



#### Evidence in Agriculture: Information

Kyle Murphy July 7<sup>th</sup>, 2016





#### Overview

- Introduction to ATAI
- Constraints in Agriculture
- Information and Extension Services
- Price Information Interventions
- Conclusion



#### Around 65 Agriculture projects



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## Randomized evaluations provide the most rigorous estimate of program impact



#### Since the start of ATAI

Category	Total
Farmers surveyed	111,351
Female farmers surveyed	47,845
Farmers whose behavior has changed	17,932
ATAI Awards	55
Unique ATAI projects	42
Countries with ATAI projects	14
Researchers on ATAI projects	89

#### Cereal yields (metric tons/hectare)



#### Fertilizer use (kilograms/hectare)



# What is hampering technology adoption?

#### Inefficiencies constraining tech adoption

- 1. Credit markets
- 2. Risk markets

- 3. Information
- 4. Externalities
- 5. Input and output markets
- 6. Labor markets
- 7. Land markets

#### Preview: Information

- General extension is often ineffective
- Information given to farmers may be wrong
- Extension may be improved
  - Incentives
  - Feedback
  - Leveraging social networks
- Successes
  - ICT
  - New crops
  - Behavioral barriers



#### Profits vs. Yields



- Governments and NGOs provide advice is designed to maximize yield, rather than maximize farmer profit
- Farmer decisions are based on profit, not yield

Duflo et al. 2008, Hanna et al. 2013

#### Why do farmers need information?

- Learning about a new agricultural technology is a fundamentally hard learning problem
- Information helps famers assess novel technologies, their risk profile and potential profitability
- If a farmer is to use a new technology effectively they need to know:
  - That it exists
  - Something about its benefits and costs
  - How to use it effectively

#### How do farmers receive information?

- Government or NGO extension
  services
  - Test plots

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- Trainings
- Social learning
- Direct to farmers
  - Door-to-door
  - ICT



#### Often, traditional extension has limited effects

- Traditional extension often has relatively low impacts on adoption
  - Test plots
  - Farmer field schools
  - Train and visit
  - Training seed farmers
- Extension services have sometimes been ineffective because they promote a technology that is incorrect or unprofitable.

Duflo et al 2008, Blair et al. 2013, Kondylis et al. 2014, Beaman et al. 2015, Duflo and Suri, forthcoming

#### And yet, potentially big costs to ignoring extension

- Upland Nerica Rice introduced in Sierra Leone
  - In villages where seeds coupled with extension, yields increased by 16%
  - In villages where seeds were simply distributed, yields fell
  - Without extension, would be hard for farmers to learn about yield potential

How to improve extension?

Contracting

Technology (ICT)

Social Learning

**Behavioral Constraints** 

#### Improving extension services

- Incentives may improve adoption
  - Extension officers
  - Lead farmers
- Feedback on extension may help
  - Improves satisfaction
  - Improves knowledge in certain circumstances

BenYishay and Mobarak 2015, Ben Yishay et al. 2015, Jones and Kondylis 2015, Masset and Haddad 2014

#### Contracting: incentive structure

- Extension agents and contact farmers often face weak incentive environment
- Extension officers
  - Incentives on other's adoption have some effects
- Contact farmers
  - Incentives based on own adoption (suggestive)
  - Incentives based on other's adoption lead to higher village adoption rates
- Monitoring?

BenYishay and Mobarak 2015, Ben Yishay et al. 2015

#### Incorporating feedback

- User-driven curriculum a core element in FFS
- Feedback on extension may help
  - Improves satisfaction & demand for extension services
  - Improves knowledge in certain circumstances
  - Less evidence of adoption/yield impacts
- Curriculum or monitoring?

#### ICT to reach farmers directly

 Interventions using mobile phones to provide information to farmers have been shown to increase adoption and improve yields



#### Mobile phone-based agricultural extension

- Gujarat, India
- 2011-2012
- Center for Microfinance
- Awaaz.De



#### Cole and Fernando 2014

#### Mobile phone-based agricultural extension

- 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

#### Harnessing ICT to Increase Agricultural Production in Kenya (ATAI)



Casaburi et al. 2014

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#### Social learning

- The messenger matters
  - A farmer is more likely to demand a new technology if a greater proportion of his/her network is demonstrating it
  - Lead farmers most closely resembling target farmers were more effective at promoting a new technology



Ben Yishay et al. 2015, Beaman et al. 2015, Tjernstrom 2015, Ben Yishay and Mobarak 2013



### Timing the information

### Reminders to use inputs

Duflo et al. 2011, Casaburi et al. 2014, Cole and Fernando 2014

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### Farmer-led experimentation

### Simple tools to aid learning

Hanna et al. 2012, Duflo et al. forthcoming, Islam 2014

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#### Summary: Extension Services

- General extension is often ineffective
- Extension may be improved
  - Incentives
  - Feedback
  - Technology
  - Leveraging social networks
  - Adapting the pedagogical model
- Successes

- ICT
- New crops
- Behavioral biases

### Theory of price information

Farmers get price information Farmers sell at markets where prices are high Market prices converge

#### Price information to farmers

- Limited effect on prices
- Farmers may change behavior
- No gain on average for farmers

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#### Price information to others

- Price information is actionable
  - Traders

- Fishermen
- Reductions in price dispersion
- Potential improvement in profits

#### Price information and the market

- Farmers are unlikely to benefit from price information
- Members of value chains who can take action on the information can see benefits

#### **Price Information Summary**

- 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

#### Conclusions

- A lot of specific information is necessary for farmers to make informed decisions on technology adoption
- In this information needy context: higher adoption can be achieved through increasing the efficiency of information transfer
- Information is only useful to the degree that it is profitably actionable





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