Real-time use of impact evaluation to enhance development impact

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Using data to increase environmental services by 68% with the same budget
What evaluation?

• Traditional evaluation (retrospective, external, “independent”) is a lot of effort with little entryways to affect change

• Think again
  – Operational, problem-driven, iterative counterfactual evaluation
  – Secure ownership from the people that will be taking decisions
A SIMPLE IDEA

Identify problems

Test alternatives

Adopt solutions
Global outreach

5 regions
60 countries
+170 IEs
300 partners
DIME-EU partnership in Rwanda
<table>
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<th>Learning agenda to transform agriculture</th>
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### 1. Understanding constraints and returns to technology adoption
- Rural finance intervention >> savings for agricultural inputs, **increased input use by 68%**
- Farmers’ feedback tools **increased demand for training by 29-44%**
- Overall Impact of LWH >> households with plots in site witnessed **harvest-increases of 39% in main season**; irrigation usage correlated with an increase of **50% in sales value**

### 2. Use and Sustainability of Irrigation
- Adoption of horticultural crops within the irrigated areas **doubles farm earnings**
- 100ha of land under full horticultural adoption **creates the equivalent of 138 full-time agricultural jobs**

### 3. Road connectivity & Market access
- Feeder road rehabilitation **increase incomes of the least connected by 23%**, allowing them to catch up with more connected households
- Early consumption results suggest a **decrease in the price of urban-typed goods**, expanding households’ consumption set

### 4. Land management and optimal farm size
- Infrastructure development (irrigation) **increases land transactions (rental and sales) by 12 p.p. (197%)**
- 20% of the transformative effects of irrigation are driven by land rentals
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RURAL TRANSFORMATION
The transformative impacts of irrigation:

Capturing the welfare impacts of irrigation investment to inform the national strategy
Estimating the impacts of irrigation
Estimating the impacts of irrigation
Estimating the impacts of irrigation
Estimating the impacts of irrigation
Adoption

Irrigation enables a switch from bananas to (high-value) horticulture
Intensification of production

This switch leads to a sharp intensification of production ...

↗ 200 days/ha HH labor, 46 days/ha hired labor
Cultivation and crop choice

... and doubles farming households’ earnings
The use of RCTs – Input subsidies

<table>
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<tr>
<th>Minikit takeup</th>
<th>Any horticulture</th>
<th>Seed from LWH</th>
<th>Seed not from LWH</th>
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<tbody>
<tr>
<td>Control</td>
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Subsidy (minikits) by the government crowds out private investment → access to inputs is not a constraint
Why run RCTs?

• What if we distributed minikits *without randomization*, compared farmers who took up minikits to farmers who don’t?
• Problem: farmers who accept minikits are *very different* from farmers who don’t
• Randomization guarantees that the farmers who are assigned minikits are the same as the farmers who are not!
  – In practice farmers randomly assigned minikits see no increase in horticultural cultivation, but farmers who accept minikits are 151% (35pp) more likely to cultivate horticulture!
The use of RCTs – Sustainability

Can empowering monitors to manage the operation of the schemes lead to higher long-term sustainability?
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RURAL TRANSFORMATION
Impact Evaluation
Summer School
August 13-24, 2018

For information on the event and to apply, please visit this website:
http://bit.ly/2prvQll
Do extension systems make sense with the way farmers learn?

• What model works to diffuse NRM technologies?
  – Mozambique, Malawi, Bangladesh

• What extension messages are most useful to farmers in managing common pool resources?
  – Mozambique

• Does feedback matter in increasing farmers’ interest in extension?
  – Rwanda
Summary – iterative learning

• To understand informational constraints to adoption of NRM, a number of RCTs experimented with the decentralized model of extension in Malawi and Mozambique

• Evidence from these impact evaluations suggested that

  1. Information gets lost from extension agents down to lead farmers

  2. Centralized training of lead farmers increased demonstration

  3. ... but did not substantially increase adoption among other farmers in the village

  • Common finding: Farmers were more likely to learn from communicators who were “closest” to them
Social vs Experiential learning

• Evidence from other fields highlights the importance of experiential learning
  – Seasonal migrations (Bryan et al 2014); Bednets (Dupas 2013)

• Yet, self demonstrations have been largely ignored in design of agricultural interventions
  – Extension services focus mostly on learning from others
    • Use of demonstration plots is ubiquitous (farmers field schools with extension workers, contact farming with variety of communicators)
Improved seeds – Bangladesh

(Jones, Kondylis, Mobarak, Stein)

Regular demonstration plot
17 villages

Shared demonstration plot
19 villages

Self-demonstration
21 villages
Self-demo increases adoption in Year 2
Self demo also increases the area under new crop
Results and mechanisms

• Findings suggest self experimentation is about 3-4 times the size of a social contagion effect
  – Reduced form and full interaction model
  – Model calibrated to our RCT
• We do not find evidence that reducing the size of the demo package affects learning
How much can measuring and reporting water use improve equity and efficiency of water allocation?
High frequency monitoring by community members

Propeller and optical calibration method for canals/furrows (site-specific application).

Volumetric dosing for sprinklers and hydrants

Establish site-specific h-Q relationship
Water availability as the dry season develops

The z-score values were centered by the median water availability over all fields in the scheme, i.e. 61. Blue hues indicated positive z-scores where red hues indicate negative ones correspondingly. Two fields (13701 and 13201) show extreme positive deviations of the corresponding z-score values. The underlying reason of these extreme values needs to be further investigated.
Water inefficiency follows a particular pattern

- Water is wasted by applying irrigation equally over the cropping cycle
- Simple reminders seem to solve a lot of water scarcity
Water inefficiency is solvable

• Since we started giving reminders:
  – Conflict over water has disappeared
  – Reported water sufficiency has increased
• General reminders seem to work, individualized reports don’t seem necessary
• Continuing to collect data to verify:
  – Water improvements not caused by better rainfall
  – More efficient use of water translates to gains

Notes: Observations are plot-crop-week. Lines show the proportion of plots in the week (x-axis) where water gap is negative (water availability<water requirements) given the crop cultivated and that crop’s growth stage in the week. If plots have multiple crops cultivated simultaneously, the plot is represented once for each crop. The grey dotted line indicates the week in December 2016 when all farmers had received feedback. Grey bars measure rainfall in the week.
Thank you!

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blogs.worldbank.org/impactevaluations

microdata.worldbank.org/index.php/catalog/impact_evaluation