DIRTS:
Addressing Constraints to Agricultural Transformation in Northern Ghana

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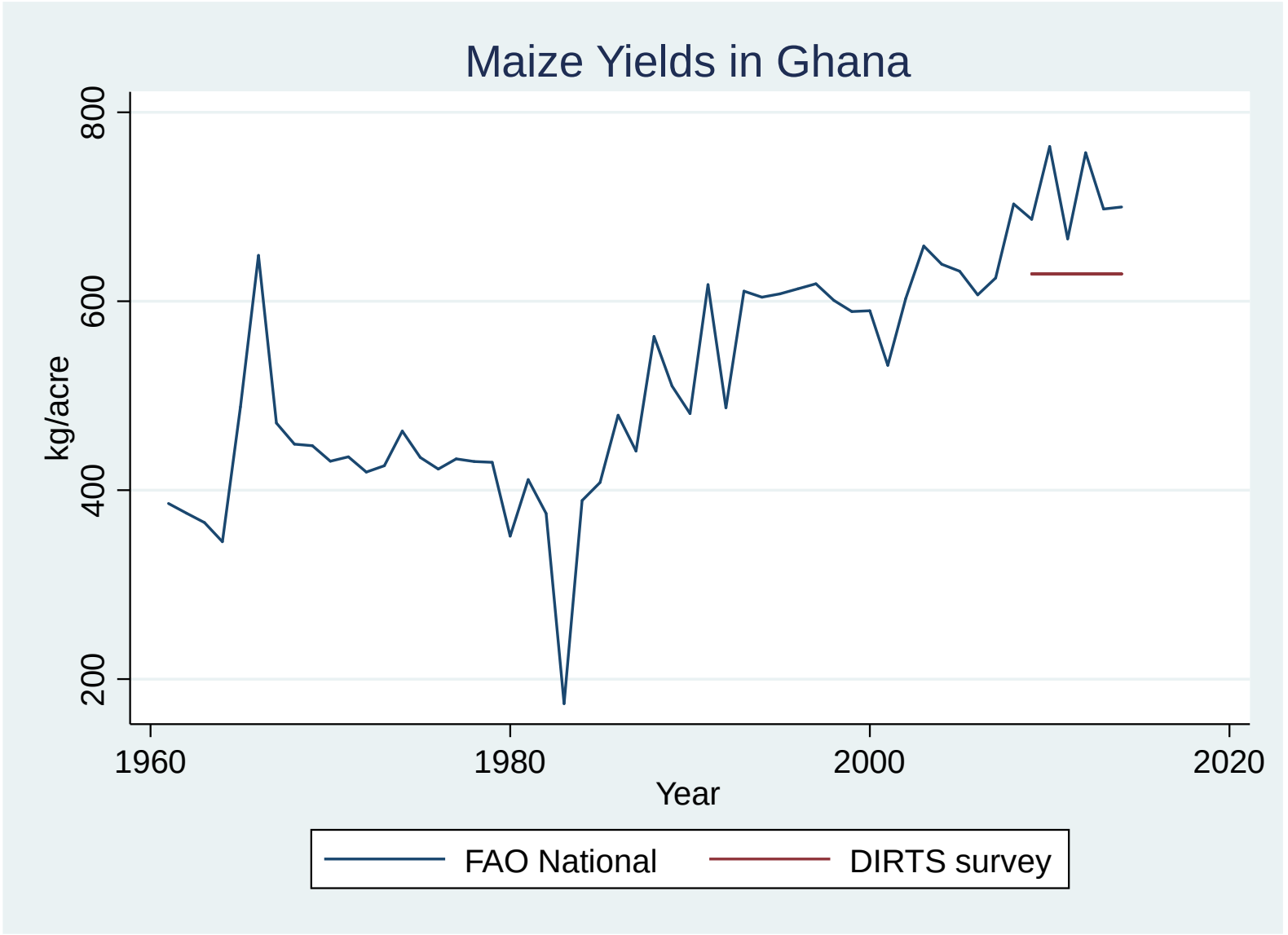
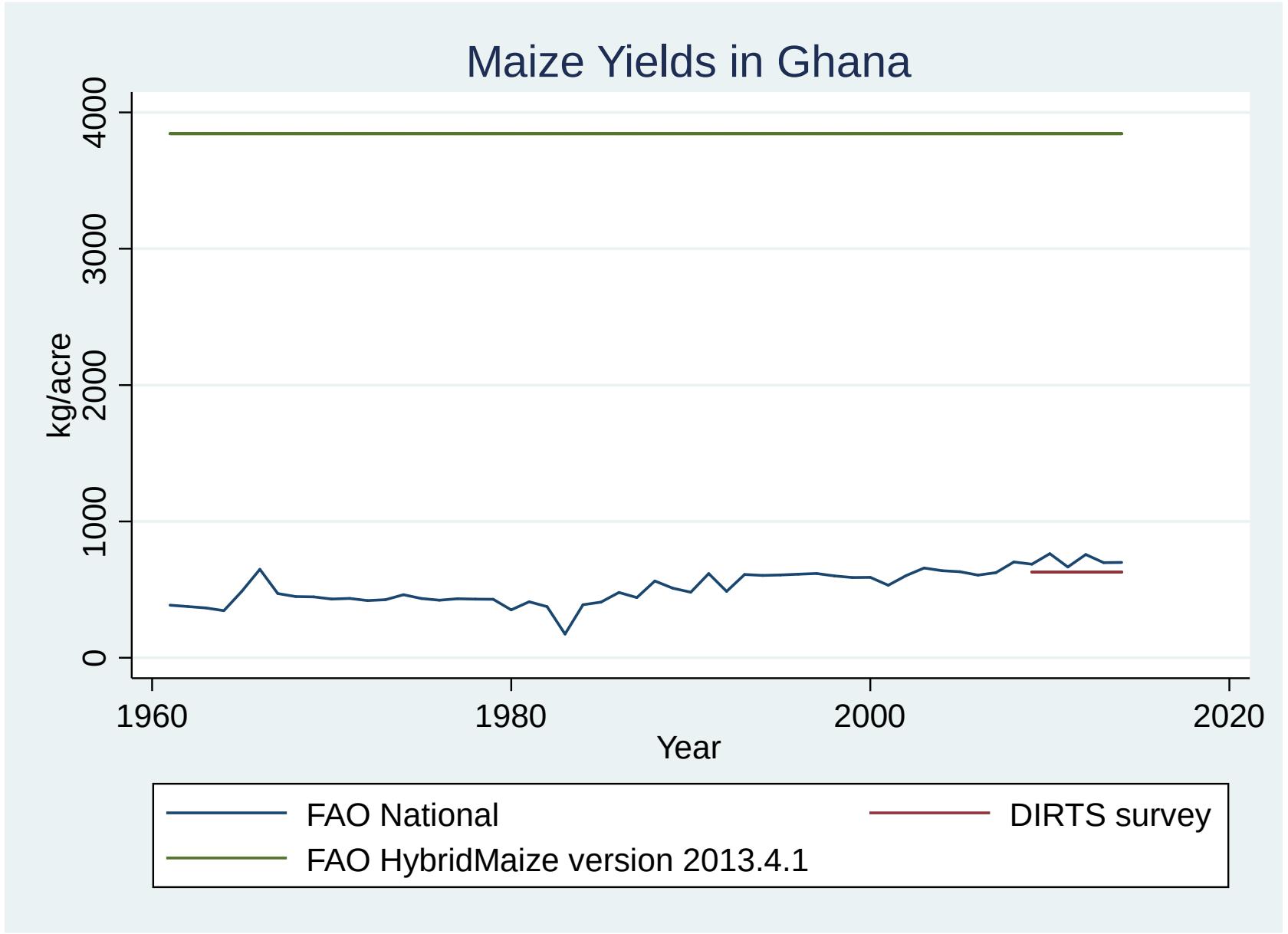
INNOVATIONS FOR POVERTY ACTION


Maize Yields in Ghana
800
600
400
200
kg/acre
1960
1980
2000
2020
Year
FAO National
DIRTS survey


Maize Yields in Ghana
kg/acre
0
1000
2000
3000
4000
1960
1980
2000
2020
Year
FAO National
DIRTS survey
FAO HybridMaize version 2013.4.1

How can we increase agricultural productivity in northern Ghana?

- **Many possible barriers:**
  - Previous findings: Using insurance to reduce farmers' risk frees them up to invest more in inputs
  - Capital constraints?
  - Knowledge of best practices?
  - Timely access to inputs?
  - Information on output prices; weather forecasts?

DIRTS Key Findings

INFORMATION

- Community Extension Agents improve knowledge and practice by 3% to 50% depending on the practice.
  - Timing of the message matters
- Adoption of improved practices by some farmers did not translate into measurable increases in average yields or profits for the group as a whole.

DIRTS Key Findings

INFORMATION

- Farmers adjust timing of planting and agrochemical application in response to text messages of 48-hour weather forecasts
- Text messages regarding current prices of grains at major markets influence decisions regarding storage

DIRTS Key Findings

RISK

- There is limited demand for rainfall index insurance
  - But farmers granted substantial amounts of rainfall index insurance invest more heavily in agrochemical use

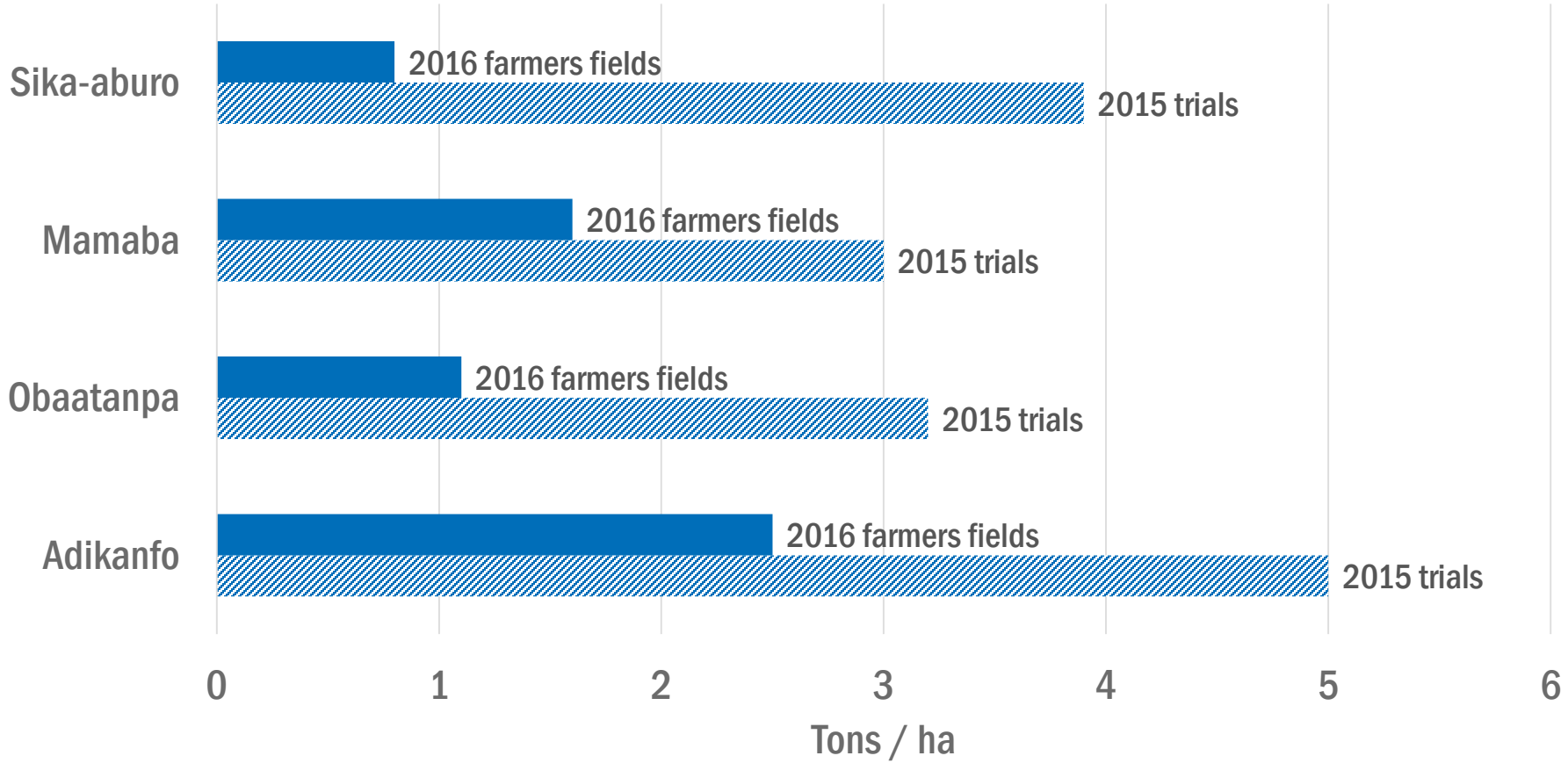
DIRTS Key Findings

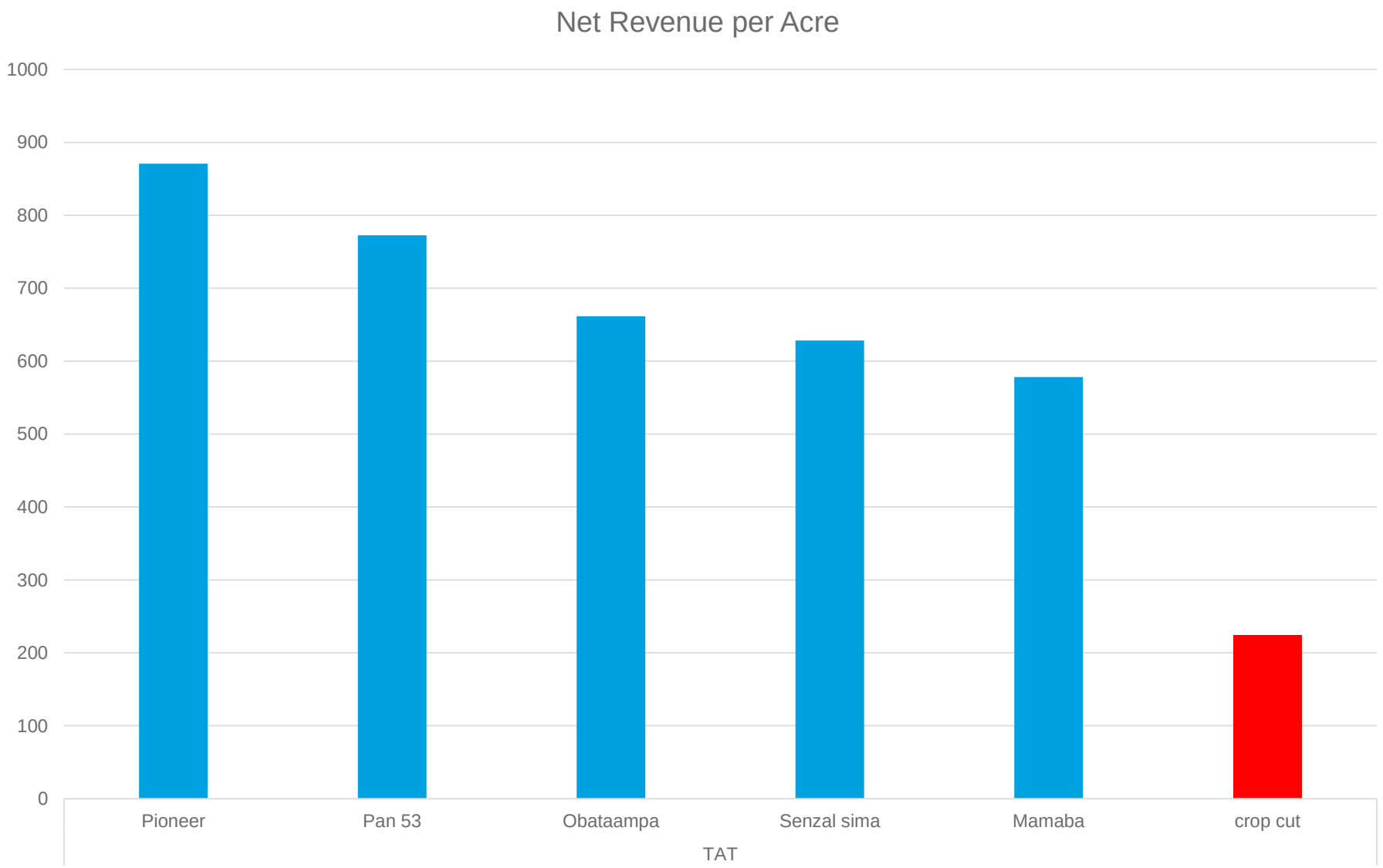
INPUT MARKETS

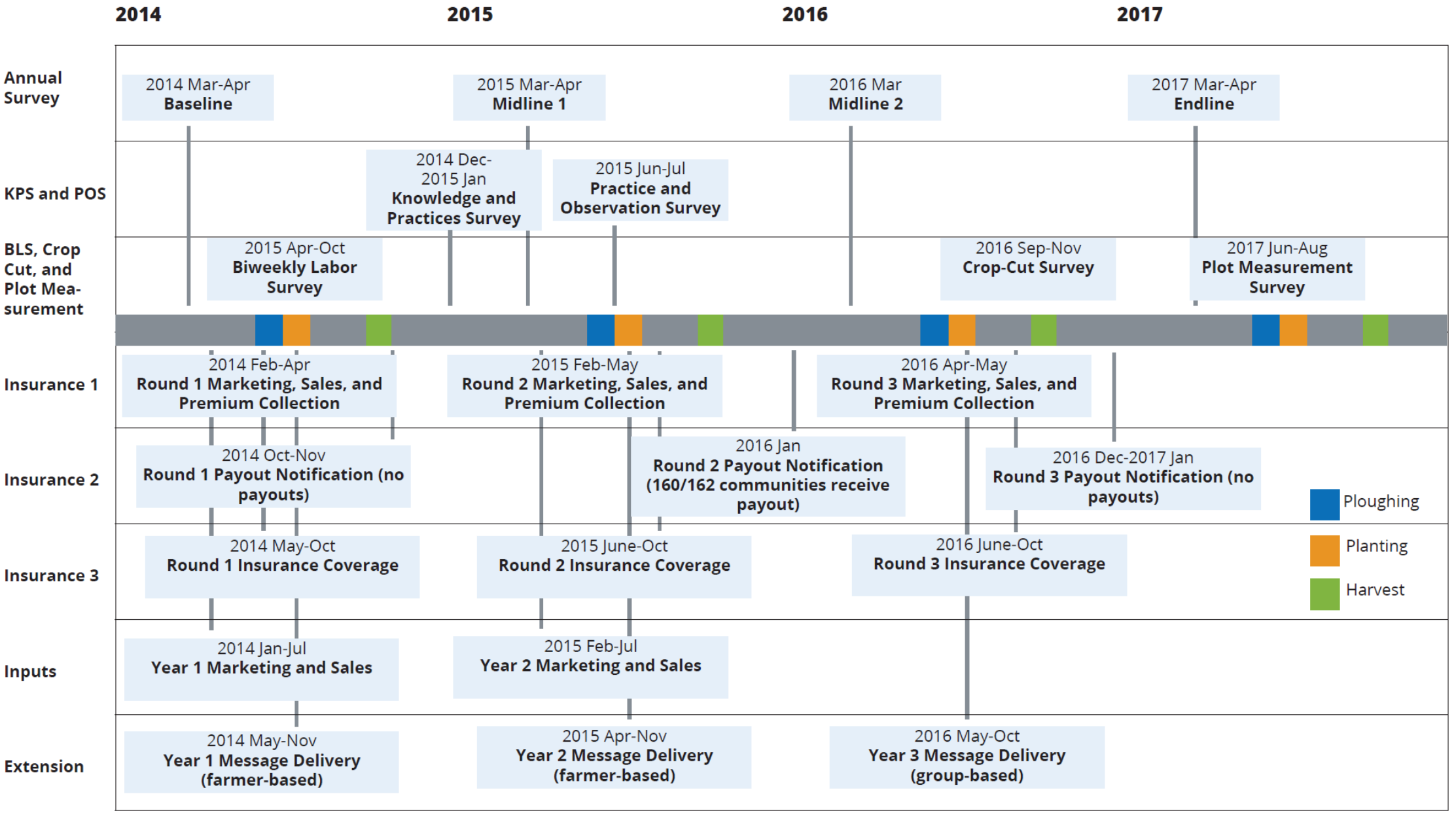
- Free delivery and community marketing did not increase demand for inputs
  - Demand was driven by expectations given the availability, timing, and value of subsidies for inputs

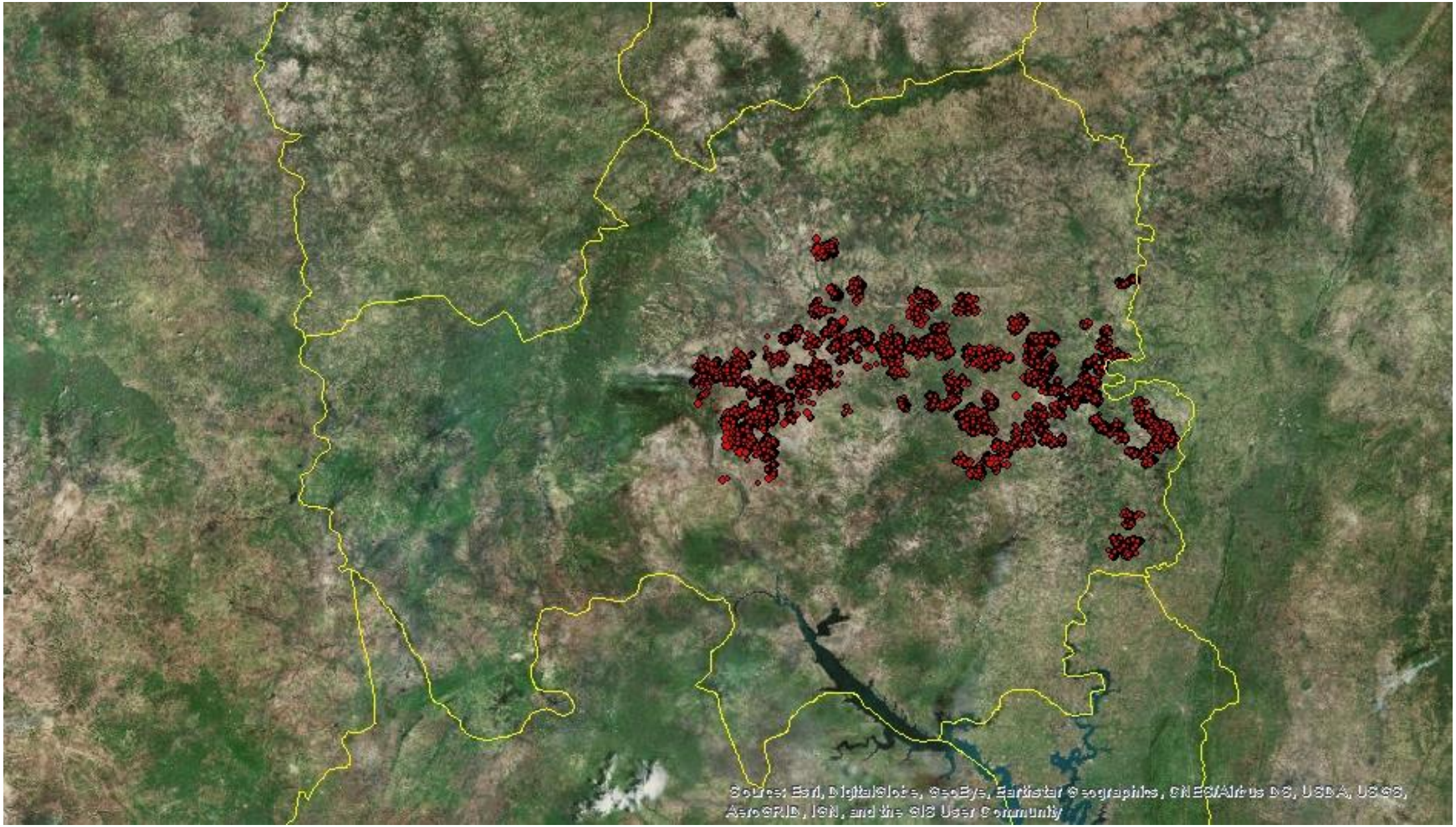
Ideal vs Actual Yields

by variety

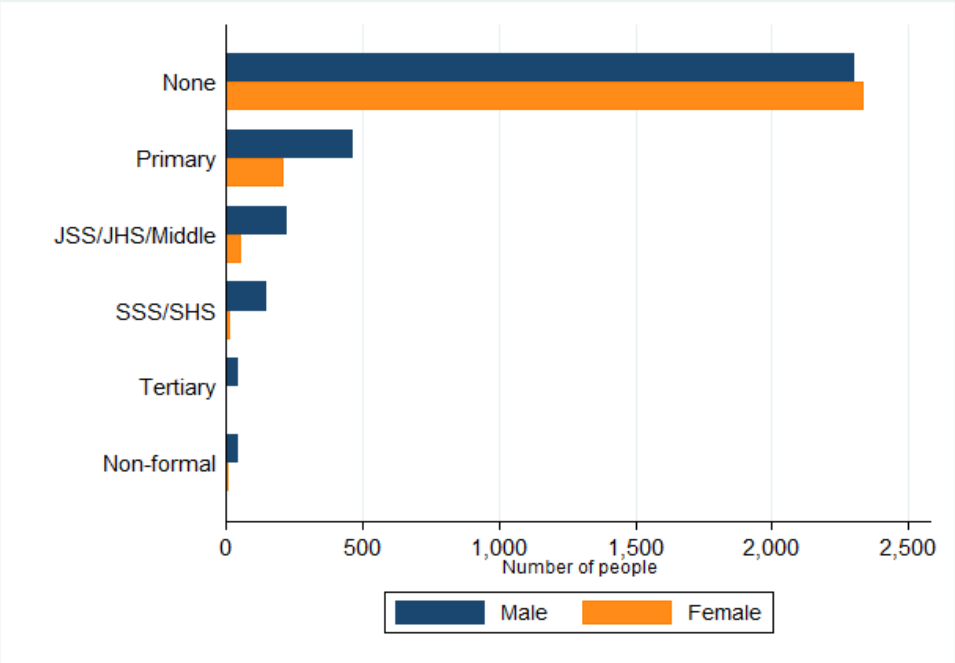



Net Revenue per Acre
1000
900
800
700
600
500
400
300
200
100
0
Pioneer
Pan 53
Obataampa
Senzal sima
Mamaba
crop cut
TAT

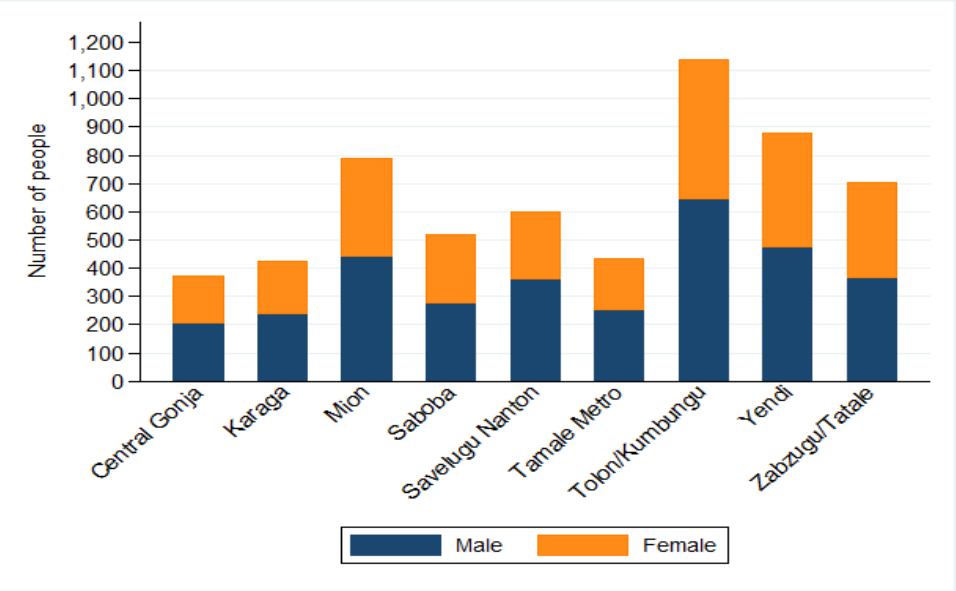

2014
2015
2016
2017
Annual Survey
KPS and POS
BLS, Crop Cut, and Plot Mea-surement
Insurance 1
Insurance 2
Insurance 3
Inputs
Extension
2014 Mar-Apr
Baseline
2015 Mar-Apr
Midline 1
2016 Mar
Midline 2
2017 Mar-Apr
Endline
2014 Dec-2015 Jan
Knowledge and Practices Survey
2015 Jun-Jul
Practice and Observation Survey
2015 Apr-Oct
Biweekly Labor Survey
2016 Sep-Nov
Crop-Cut Survey
2017 Jun-Aug
Plot Measurement Survey
2014 Feb-Apr
Round 1 Marketing, Sales, and Premium Collection
2015 Feb-May
Round 2 Marketing, Sales, and Premium Collection
2016 Apr-May
Round 3 Marketing, Sales, and Premium Collection
2014 Oct-Nov
Round 1 Payout Notification (no payouts)
2016 Jan
Round 2 Payout Notification (160/162 communities receive payout)
2016 Dec-2017 Jan
Round 3 Payout Notification (no payouts)
2014 May-Oct
Round 1 Insurance Coverage
2015 June-Oct
Round 2 Insurance Coverage
2016 June-Oct
Round 3 Insurance Coverage
2014 Jan-Jul
Year 1 Marketing and Sales
2015 Feb-Jul
Year 2 Marketing and Sales
2014 May-Nov
Year 1 Message Delivery (farmer-based)
2015 Apr-Nov
Year 2 Message Delivery (farmer-based)
2016 May-Oct
Year 3 Message Delivery (group-based)
Ploughing
Planting
Harvest



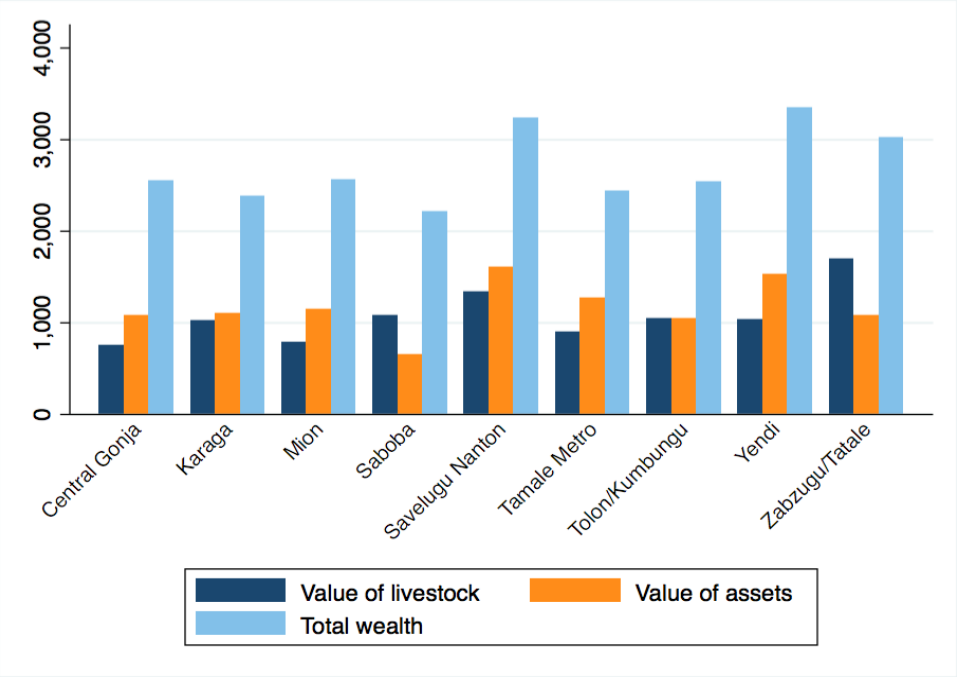
4 years, 9 districts, 162 communities, 3178 households



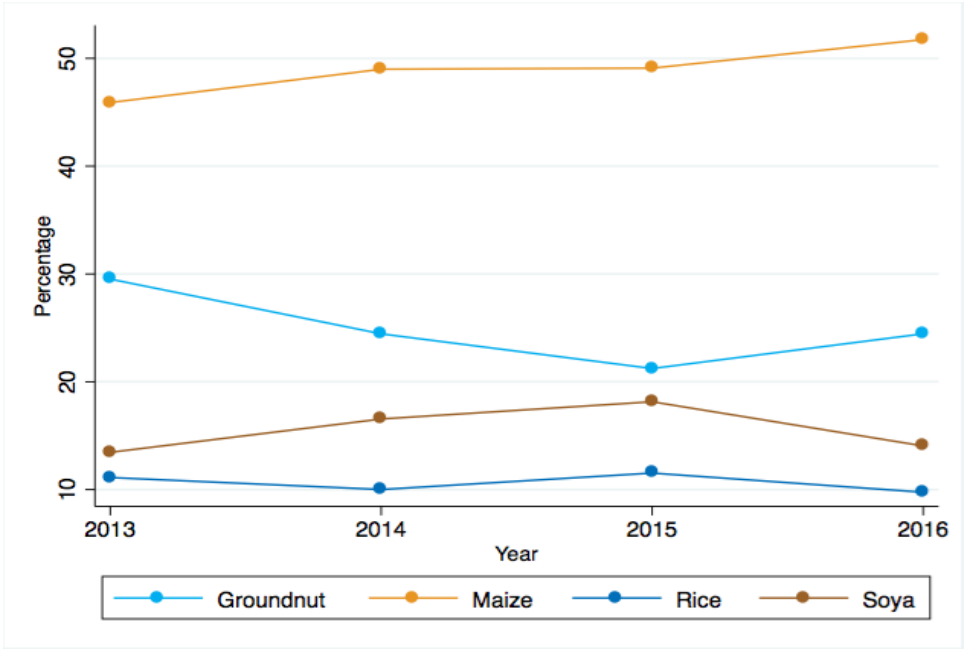
The DIRTS sample by respondent gender and education.



The DIRTS sample by district and gender of the respondent.

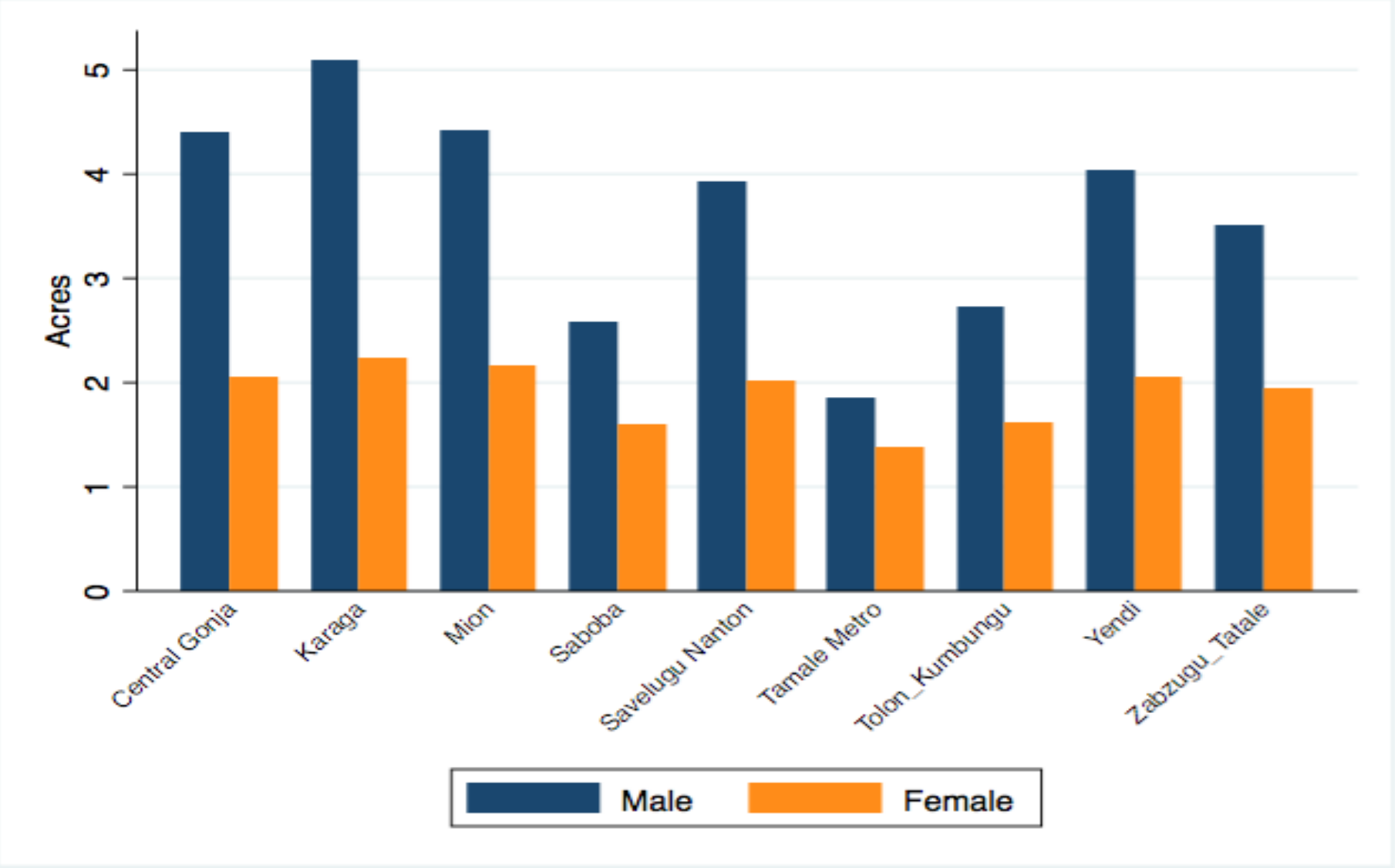


Household wealth

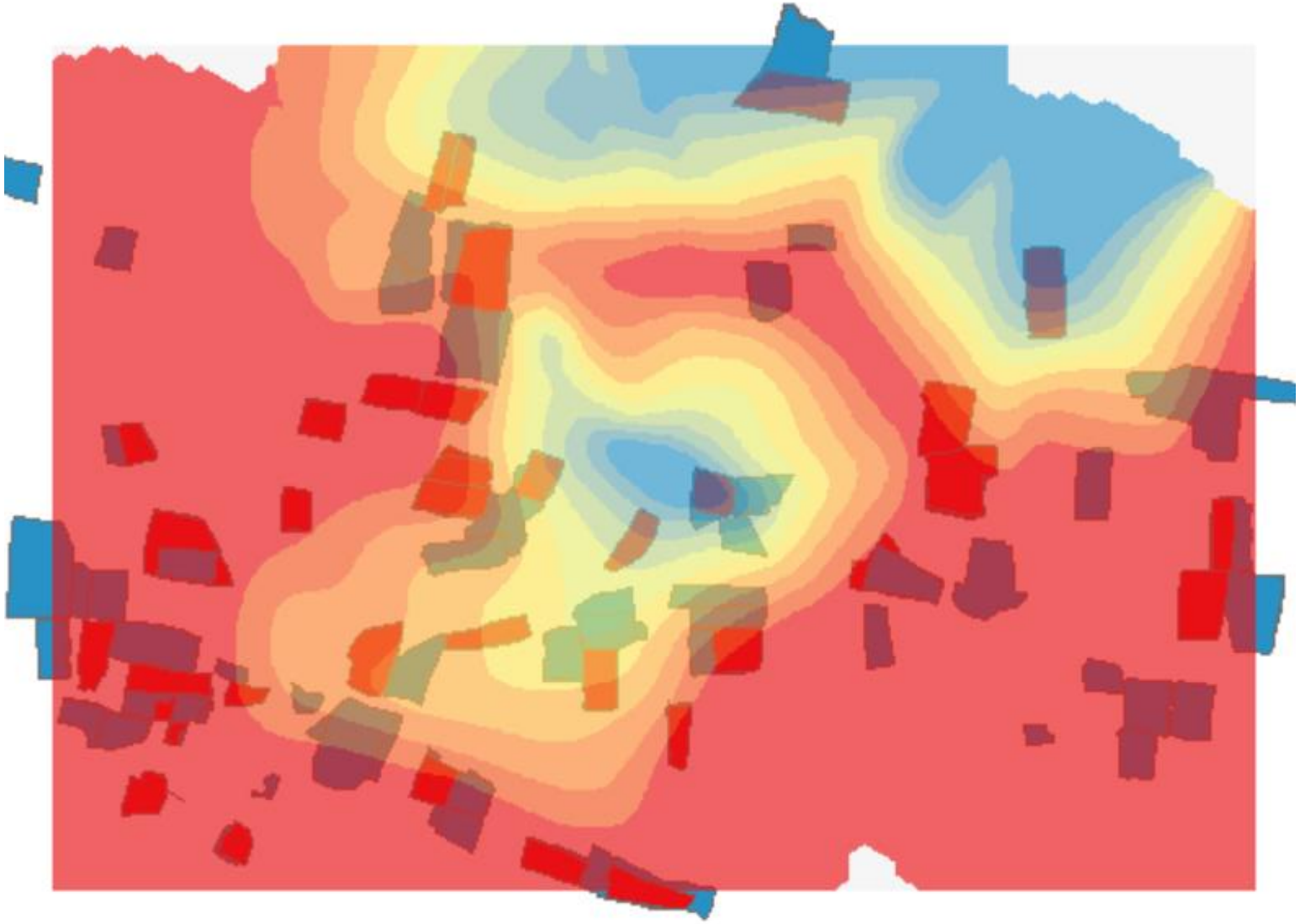


Crop shares of output by value

Distribution of cultivated area by gender



Topography and Crop Choice



Community Extension Agent (CEA) treatment

- One month residential training
- ≈ 30 messages to be delivered, weekly, to 10 farmers; videos on tablets, managed by farmer history and current activities
- 2014 Initial focus on maize

  2015 Extended to legumes and female farmers

  2016 Meetings opened to others in community

CHEVROLET

CEA treatment

- One month residential training
- ≈ 30 messages to be delivered, weekly, to 10 farmers; videos on tablets, managed by farmer history and current activities
- 2014 Initial focus on maize

  2015 Extended to legumes and female farmers

  2016 Meetings opened to others in community
- Feedback – approximately 12,000 questions/year
- 75% of treatment farmers said the CEA made a “very” or “extremely positive effect” on their lives.
- 98% of treatment farmers agreed with the statement “Meeting with a CEA has led me to change some part of my farming practices.”

Insurance treatment

- *Faarigu* rainfall index insurance; developed with GAIP; drought only
- Marketing within communities by CBM open to all
- Introductory grants of ≈ $15 of insurance to treatment
- “Heavy” insurance comparable to earlier study

Input marketing treatment

- Network of 10 input dealers and 60 Community Marketing Agents
- Catalogue available immediately at harvest
- Shipment to community provided

- Subsidy program
- 2014, 2015 FS

Forecast treatment

- Ignitia forecasts
- 2 day ahead via text early AM
- 2015, 2016 FS

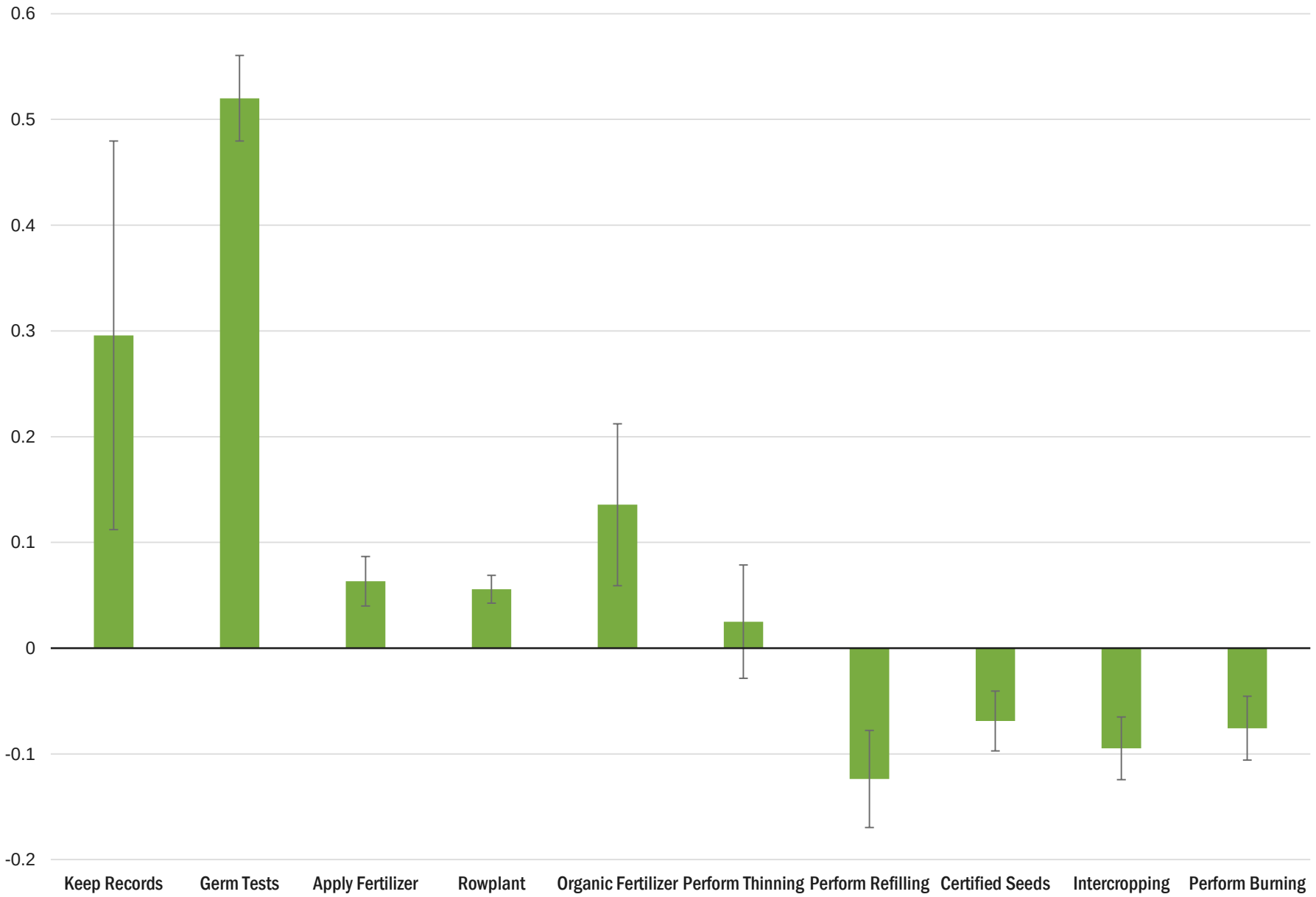
Market Price Information treatment

- Esoko price information
- 2015, 2016 FS
- Output prices at 6 northern markets

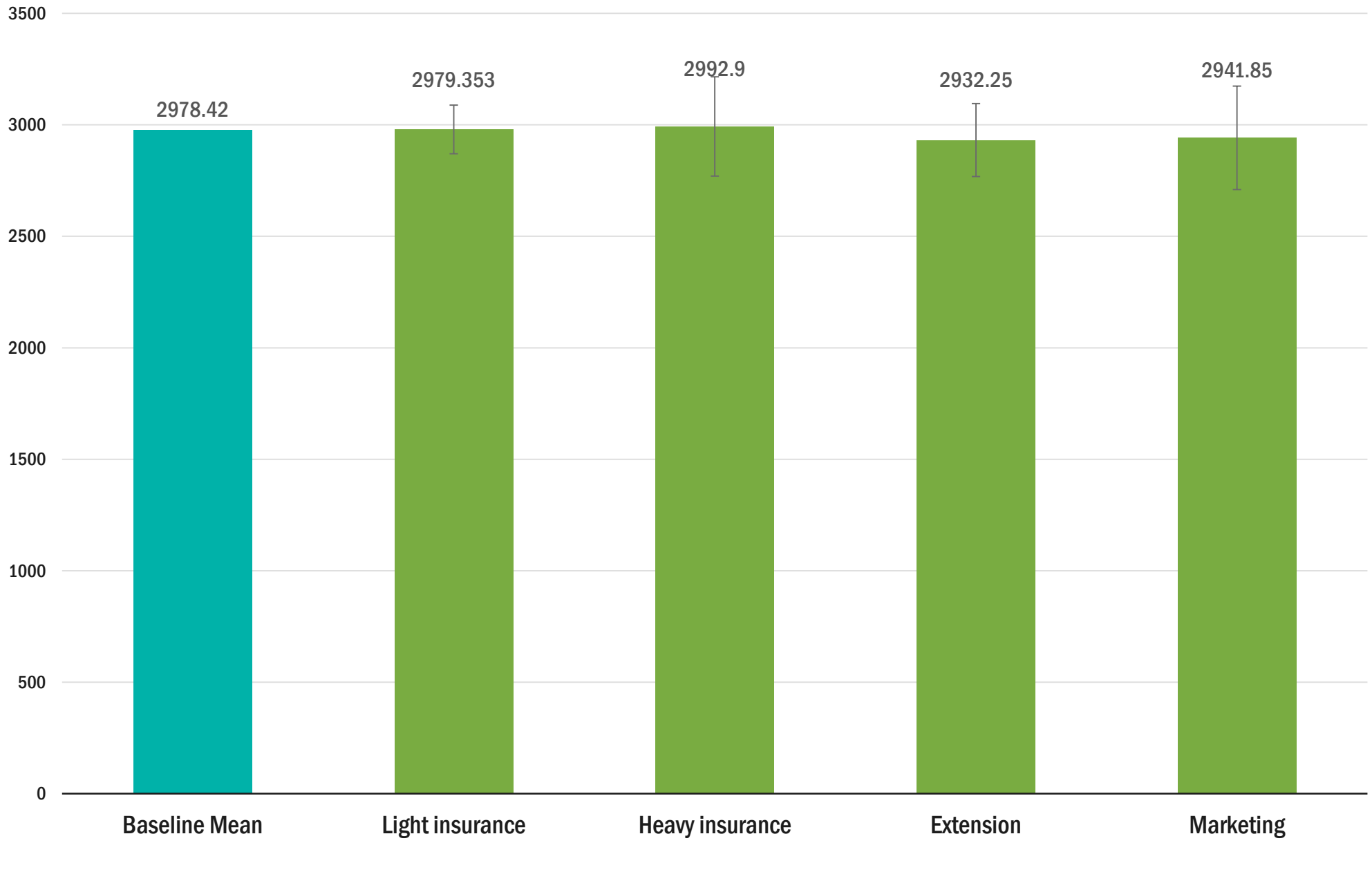
Overview of Preliminary Results

Note: These results are preliminary and may change after further analysis

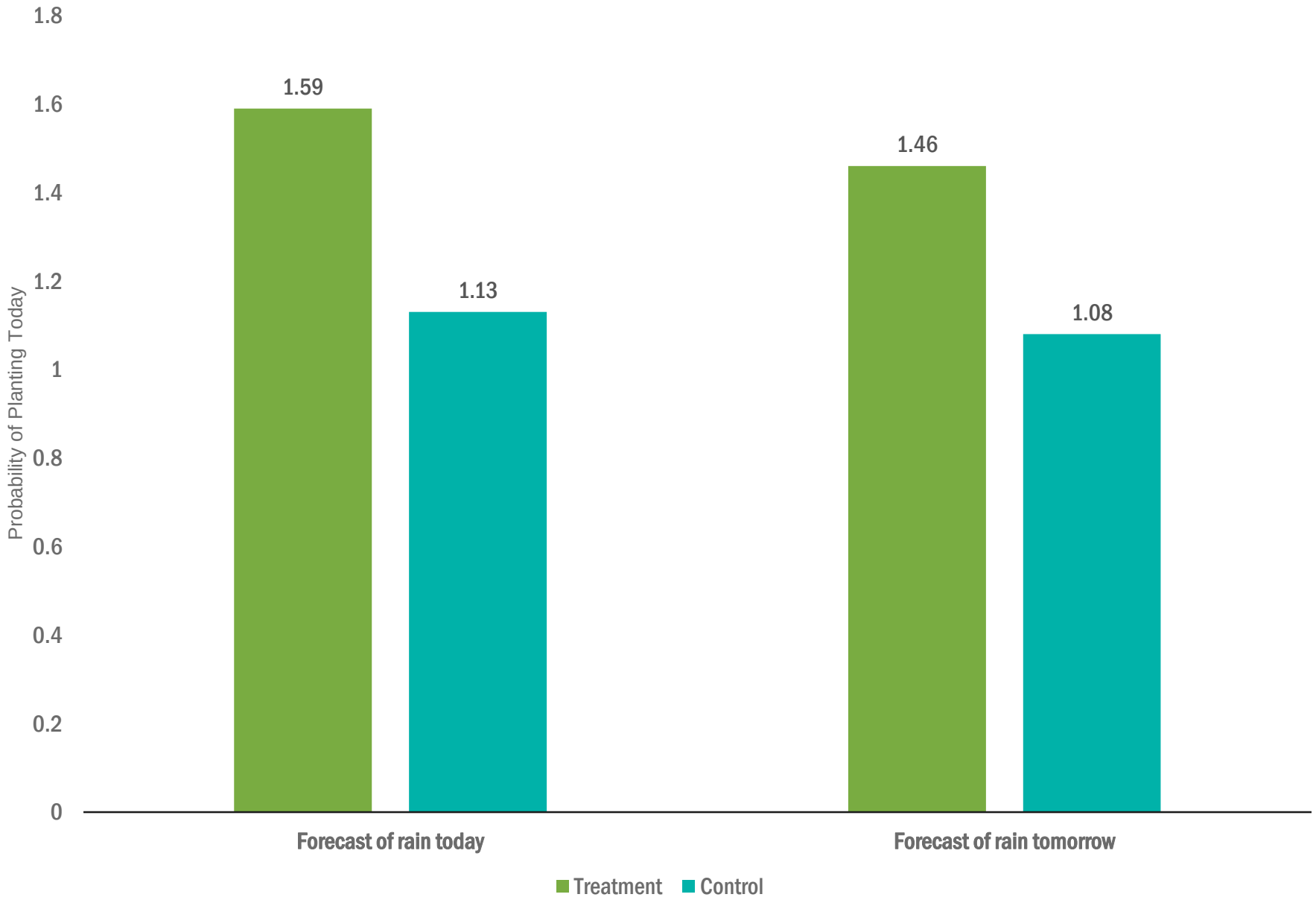
Adoption of New Practices

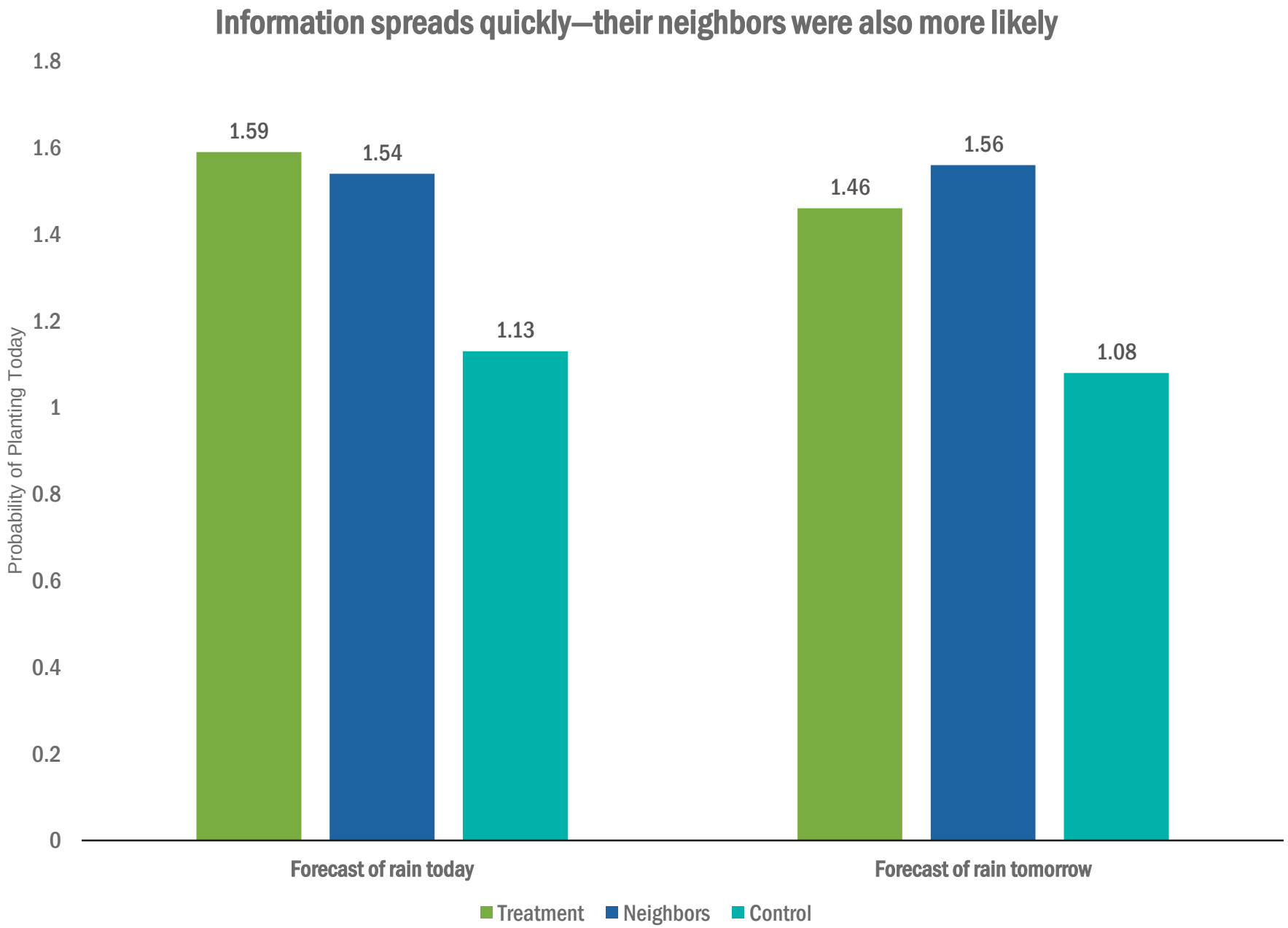


On average, the programs studied did not increases farmers' output

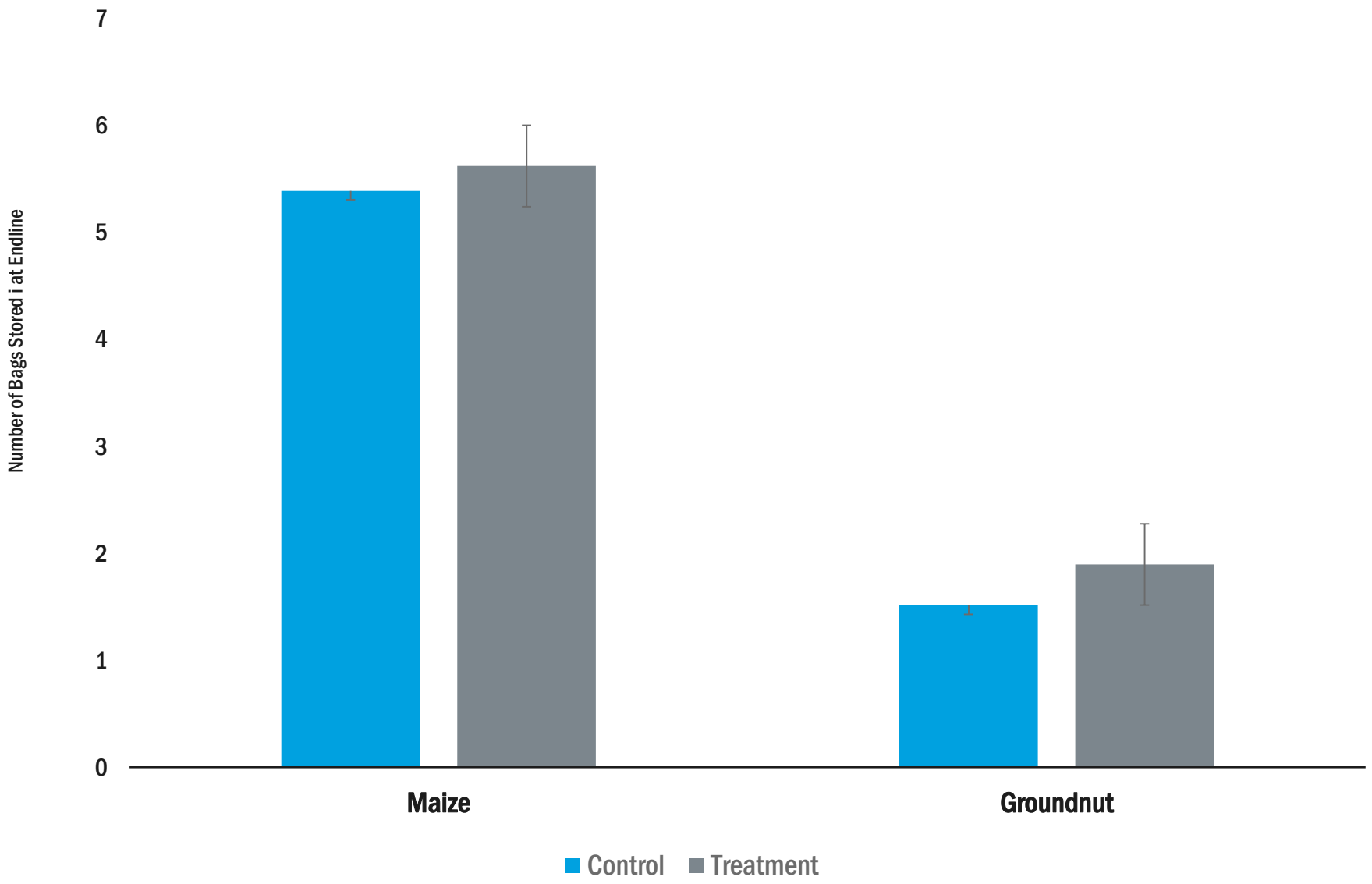


Households who got weather forecasts were more likely to plant in advance of rain




Information spreads quickly—their neighbors were also more likely
Probability of Planting Today
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1.59
1.54
1.13
1.46
1.56
1.08
Forecast of rain today
Forecast of rain tomorrow
Treatment
Neighbors
Control

Market Price Information changed how farmers stored crops



Conclusions and Policy Lessons

- Community Extension Agents increase farmer knowledge and improve farmer practices
  - Appropriate timing of message delivery matters
  - Technology can be harnessed to leverage human resources

- Adoption of improved practices by some farmers did not generate an increase in average yields or profits the full group of farmers

Conclusions and Policy Lessons

- There is limited demand for rainfall index insurance
- Free delivery and community marketing did not increase demand for inputs
- Farmers adjust timing of planting and agrochemical application in response to text messages of 48-hour weather forecasts
- Text messages regarding current prices at major markets influence decisions regarding storage

Conclusions and Policy Lessons

- Our seed comparison suggests that currently-available improved seeds can perform better than the most commonly used seeds
  - **An imported hybrid variety was the most profitable in these trials**

Collaboration and Funding

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IFAD – NRGP

IFPRI

MoFA

Northwestern University

SARI

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USAID - DIV

World Bank – GIL

Yale University

Citations

- Dean Karlan, Robert Osei, Isaac Osei-Akoto, Christopher Udry. 2014. “Agricultural Decisions after Relaxing Credit and Risk Constraints,” Quarterly Journal of Economics. May 2014, 129/2: 597-652.
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Thank you