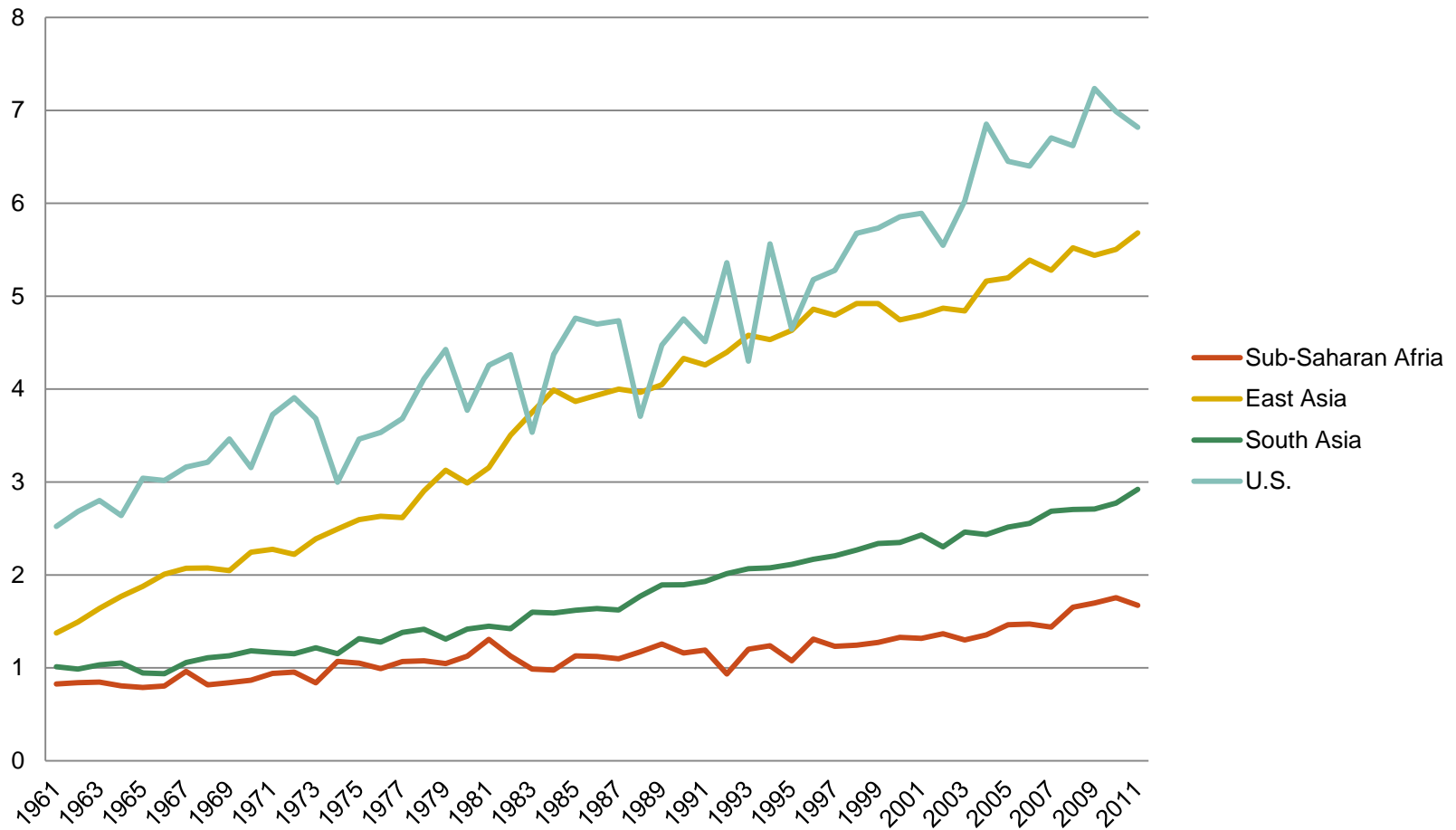




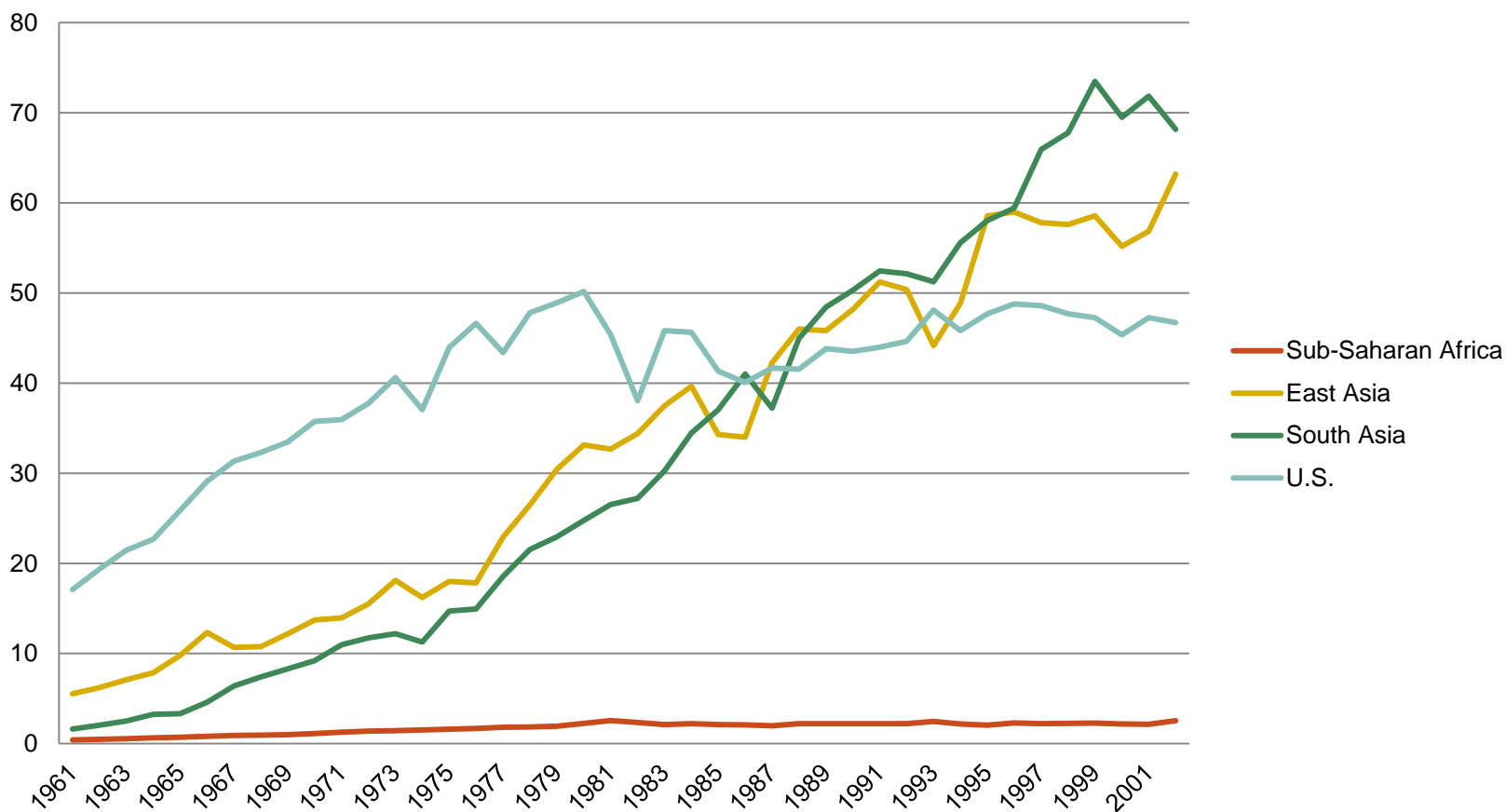
Reaching Farmers Where They Are: Evidence from Randomized Evaluations of ICT in Agriculture

Kyle Murphy
27 April 2016

Cereal Yields (Metric Tons/Hectare)



Fertilizer Use (Kilograms/Hectare)



What is hampering technology adoption?

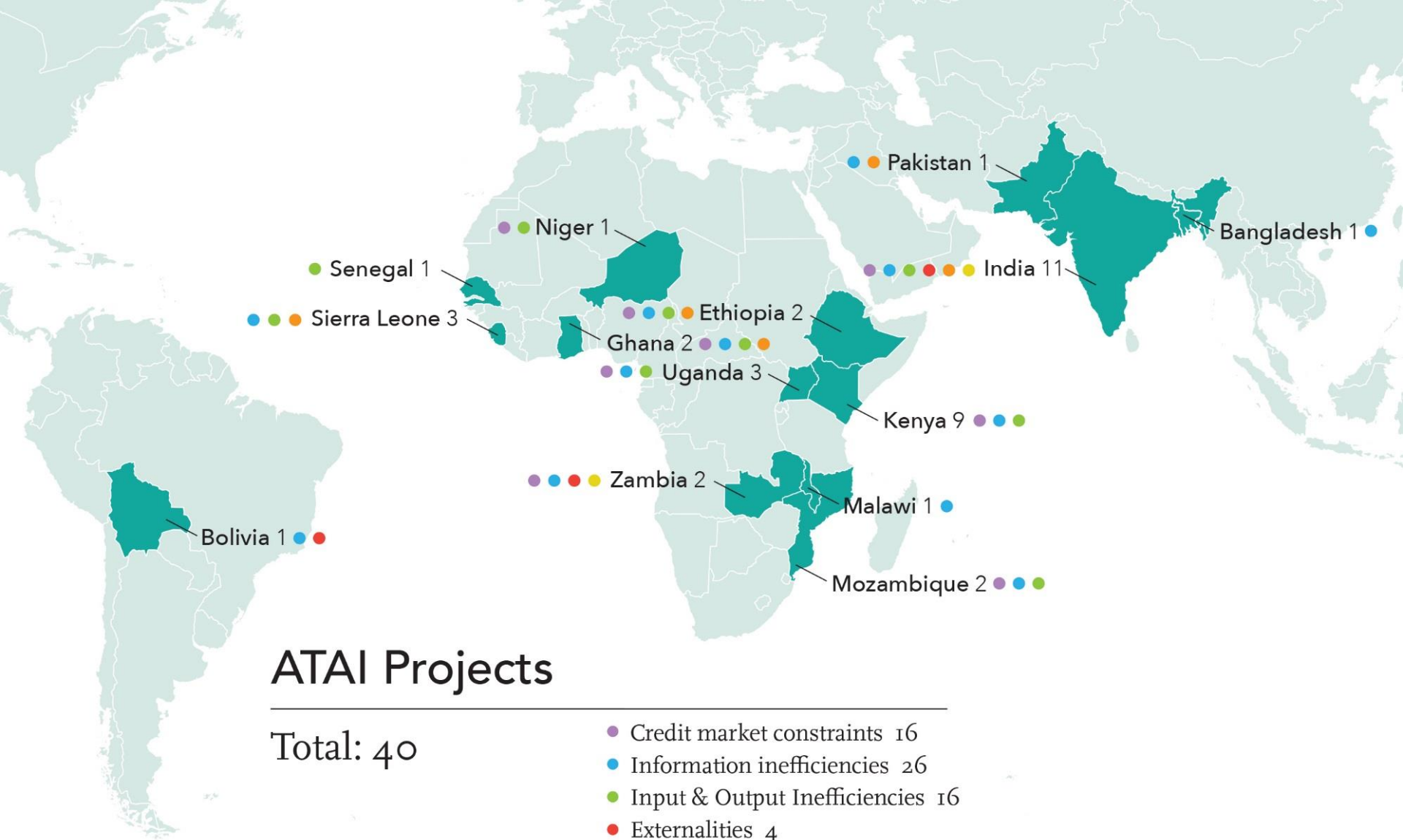
Market Inefficiencies

1. Credit markets
2. Risk markets
3. Information
4. Input and output markets
5. Externalities
6. Labor markets
7. Land markets

J-PAL'S MISSION IS TO ENSURE THAT POLICY IS DRIVEN BY **EVIDENCE** AND RESEARCH IS TRANSLATED INTO **ACTION**

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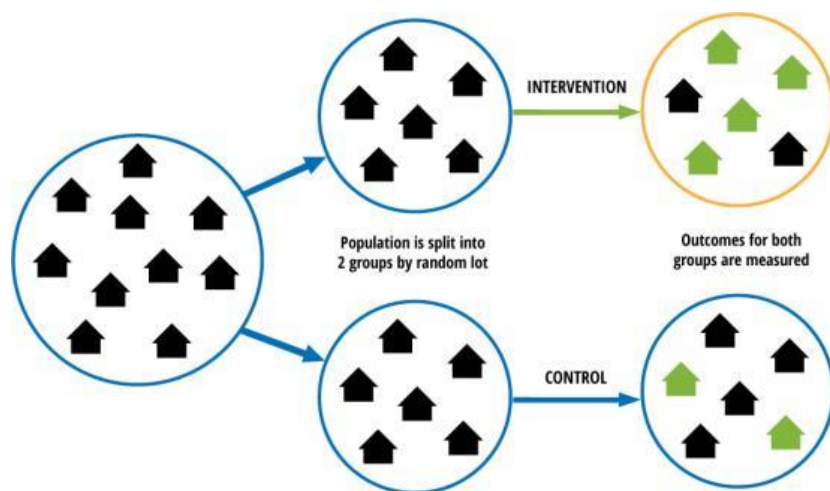
ATAI Projects

Total: 40

- Credit market constraints 16
- Information inefficiencies 26
- Input & Output Inefficiencies 16
- Externalities 4
- Risk market inefficiencies 9
- Labor inefficiencies 4
- Land inefficiencies 0

Randomized Evaluations

Before the program starts, eligible individuals are randomly assigned to two groups so that they are statistically identical before the program.



**Two groups
continue to be
identical,
except for
treatment**

**Any differences in
outcomes
between the
groups can be
attributed to the
program**

- I. Types of ICT Interventions
- II. Evaluation Examples
- III. Conclusion



I. Types of ICT Interventions

II. Evaluation Examples

III. Conclusion



ICT Interventions in Agriculture

1. Digital Financial Services

2. Information Delivery

1. Farming practices and inputs
2. Market prices

3. Interactive Platforms

1. Review services
2. Share with neighbors
3. Connect with the market

I. Types of ICT Interventions

II. Evaluation Examples

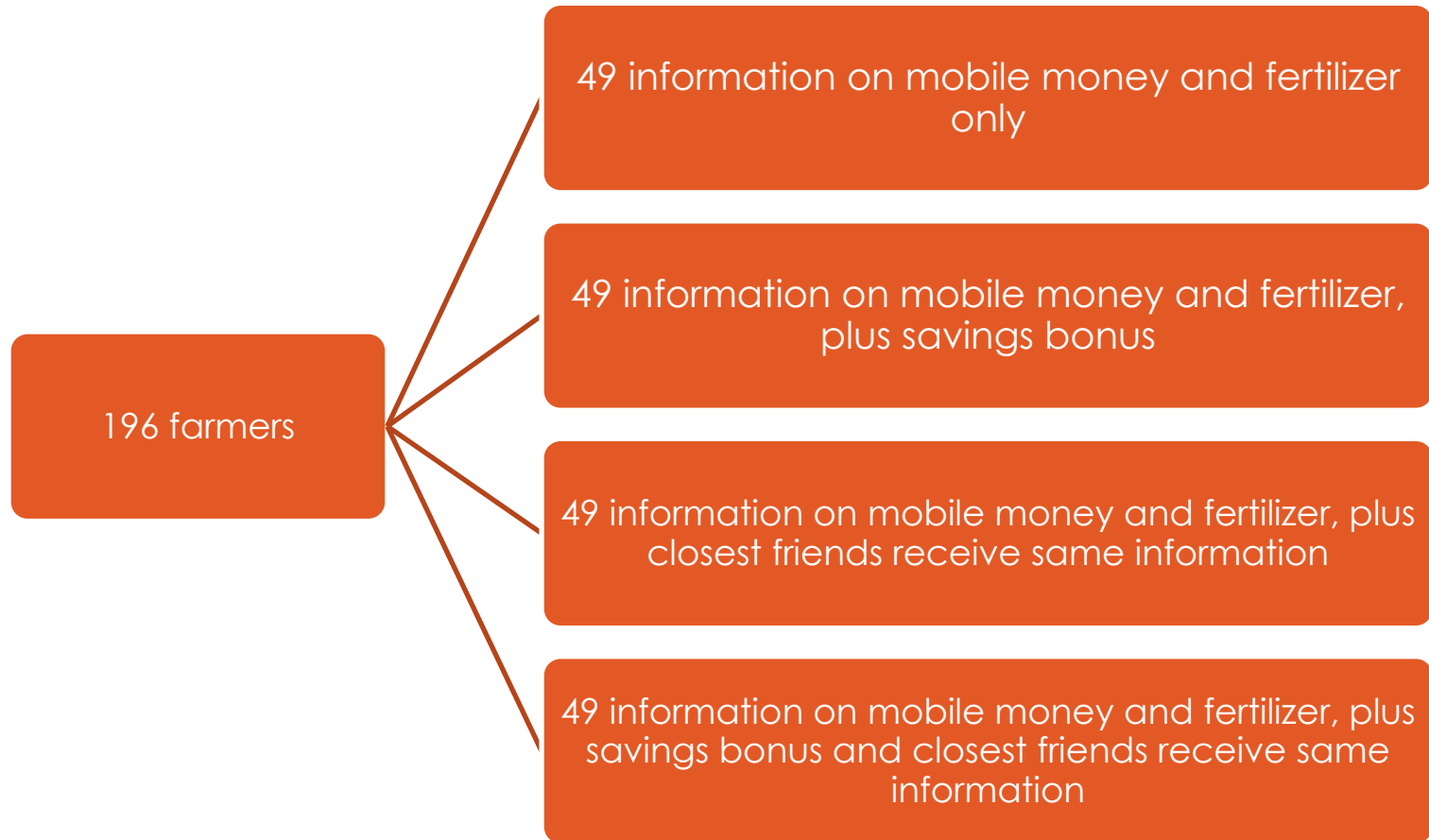
III. Conclusion



Digital Financial Services



Mobile Money in Mozambique (ATAI)



Batista et al. 2015 (preliminary)

Mobile Money in Mozambique (ATAI)

- Effects of savings bonus
 - Increased use of mobile money, including deposits
 - Increased non-frequent expenditures
 - Increased probability of fertilizer use
 - Decreased social pressure to share resources
- Effects of social network
 - Increased use of mobile money
 - Decreased social pressure to share resources

Batista et al. 2015 (preliminary)

Mobile Money in Context

Credit supply

- Microfinance model is inappropriate for farmers
- Banks often do not lend to the agricultural sector
- Interventions
 - Digital financial services
 - Improved information about borrowers

Credit demand

- Lack of credit is unlikely the primary constraint
- Take Up of credit is low
- Interventions
 - Flexible collateral
 - Seasonal variation of farmer income
 - Labeling

Ashraf et al. 2006, Banerjee et al. 2013, Basu & Wong 2012, Beaman et al. 2014, Boucher et al. 2008, Burke 2014, Carter et al. 2013, Casaburi et al. 2014 Crepon et al. 2015, De Janvry 2010, De Laat et al. forthcoming, Duflo et al. 2008, Fink et al. 2014, Gine et al. 2010, Gine et al. 2011, Karlan et al. 2010, Matsumoto et al. 2013, Tarozzi et al. 2013

Information Services

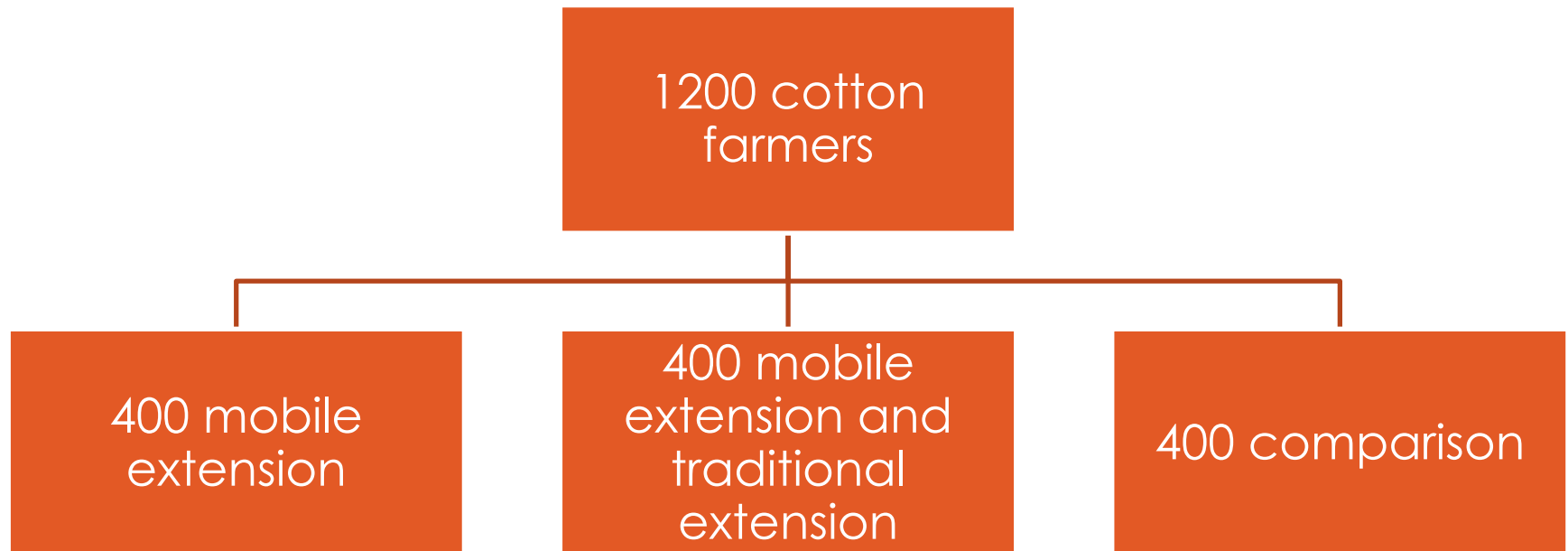


Mobile Phone-Based Agricultural Extension in India (ATAI)



Cole and Fernando 2012, Cole and Fernando 2014

Mobile Phone-Based Agricultural Extension in India (ATAI)



Cole and Fernando 2012, Cole and Fernando 2014

Mobile Phone-Based Agricultural Extension in India (ATAI)

- High take up and use of mobile platform
- Traditional extension had no effect
- Switch to more effective pesticides
- Increased adoption of cumin
- Some evidence of increased yields in cotton and cumin

Cole and Fernando 2012, Cole and Fernando 2014

Harnessing ICT to Increase Agricultural Production in Kenya (ATAI)



Casaburi et al. 2014 (forthcoming)

Harnessing ICT to Increase Agricultural Production in Kenya (ATAI)

- High take up of the SMS and hotline interventions
- SMS messages lead to 11.5% yield increases relative to control
- Access to hotline decreased
 - Likelihood of not receiving fertilizer
 - Likelihood of fertilizer delivery being delayed
- CAVEAT
 - Researchers are replicating the SMS intervention with a larger sample and so far so **no effect on yields**

Casaburi et al. 2014 (forthcoming)

Information Delivery in Context

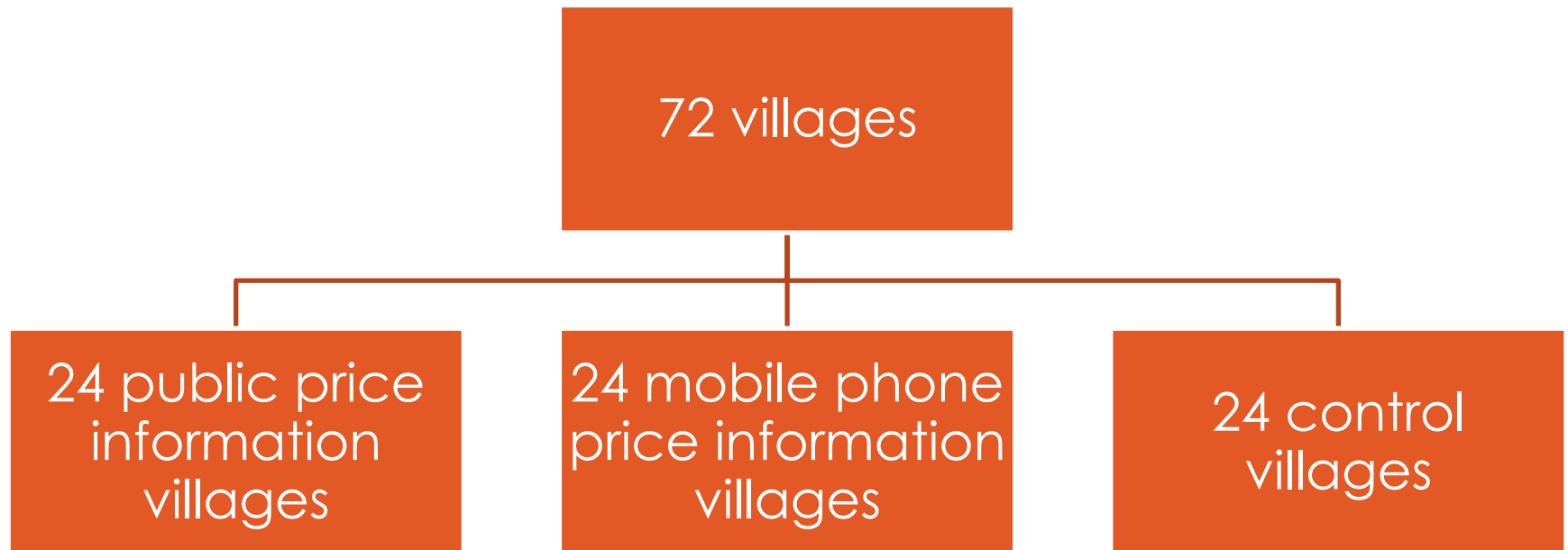
- Agricultural extension is the most common model
- Use of traditional extension services is low
 - Incorrect or unprofitable technology
- Extension can be effective
 - Overcoming a behavioral bias (procrastination)
 - Providing accessible, tailored, and timely information
 - Incentivizing trainers
 - Mobilizing networks (similar farmers, multiple farmer)
 - New or novel technologies such as risk reducing seeds

Beaman et al. 2015, BenYishay & Mobarak 2014, BenYishay et al. 2015, Blair et al. 2013, Casaburi et al. 2014, Cole & Fernando 2012, Duflo et al. 2008, Duflo et al. forthcoming, Hanna et al. 2012, Islam 2014, Kondylis et al. 2014, Tjernstrom 2015, Waddington et al. 2014

Ongoing Information Delivery Studies

- An Evaluation of Digital Green's Agricultural Extension Program in India
- Harnessing ICT to Increase Agricultural Production in Kenya (ATAI)

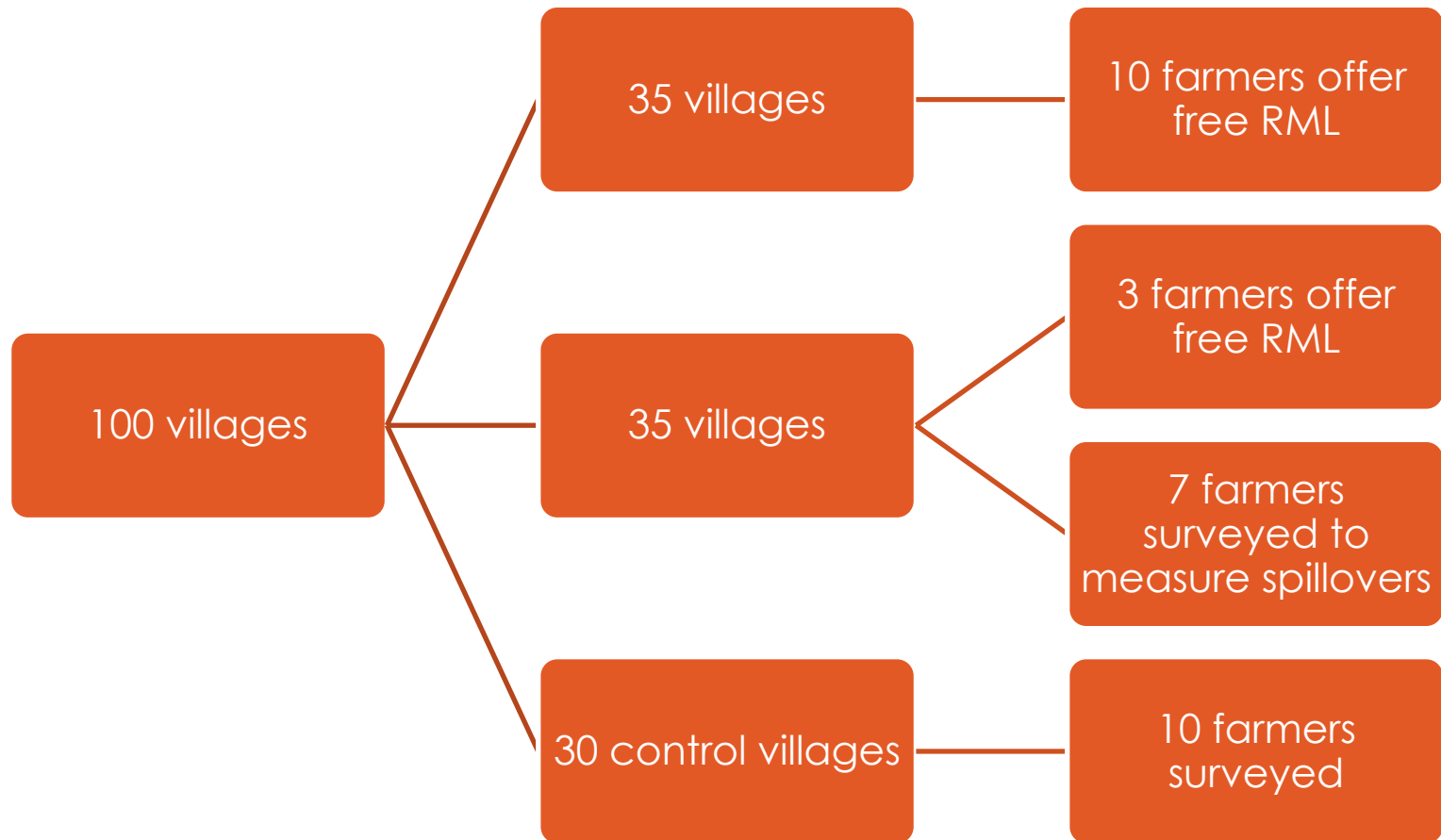
Price Information to Indian Potato Farmers



Price Information to Indian Potato Farmers

- Price information had no average effect
- Price information through the **mobile phone** affected farm behavior when prices were unexpected
 - Farmers sold more at higher prices
 - Farmers sold less at lower prices
- Farmers lack outside options, preventing them from realizing gains from knowledge of price

Reuters Market Light (RML) Evaluation in India



Fafchamps and Minten 2012

Reuters Market Light (RML) Evaluation in India

- Modest take up
- No effect
 - Price received by farmers
 - Crop value-added
 - Crop losses resulting from rainstorms
 - Planting different crops
 - Cultivation practices
- Small increases
 - Selling at new markets
 - Sorting crops by quality

Price Information Context

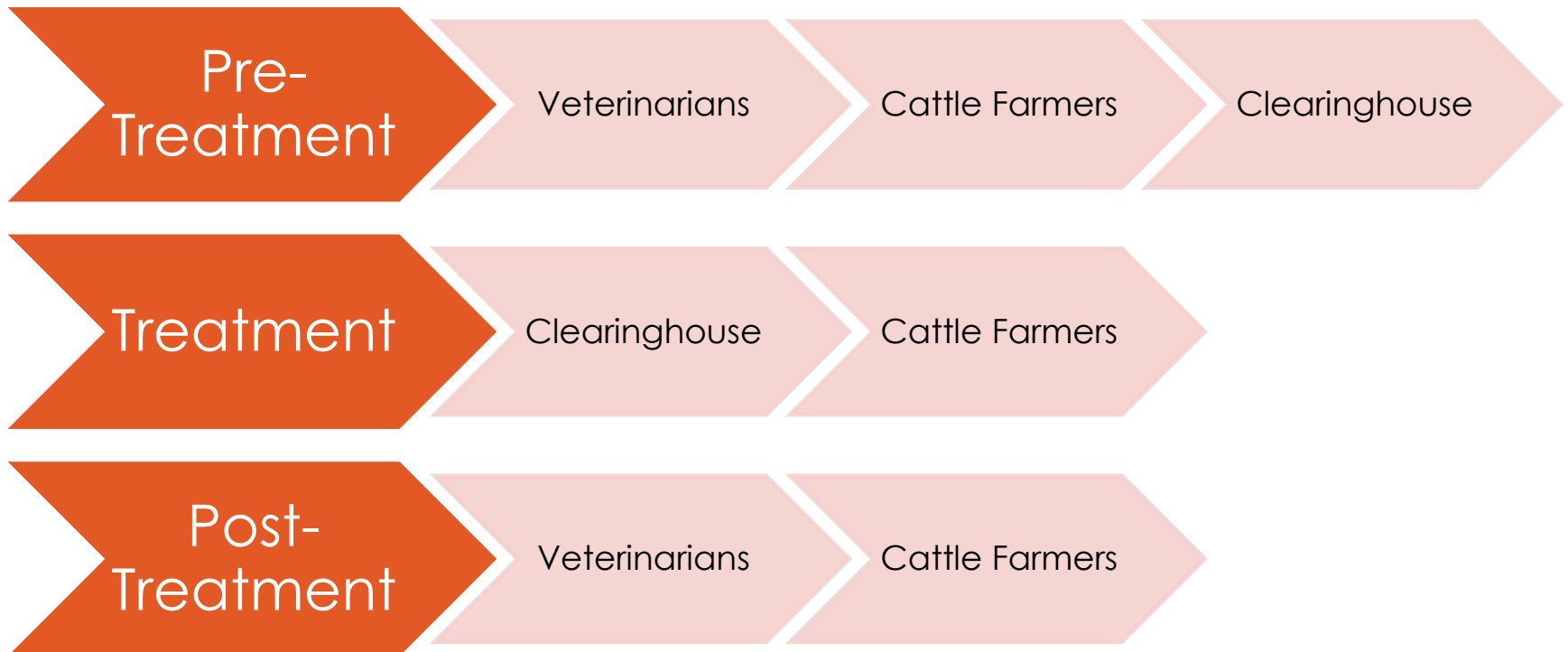
- Price information to farmers
 - Unlikely to affect farmer incomes or price levels
 - Farmer lack bargaining power
 - Transport costs remain high
- Price information to intermediaries or producers
 - Market prices converge and producers may benefit

Aker 2010, Fafchamps & Minten 2012, Goyal 2010, Jensen 2007, Mitra et al. 2015

Interactive Platforms



Coordinating Farmers with Cellphones in Pakistan (ATAI)



Rezaee et al. 2015

Coordinating Farmers with Cellphones in Pakistan (ATAI)

- More likely to return to government service provider rather than a private provider
- Higher insemination success
- Lower prices for insemination services

Ongoing Interactive Platform Studies

- Market Interventions (ATAI)
 - Building Market Linkages in Uganda
- Agricultural Information
 - Precision Agriculture for Development (PAD)
 - India, Kenya, and Ethiopia

- I. Types of ICT Interventions
- II. Evaluation Examples
- III. Conclusion



Information is only
useful to the degree
that it is profitably
actionable



Thank you

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