

Retargeting Agricultural Investments

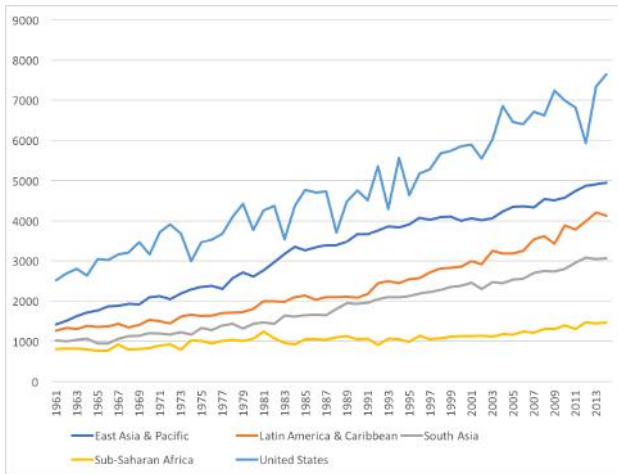
Florence Kondylis

January 23, 2017



Productivity gap

Agricultural productivity (cereal yield)



Agricultural productivity towards rural transformation

- Green Revolution has not yet reached rainfed areas
 - increase in production comes from extensification rather than intensification of agriculture



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 - increase in production comes from extensification rather than intensification of agriculture
- Absent an increase in productivity, agriculture will not support a rural transformation
 - transfer of labor from agriculture to industry and services
 - reduction of rural poverty
- How to retarget investments to increase agricultural productivity?

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Spending

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- Investment is low relative to other developing nations during their Green Revolution
- Composition of the spending
 - dominated by input subsidies [30-70%], extension and advisory services [~35% in Ethiopia, Uganda]
 - very small shares allotted to R&D, infrastructure projects (irrigation, access to markets)

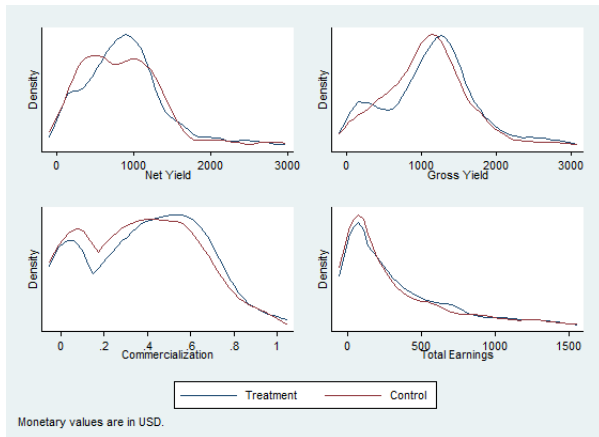
Role of impact evaluations

Typical bundled agricultural investment



Role of impact evaluations

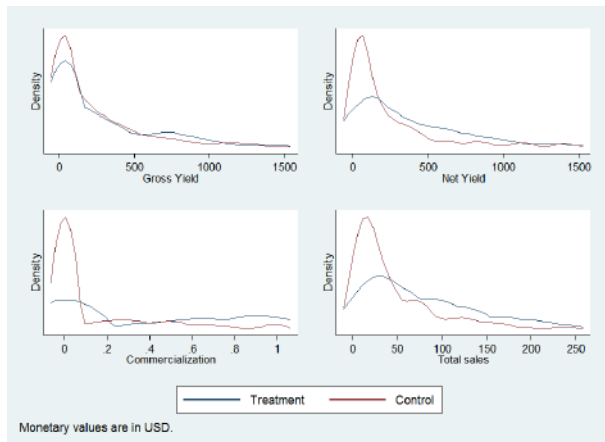
Distributional impacts of bundles (Bangladesh IAPP)



Source: Jones Kondylis Mobarak Stein 2016

Role of impact evaluations

Distributional impacts of bundles (Rwanda LWH)



Source: Jones Kondylis 2016

Impact evaluations to help retarget investments

- Use IEs to retarget implementation, testing
 - various modalities to document constraints and opportunities
 - for complementarities in the production function

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- Refine targeting of recipients across instruments aiming to
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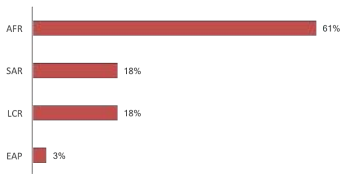
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- Use IEs to retarget implementation, testing
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- Build causal evidence to motivate budgetary reallocations

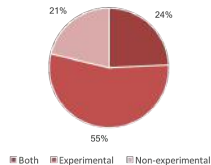
Role of impact evaluations

Building a strong evidence base (N=33)

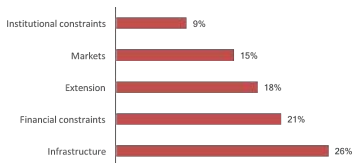
Regional Distribution



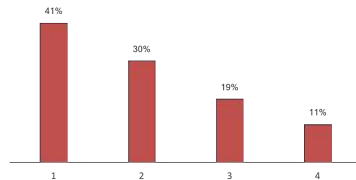
Evaluation Method



Agriculture Portfolio Distribution



Number of Treatment Arms



Iterative adoption trials

Do extension systems make sense with the way farmers learn?

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- Farmers learn from each other—but is that the efficient allocation? [◀ Jones Kondylis Mobarak Stein 2016](#)
- Demand-side issues
 - Feedback tools boost farmers' demand for extension [◀ Jones and Kondylis 2016](#)

Women's participation in extension services

- As suppliers:
 - Gender discrimination in extension service provision in Malawi
◀ BenYishay Jones Kondylis Mobarak 2016
 - Work in Mozambique suggests gender frictions may be at play in some contexts (Kondylis et al 2016)

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- As users:
 - Feedback tools in Rwanda has largest impact on female farmers' attendance
 - Lift gender-specific constraints to boost attendance, e.g. chidicare (O'Sullivan et al 2014)

A lot more to do

■ Measurement

- Hard to measure learning (Laajaj and Macours 2017; Kondylis et al 2015)
- Target farming capacities (e.g. SME growth literature)
- Crowding out other experimentation?

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 - Agricultural technologies may not pass the profitability bar
 - Thin market issues

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■ Lack of a robust effect of extension on yields suggests content of extension trainings may not be valuable

- Tailor recommendations to local conditions (Carter et al; Gine et al)

Costs and benefits of irrigation

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 - farmers are responsible for recurring Operation & Maintenance costs (O&M)
- Costs must be weighed against benefits of second-best products, since commons problems affect water access

Success requires that

- Farmers adopt higher-value crops
 - in Rwanda's new schemes, only 5% of farmers practice commercial farming
 - combining escalating fees and minikits (Jones et al)
 - ◀ minikits and fees

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 - ◀ minikits and fees
- Governance structure ensures adequate O&M of system (Olson 1965; Ostrom 2003)
 - only 1/3 of land equipped with irrigation is actually irrigated
 - targeting to affect make up of Water User Associations in Mozambique (Christian et al)
 - ◀ targeting

Availability and heterogeneity

- Low take up of inputs may be explained by
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◀ market heterogeneity

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- Low take up of inputs may be explained by
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- Future areas of work
 - Certification trial with vouchers in Uganda (Carter et al)
 - Certifying smaller bags to boost use among female farmers (O'Sullivan et al 2014)

Property rights towards rural transformation

- Countering sub-optimal farm size, allowing (Lucas 1978; Restuccia and Adamopoulos 2014; de Janvry et al 2015; Deininger et al 2017)
 - higher investment
 - gains from trade
 - labor reallocation to wage economy

Property rights towards rural transformation

- Countering sub-optimal farm size, allowing (Lucas 1978; Restuccia and Adamopoulos 2014; de Janvry et al 2015; Deininger et al 2017)
 - higher investment
 - gains from trade
 - labor reallocation to wage economy
- RCTs are a recent addition to this literature
 - document implementation hurdles (Ali et al 2016; Goldstein et al 2017)
 - steps in the causal chain of these programs (Goldstein et al 2015)
 - find important changes in investment after demarcation, before certificates are issued

Evidence moving forward

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- Ongoing work on matching grants for commercial farmers organizations in LAC (Kondylis, Piza, Zwager)
- Recent null/low adoption results on savings programs/insurance products (Jones et al; Gine et al; Cole et al)
 - These products may just be bad
 - Farmers may have low levels of trust
 - Can IT help (SMS reminders/digital lockboxes)? (Aker et al)

Conclusion

Areas for future work

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 - Social protection vs Productivity growth
- Work closer with private sector
 - Input certification and packaging, contracts
- Invest in data systems to capture process of structural transformation
 - capture moves in/out of agriculture, changes of ownership, farm size, market structure
 - household surveys will not be enough

Conclusion

Thanks to





Contact farmers

- Decentralized models assume that information flows from
 - researchers to extension agents, and
 - from extension agents to contact farmers (CFs)
 - CFs should then train other farmers in their communities



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 - researchers to extension agents, and
 - from extension agents to contact farmers (CFs)
 - CFs should then train other farmers in their communities
- Such a modality may fail to address informational inefficiencies and accountability issues
- In Mozambique, ran a RCT to learn about information transmission across nodes of the network
 - 1 shock network with new technology (Conservation ag, SLM)
 - 2 provide direct training on the technology to a random subset of CFs



Does information get lost in the network?

- From extension agent to contact farmer? **Yes**
 - adding a direct training led to a 20% increase in demonstration of the new technology
 - benefits of adoption are enough to ensure cost effectiveness (37% increase in yields; 0.37 SD reduction in labor)



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- From extension agent to contact farmer? **Yes**
 - adding a direct training led to a 20% increase in demonstration of the new technology
 - benefits of adoption are enough to ensure cost effectiveness (37% increase in yields; 0.37 SD reduction in labor)
- Is that increase in demonstration enough to trigger adoption among other farmers? **No**
 - but farming proximity to the source increases adoption by 75%, relative to the control [◀ back](#)



Learning from self and Learning from others

- Given a certain amount of demonstration resources, what is the optimal allocation?
 - In particular, what is the relative role of self-experimentation w.r.t. learning from others?



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- We embed a field experiment in a GAFSP-supported government program in Bangladesh (IAPP)
 - seed variety trial



Learning from self and Learning from others

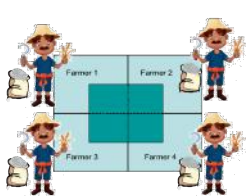
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- We randomly vary the number of experimenters across villages to learn about optimal allocation of demonstration resources



Experiment



Regular
demonstration
plot
17 villages



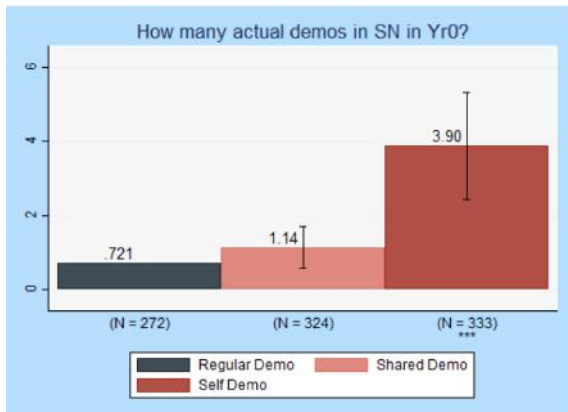
Shared
demonstration
plot
19 villages



Self-
demonstration
21 villages

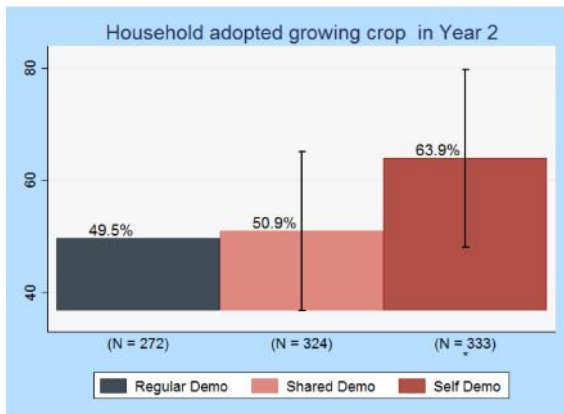


Demonstration buzz



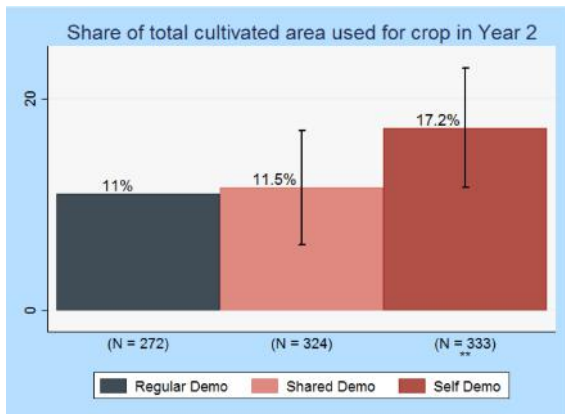


Self-demo increases adoption in Year 2





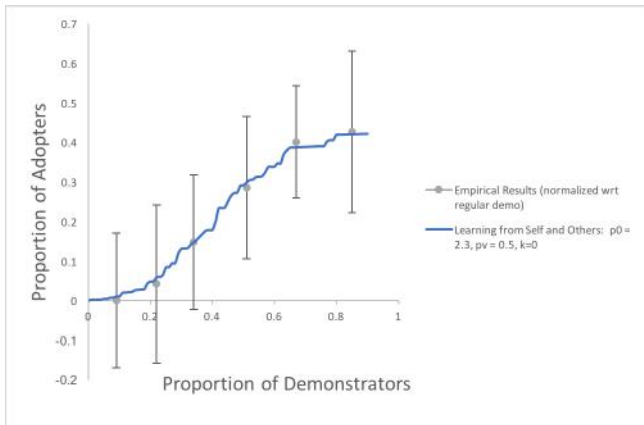
Self-demo increases area under new crop





Experiential learning

Ratio of learning from self vs from others o.t.o. 4.5:1





Implications for extension policy

- Our findings reject the idea that social learning is very large relative to self experimentation



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Implications for extension policy

- Our findings reject the idea that social learning is very large relative to self experimentation
- This suggests a need to break away from traditional extension systems
- Encouraging farmers to experiment and innovate in their own farming conditions may be the most productive use of demonstration resources
 - Further testing is needed to move closer to the efficient frontier and increase productivity in agriculture [← back](#)

Attendance in extension trainings is low





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Feedback tools

ITSINDA A:
1.A.1. SERIAL NUMBER: _____
1.A.2. Izina ry'itsinda rya TUBURA _____

ITSINDA B: GUTAHURA INDWARA






2 B.1

▶ Section C

2 B.2

1=Yego

2=Oya


 1= Ndacyishimiye _____

 2= Ndirafasho _____

 3= Sinkwishimiye _____



Sign up increases

	New users joined group (Yes/No)	# New users	Users dropped out (Yes/No)	# Drop outs
Scorecard Treatment	0.28** x 3 [0.13]	0.61 [0.56]	-0.44*** - 3 [0.14]	-1.03 [1.26]
Logbook Treatment	0.26*** x 2.5 [0.10]	1.12*** [0.37]	-0.29*** - 1 2 [0.11]	-1.94** [0.94]
Control mean	0.08	0.21	0.88	4.25
Observations	180	180	180	180



Use increases

	<i>Men</i>		<i>Women</i>	
	Attended training	# trainings attended	Attended training	# training attended
	(1)	(2)	(3)	(4)
Scorecard Treatment	0.03 [0.08]	 1.23*** 67% [0.38]	 0.25** 139% [0.10]	 0.97* 66% [0.53]
Logbook Treatment	-0.07 [0.06]	 0.67** 36% [0.27]	 0.14** 78% [0.07]	 0.86** 59% [0.41]
Control mean	0.38	1.85	0.18	1.47
Observations	887	830	573	514



Implications

- In the context of a private extension system, feedback tools increased
 - attendance among current users
 - sign up among non-users



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 - attendance among current users
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- Comparing different types of feedback tools shows that these effects are not due to anchoring
- Used RCT to show these effects are not simply the result of additional monitoring
- Accountability appears to be a substantial constraint in extension networks [◀ back](#)

Assigning the gender of contact farmers

• Treatment

- designated and trained CFs
- assigned gender



VS



• Control

- *shadow LFs*, not trained

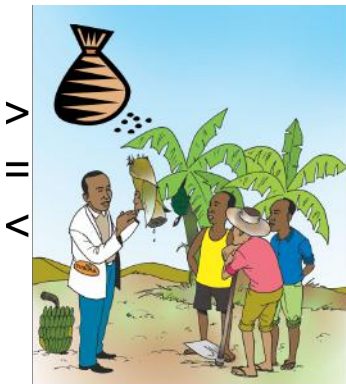
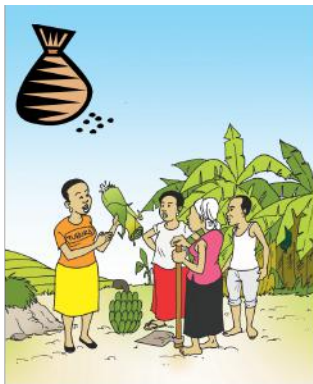


treatment, trained



control, left alone

The role of incentives



>> identify gender-specific barriers to delivering agricultural service



Discrimination contributes to the gender gap

- Female communicators outperform male counterparts in acquiring, retaining information about a new technology, and applying it on their own farms



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 - results document a gender perception bias



Discrimination contributes to the gender gap

- Female communicators outperform male counterparts in acquiring, retaining information about a new technology, and applying it on their own farms
- Despite this relative zeal, female communicators' performance drops in relative terms when asked to convince others
 - results document a gender perception bias
- Incentives help mitigate these issues
 - increase farmers' exposure to female communicators
 - reduce gender perception bias [← back](#)



Fees and minikits

Do irrigation fee subsidies induce experimentation?



Lotteries for Water Fee Subsidies

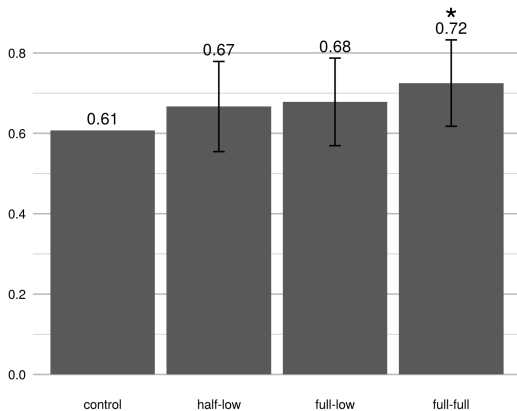
- Escalating fees over first 2 seasons
 - Control (no subsidy)
 - Half, Low
 - Full, Low
 - Full, Full



Agricultural Inputs Minikits



Irrigation fee subsidies affects minikit pickup (Rwanda)



Source: Jones, Kondylis, Loeser, Magruder 2017

[← back](#)



Who gets the irrigation kit?

Constraints:

- Has to be close to the river
- Footprint is either 5-10 Ha
- Avoid forest cover

Ex ante not clear who should get it

- Don't know who will benefit most from irrigation
- Different group structures might better maintain equipment. (Olson, 1965; Ostrom, 2003)



- Local community may have more information about who benefits most (Basurto, Dupas, Robinson, 2015)
- Costs of mismatch might be substantial (Jack, 2013)
- risk that the most powerful person in the community will take the kit (Acemoglu, Reed, and Robinson, 2013)

Source: Christian Garg Kondylis Zwager 2017

Testing two targeting models



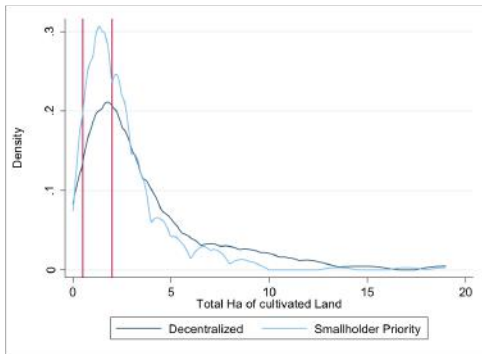
Smallholder model: the district office extension agent administers the priority test.



Decentralized model: the community leadership provides a list of the identified recipients.

Source: Christian Garg Kondylis Zwager 2017

Smallholder treatment includes more farmers in target group

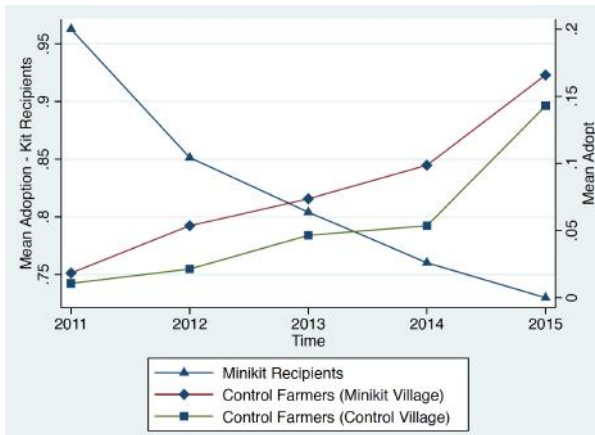


Percent of people selected for kit who report cultivating between .5 and 2 Ha of Land

Smallholder Priority	55%
Decentralization	42%

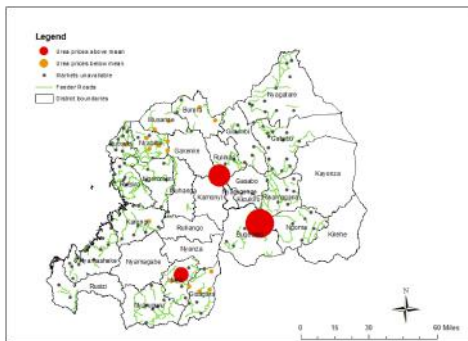
Source: Christian Garg Kondylis Zwager 2017 [← back](#)

Lack of seed availability in the market hinders adoption



Source: Emerick, de Janvry, Sadoulet 2016

High price heterogeneity across Rwandan markets



Source: Gonzalez-Navarro, Jones, Kondylis 2017

[◀ back](#)