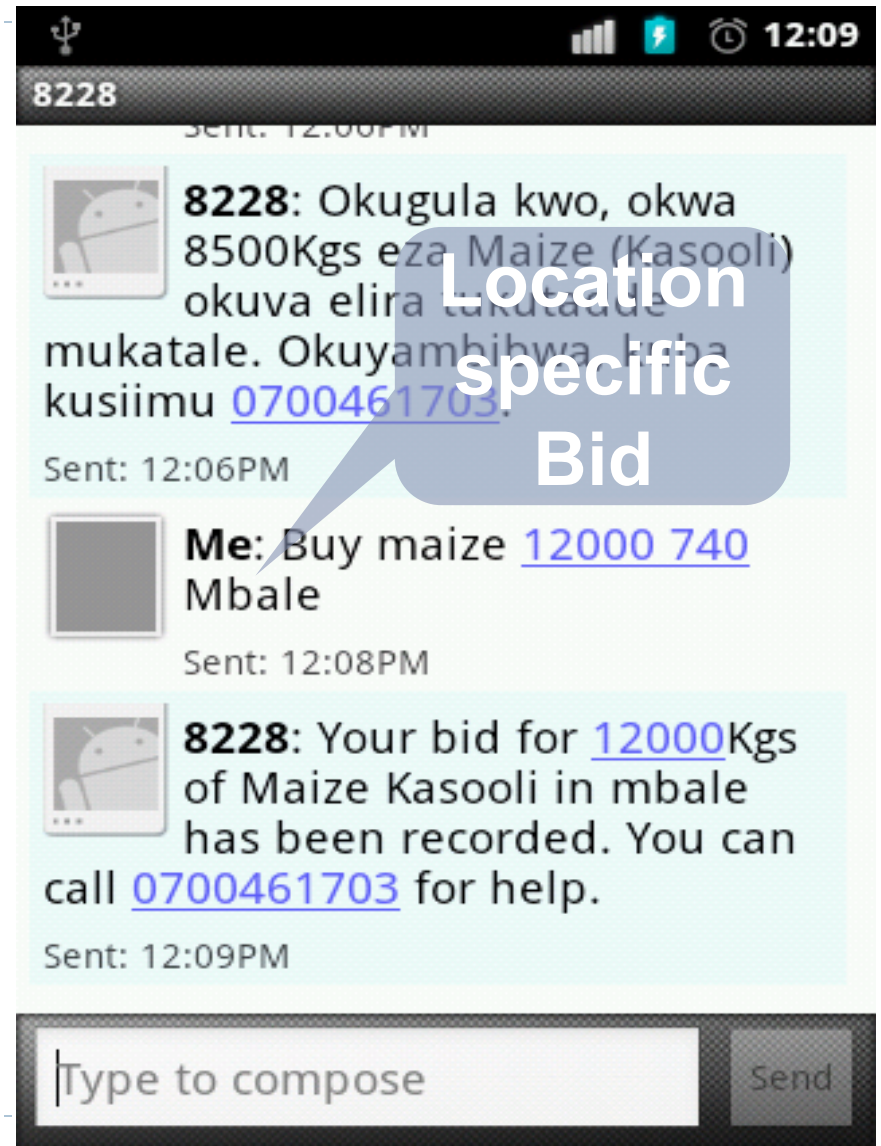
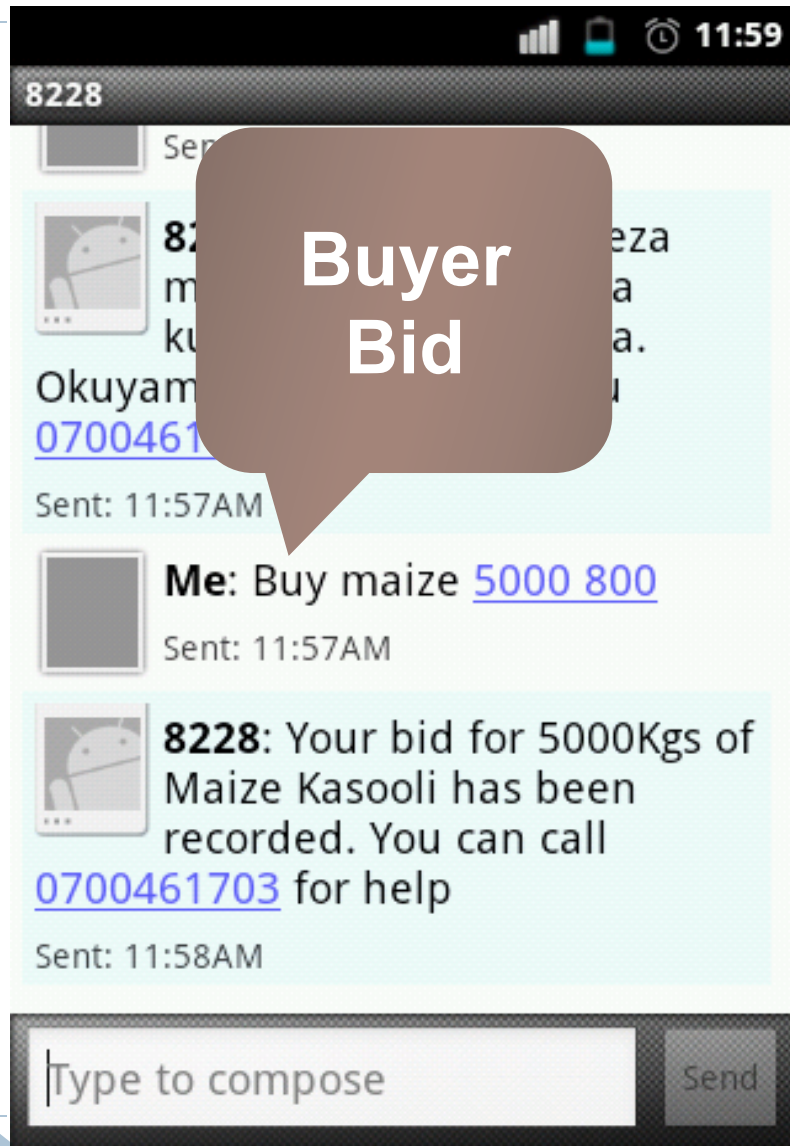


Building Blocks of the Project (2):

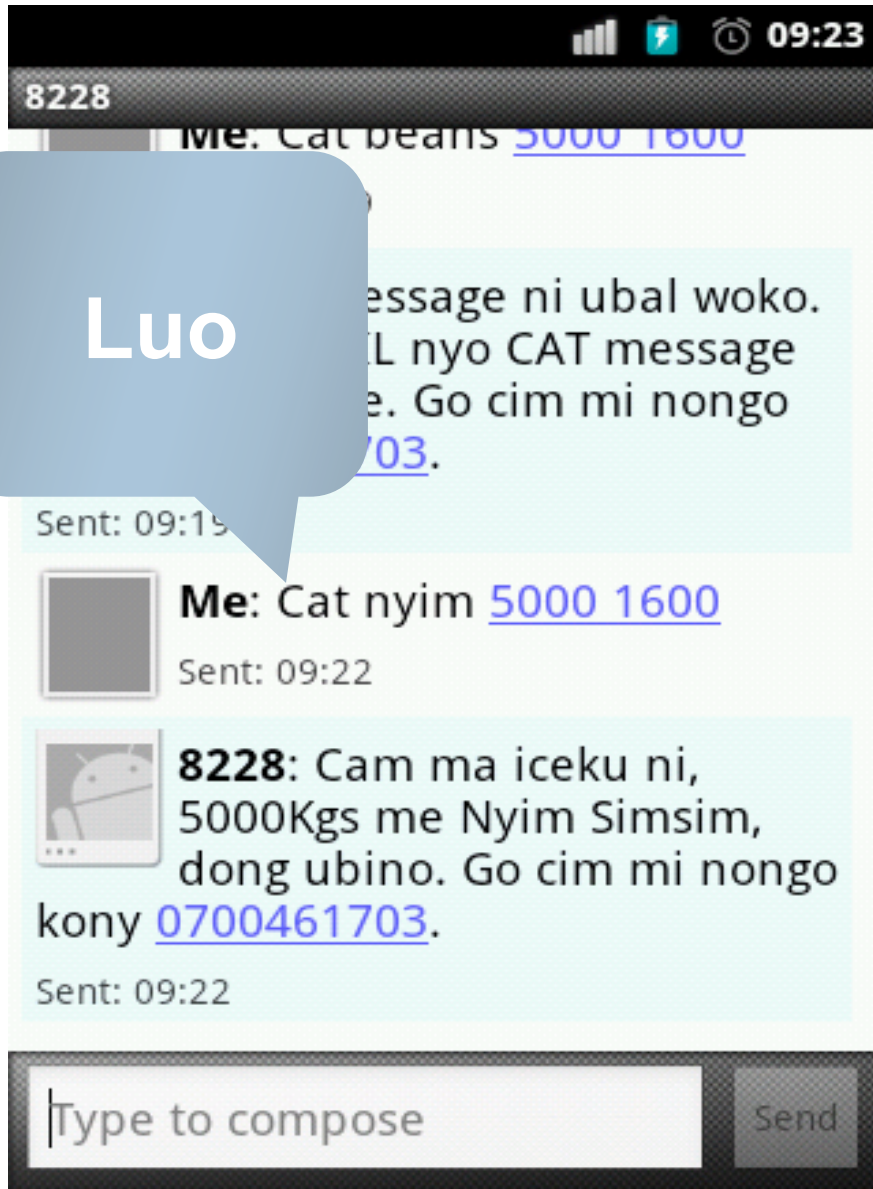
- **Kudu**

- Designed by the College of Computing and Informatics Technology at Makerere University.
 - Registered sellers post lots for sale, state reservation prices, system knows seller location.
 - Buyers post bids and a ceiling price, matching algorithm finds distance/price pareto frontier and displays 3 best lots to each seller (called “matches”).
 - Price-setting mechanism gives buyer lowest price possible.
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Kudu interface – Buyer Requests

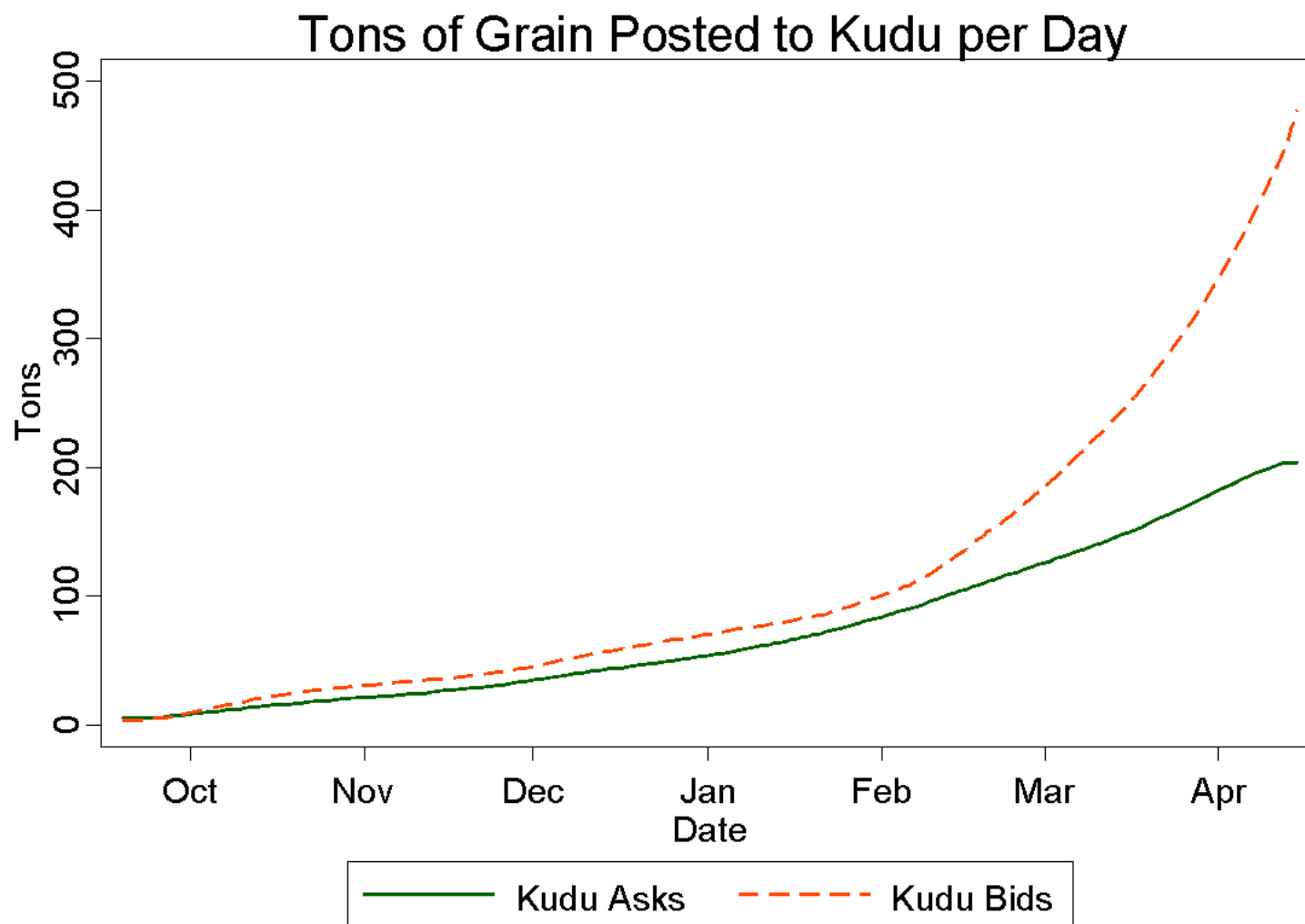


Multi-Lingual Options – English, Luo, Luganda, Swahili



The map displays the geographical layout of Uganda, with its four administrative regions clearly labeled: Northern, Western, Central, and Eastern. The capital, Kampala, is marked with a red square in the Central region. Major water bodies, including Lake Albert and Lake Victoria, are shown in blue. The map also identifies numerous towns and cities, such as Gulu, Lira, Mbarara, and Kigali. A zoom control is located in the top left corner, and a date/time stamp '08/04/2015' is visible in the bottom left corner.

Kudu quantities:

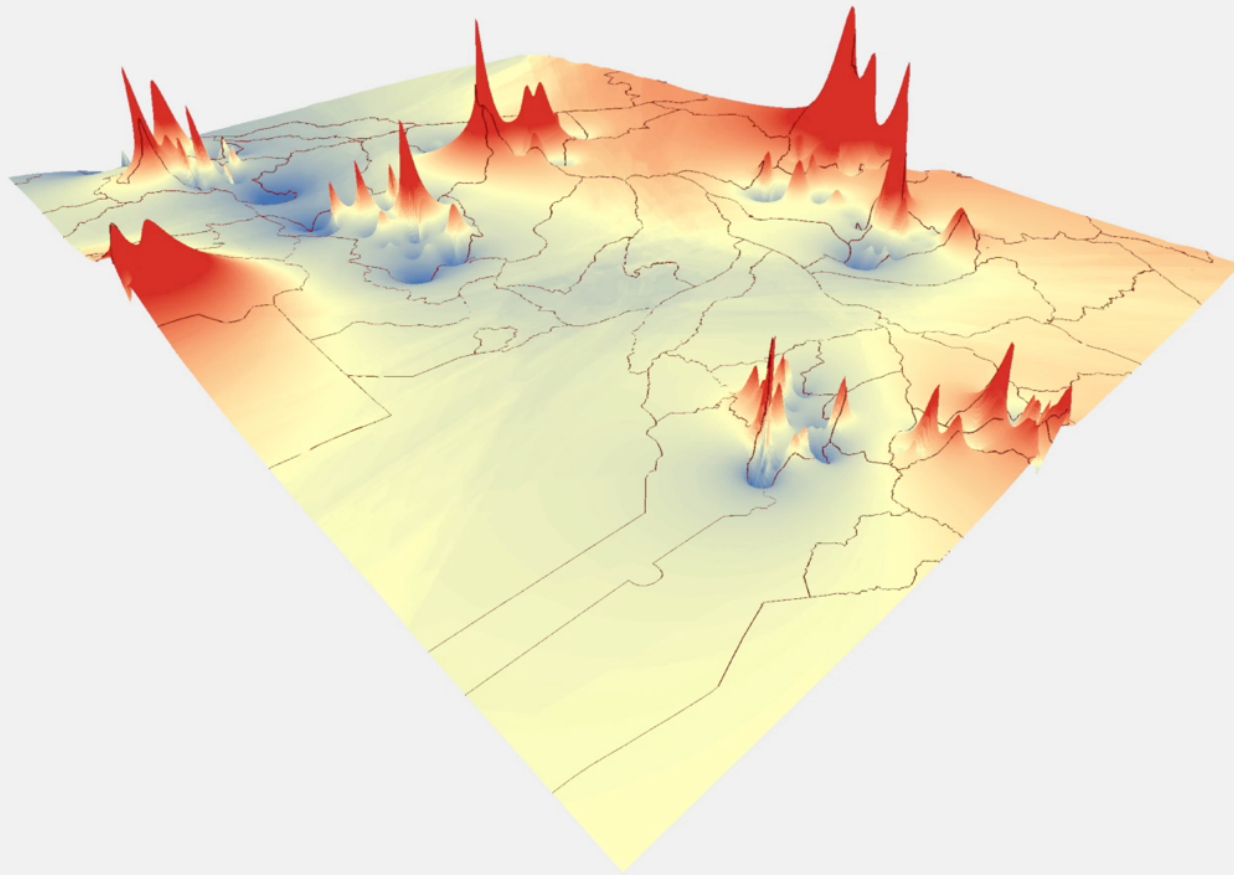


Building Blocks of the Project (3):

Market Survey System

- Recruit traders to serve as enumerators in 241 markets.
- Every two weeks they are pushed out a survey and they respond by SMS.
- Open-source software being designed at UCSD.
- Training, spot-checking conducted by IPA.
- New way of providing high-granularity market data, system designed to be scaled rapidly within SSA if successful.
- Provides data capture for study as well as price inputs for interventions in treatment markets.

Market Price Data



Building Blocks of the Project (4):

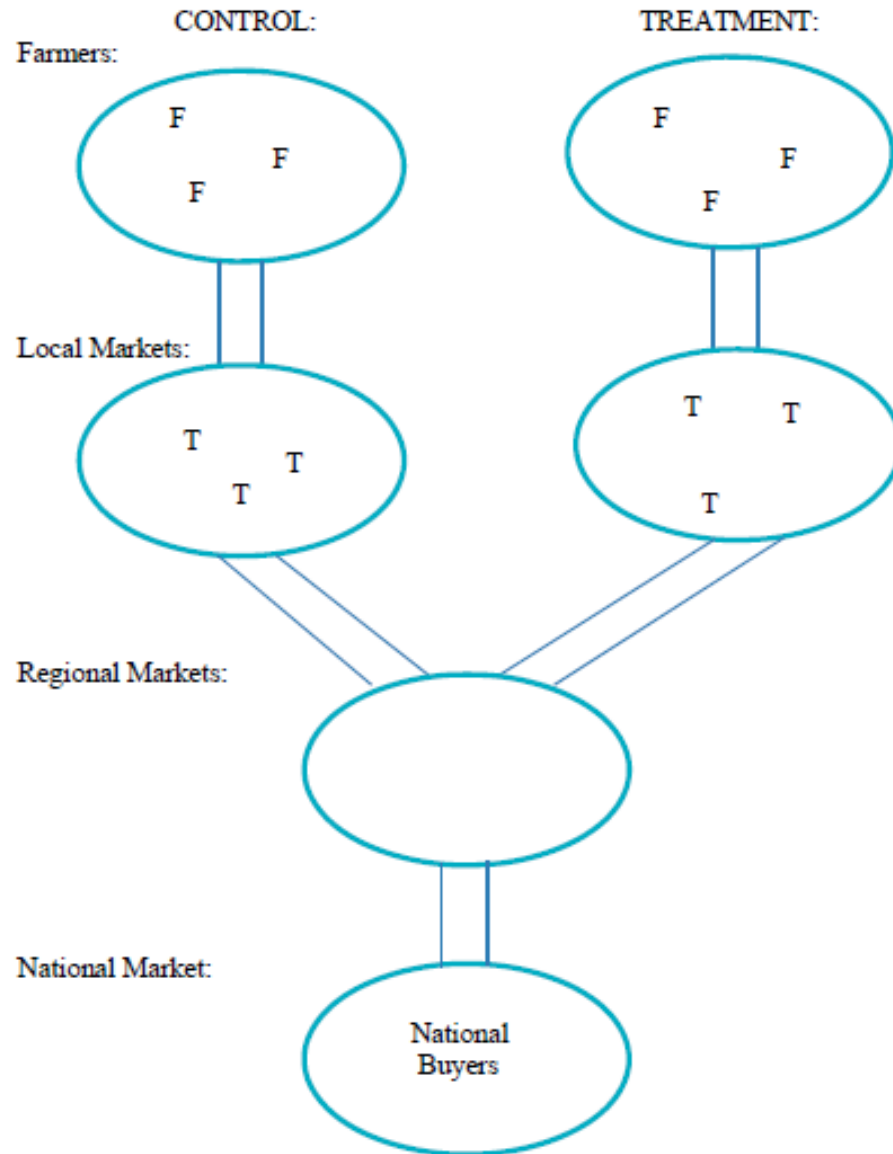
- SMS Blast System

- *“Downstream” price information:* price information for your local market, your regional market, and Kampala or closest border market.
- *“Random Blast” price information:* each week we randomly sample five treatment markets and circulate price information on these markets
- *Extra AgriNet price information:* prices for major markets across the country collected by other firms (to which AN subscribes)
- *Kudu marketing:* advertising messages for Kudu
- *Kudu price:* recent prices of deals transacting on Kudu

Market Linkages:

Basic
Schematic:
Farmers sell to
traders in local
market trading
centers.

Local traders
sell on to
regional
middlemen who
transport to
large national,
international
markets.



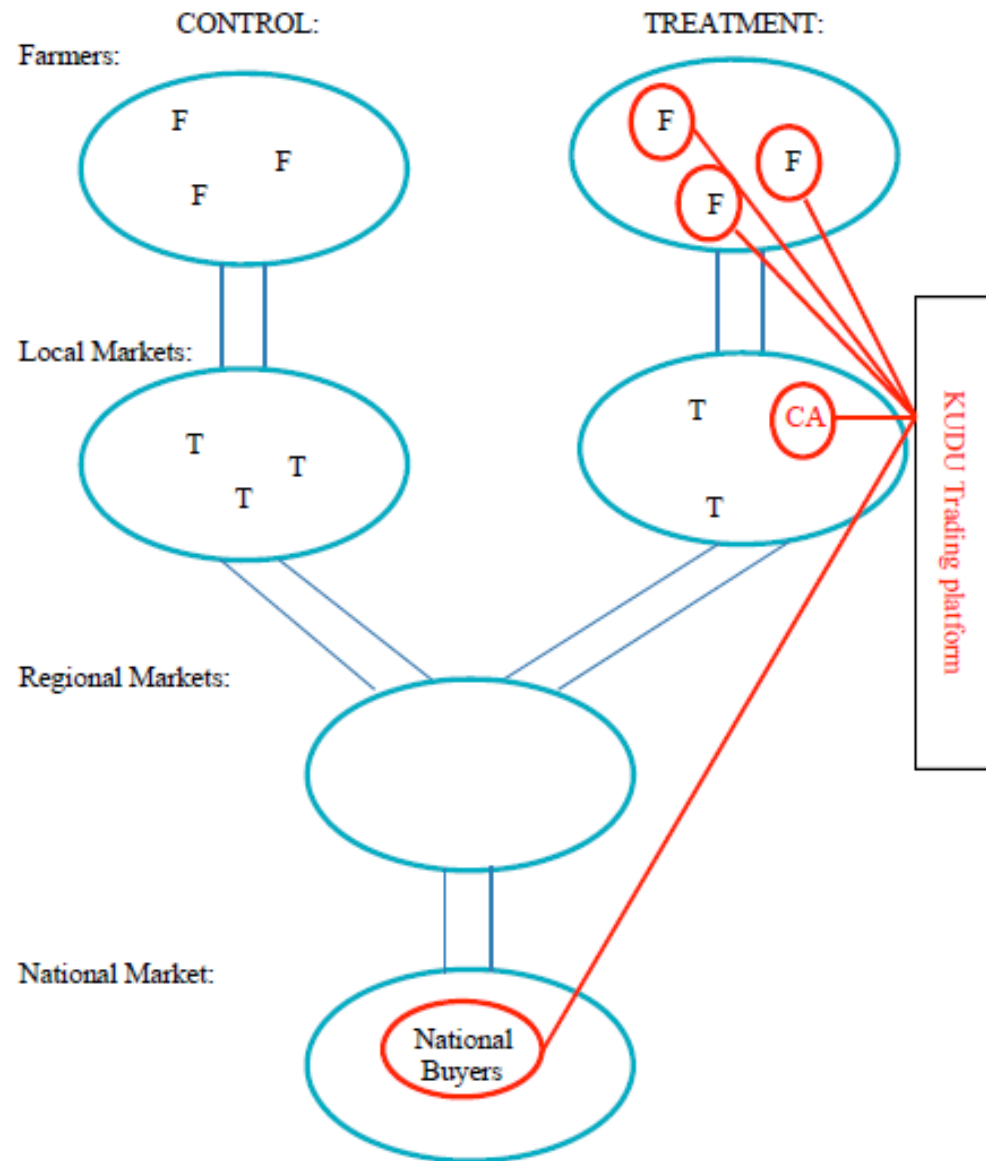
Market Linkages:

Kudu: Provides direct linkage between farmers and national buyers.

Our project trains & licences AgriNet CAs to certify the quality of lots posted in Kudu.

AN to provide liquidity for bulking.

Randomized guarantees of transport costs for buyers.

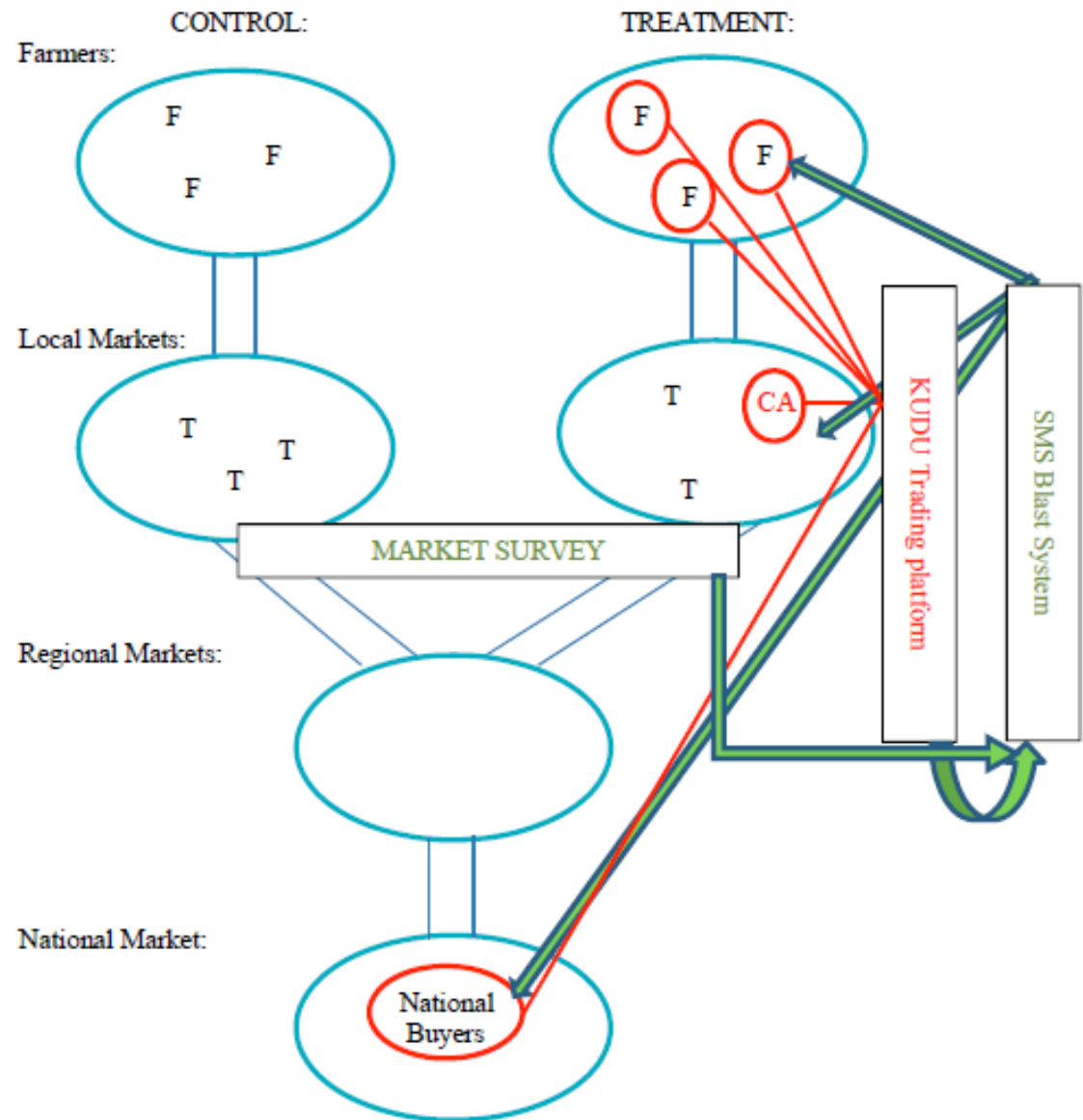


Market Linkages:

Market survey captures prices in T & C markets biweekly.

Price data from Market Survey, Kudu fed into Blast SMS system.

Farmers and Traders sign up to receive Blast SMS, system free for first two year of project.



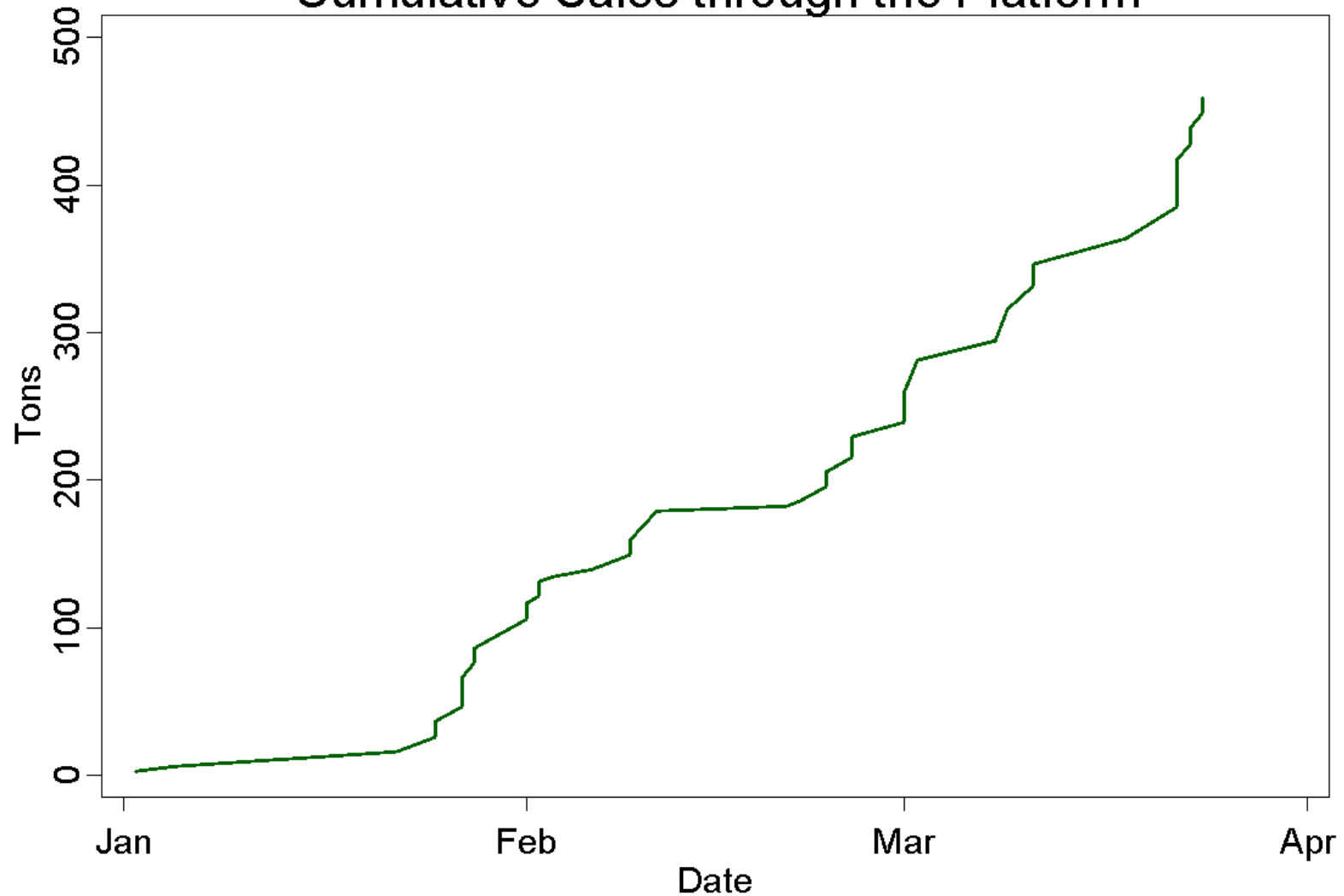
Project Timeline:

- Trader and farmer baselines run Spring 2015
- **Season 1:** July-October 2015
- **Season 2:** Dec-March 2016
- Trader midline survey May-June 2016 
- **Season 3:** July-October 2016
- **Season 4:** Dec-March 2017
- Endline surveys Spring 2017
- Move to scale project, including widespread radio advertising, linking Kudu to other implementers



Cumulative sales

Cumulative Sales through the Platform

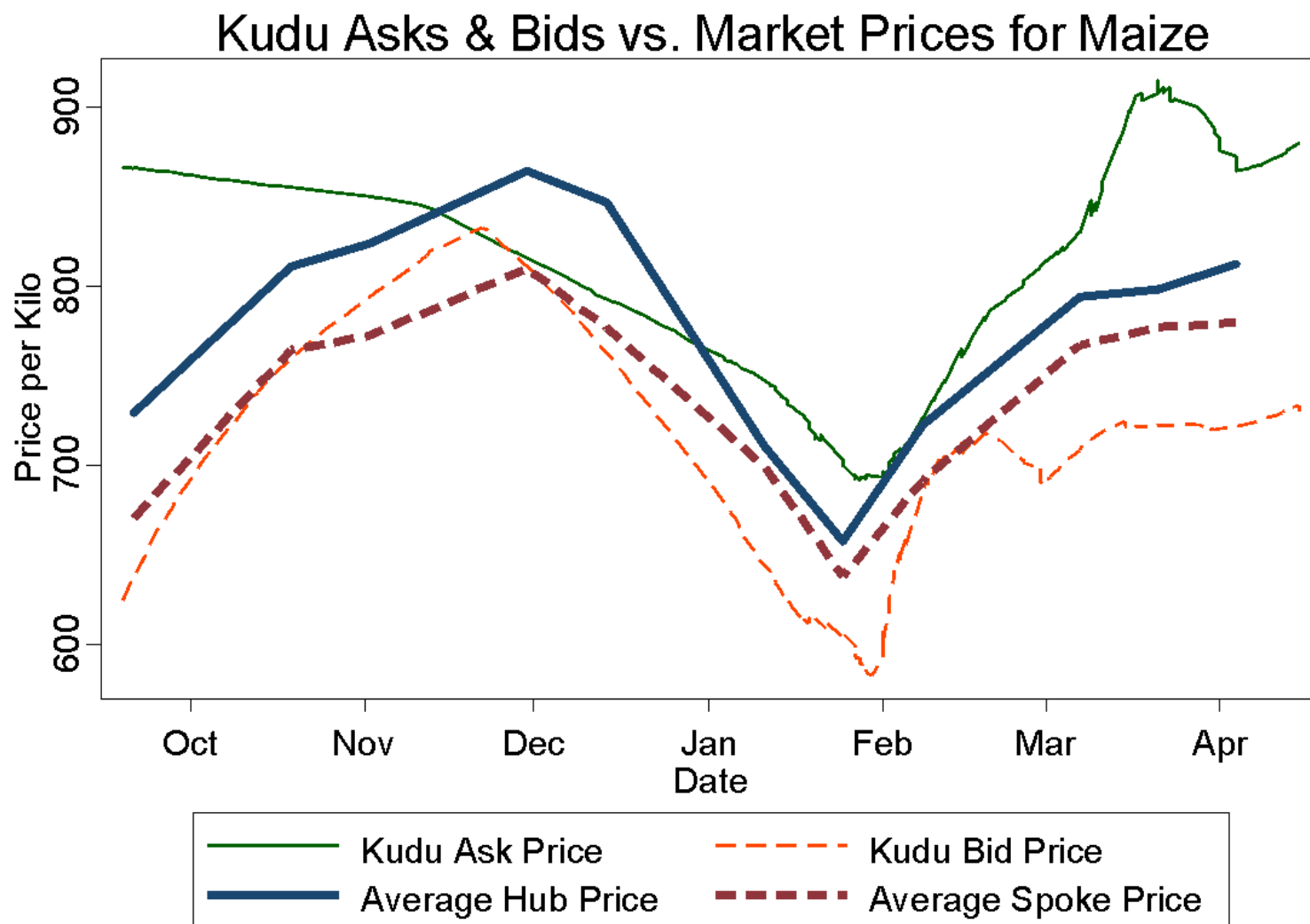


Initial signs of price convergence

Impact on Log Selling Price Dispersion, by Dyad

	maize	beans	tomato	matooke
One Market Treated	-0.0442*** (0.0043)	-0.0478*** (0.0066)	-0.00389 (0.0066)	-0.000769 (0.0086)
Both Markets Treated	-0.0898*** (0.0051)	-0.0945*** (0.0076)	-0.00542 (0.0070)	0.00939 (0.0095)
Constant	4.480*** (0.0067)	5.539*** (0.0092)	8.644*** (0.0087)	8.185*** (0.0111)
Observations	269,581	184,140	315,444	210,942
R-squared	0.076	0.041	0.027	0.019

Challenges: Price Mismatch

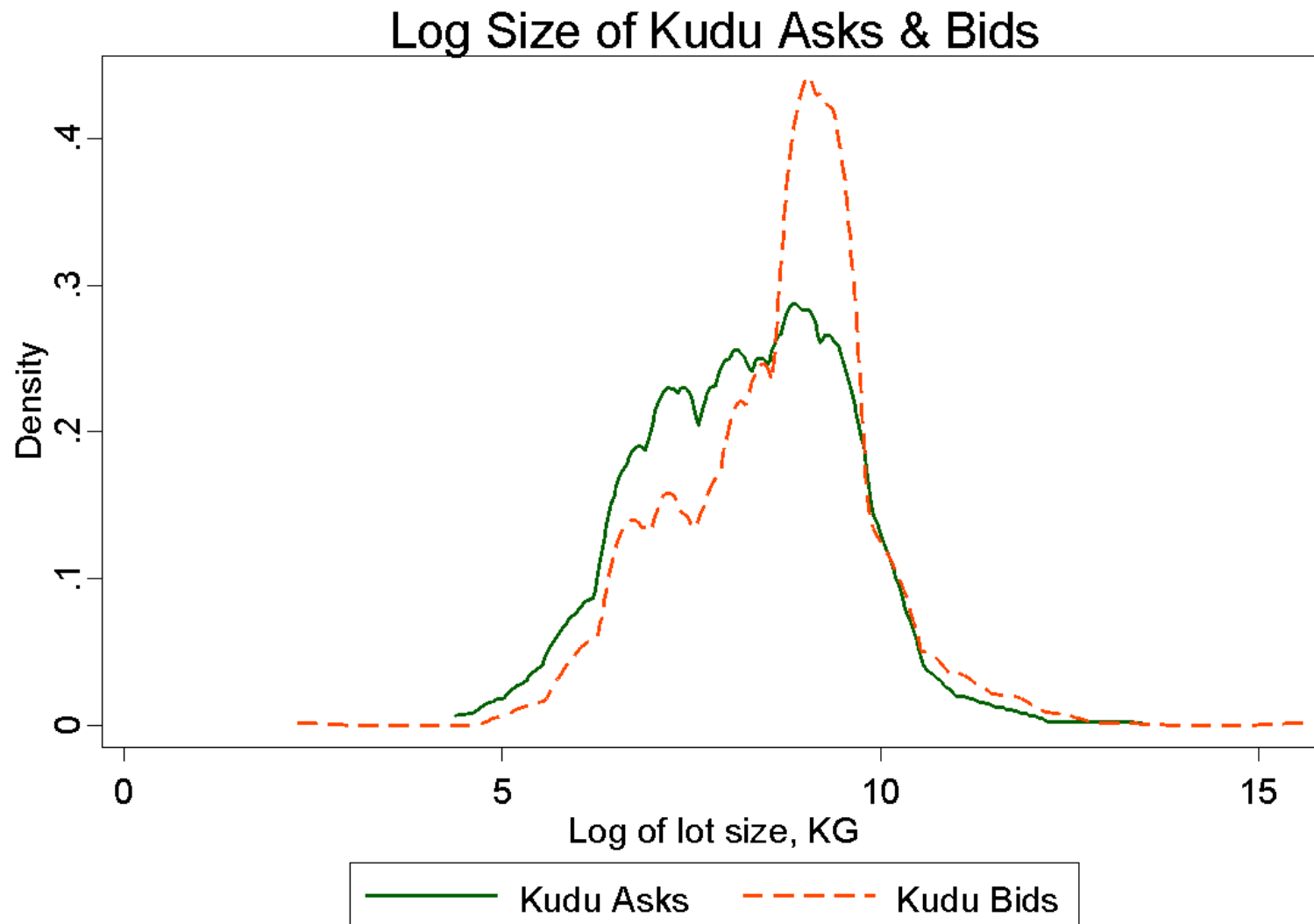


Addressing Price Mismatch:

- Adjustments to test:
 - Moving Kudu to a USSD platform that allows for more interactive relationship with customers as they post data.
 - Price discovery:
 - Clear the market daily.
 - Identify sellers and buyers who do not match
 - Send them an SMS letting them know the price they would have had to post at (given location, crop, and quantity) to have matched.



Challenges: Quantity Mismatch



Addressing Quantity Mismatch

- ‘E-Bulking’
 - Conduct intensive promotion of Kudu in treatment villages, generate high density of asks in small area.
 - Use Kudu as a way of organizing and bulking large number of farmers:
 - Data visualization tools to represent best opportunities to E-bulk.
 - Use AgriNet Commission Agents as entities to conduct bulking on the ground.
 - Connect E-bulking opportunities with COB credit for CAs
 - Get farmers better prices, more reliable buyers.



Conclusion:

- Multipronged intervention that seeks to use ICT to:
 - Reduce search costs
 - Ease credit constraints and facilitate bulking
 - Reduce contractual risk
 - Preliminary results:
 - SMS information systems worked well in season 1. Kudu achieved lift-off in season 2.
 - Initial evidence of price convergence.
 - Season 3 goals:
 - Data visualizations to allow traders to identify ‘buy’ and ‘sell’ regions.
 - Improve price discovery using SMS Blast, Kudu notifications for unmatched buyers & sellers
 - Explore E-bulking, both on the ground (village-level promotion) and as an algorithmic problem.
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Weebale Nyo!

