Impact of Phasing Out An Integrated Agricultural Development Program for Smallholder Farmers:

A "Reverse RCT" Approach Applied to a BRAC Uganda Extension Program

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Presentation Outline

- Program background
- Research questions
- Research opportunity: a “reverse-RCT”
- Surveys and data collection
- Issue: time horizon
- Issue: generating the pure control group
- Existing results on program impact
- Conclusion

Project Background

- BRAC Uganda Agricultural Program: Two main components
- Model Farmers (Mod-Farm): focuses on training
- Community agriculture promoters (CAP program): creating market channels for inputs
- To date, these programs have reached over 100,000 general farmers (GFs)
- Program must be phased out (funding constraint)
- Phase-out being sequenced, allows reverse-RCT to see if programs were “sustainable”

Program Concepts of "Sustainability"

- Extending new *practices*/technologies:
  - Improved practices are used by farmers after training and refresher courses cease
- Provision of *inputs*:
  - Demand persists after free/subsidized/monitored provision ceases
- Lasting *mechanisms* for providing knowledge and inputs
  - CAPs and Model Farmers remain active even without direct support
- We will measure sustainability along three dimensions:
  - Activities (persistence of CAPs and Model Farmers, self-organized and motivated)
  - Practices (by general farmers)
  - Impacts (on yields, productivity, net profit, incomes, market activity (e.g. regarding maize and beans)
  - Other family outcomes, etc.)

Research Questions

- Are agricultural extension activities (and any of their effects) sustainable after all or some aspects of external support are discontinued or scaled-back?
- If so: does this depend on which impact, duration, and time elapsed after the formal program is discontinued?
- Is sustainability impacted by whether (in our case) supply chain or extension (encouraged practices of weeding, line sowing, spacing, organic fertilizer, etc.) are scaled back first?
- Does relative proximity to other villages that still receive extension and supply chain services impact sustainability of program impacts?
- To what extent is there complementarity between demonstration (model farmers and extension agents), supply chains (CAP), and microfinance in achieving sustainability?

A Novel Identification Strategy: The "Reverse-RCT"

- Both government and NGO programs are frequently discontinued due to lack of funding
- Reports that impacts prove unsustainable after funding ends is a recurrent theme in discussions of rural development programs
- Reverse-RCTs can provide a novel research strategy to identify effects e.g. on farming practices, household outcomes of program termination
- Reverse-RCTs can help evaluate impacts of alternative phase-out designs (duration, phase-out of program components, etc.)
- This method may reveal program and participant characteristics associated with sustainability of impacts – so potentially also offering insight into targeting design
- Reverse-RCTs may highlight tradeoffs from a sustainability perspective, such as including more participants for shorter duration, vs a longer program duration with fewer participants, for a given budget
- Moreover, reverse-RCTs of program phase-outs may inform the design of new programs, including program duration needed for sustainability; and which program components are most vital to sustainability

Surveys and Data Collection

- 15 Branches in Eastern Region
- 90 Clusters containing 2-3 villages each
  - Average of 6 clusters per branch
  - Each currently accessing ModFarm and CAP services
  - Geographically proximate
- Surveys implemented and waves so far
  - Household
  - Community
  - Crop cutting
- Surveys yet to be done
  - Additional community and household controls
  - Endline and planning for “post-endline”

Study Sites


Places
Wanyange
submissionid = 174745
branch_name = Bugembe
Wairaka
submissionid = 174746
branch_name = Bugembe
Kyamagwa
submissionid = 174747
branch_name = Bugembe
Nakabango
submissionid = 175218
branch_name = Bugembe
Mawuta
submissionid = 175224
branch_name = Bugembe
Nakabango
submissionid = 175318
branch_name = Bugembe
Layers
Earth Gallery
Borders and Labels
Borders
Labels
Populated Places
Islands
Geographic Features
Water Bodies
Places
Photos
Panoramio
360 Cities
Roads
3D Buildings
Ocean
Weather
Nakabango
Nakabango
Kakira
Mawoito
Polota
Kainogoga
Mawūta
Musima
Musima
Musima
Wakitaka A
Wakitaka
Namulesa
Wakitaka C
Kakira Rd
Kyamagwa
Mafubira A
Nakanyonyi
Wairaka
Wanyange
Rtu
Kayunga
Bugembe
Mawuta
Wairaka
Wairaka
Wanyange
Mafubira A
Wanyange Lake
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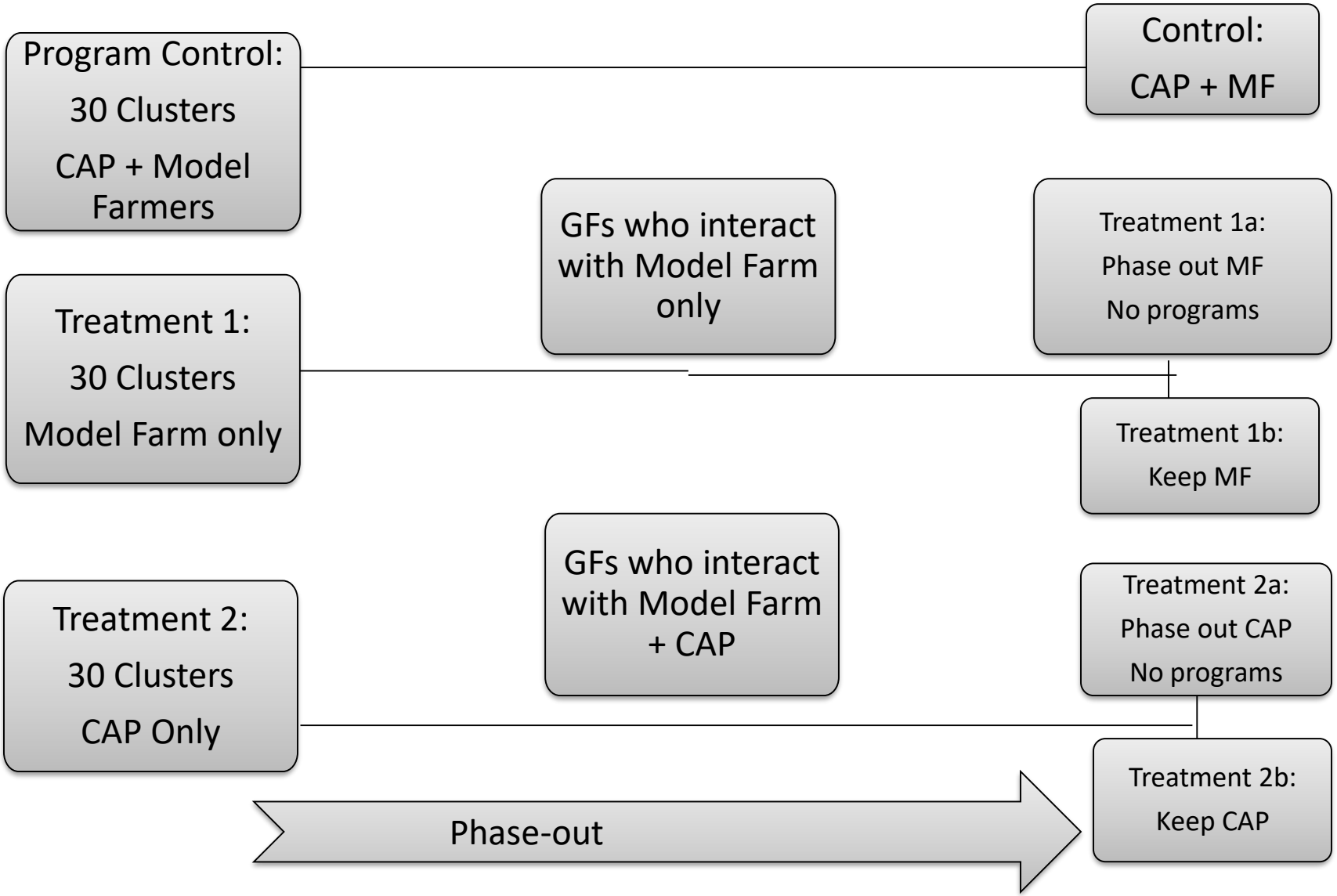
Image © 2012 DigitalGlobe
Google earth

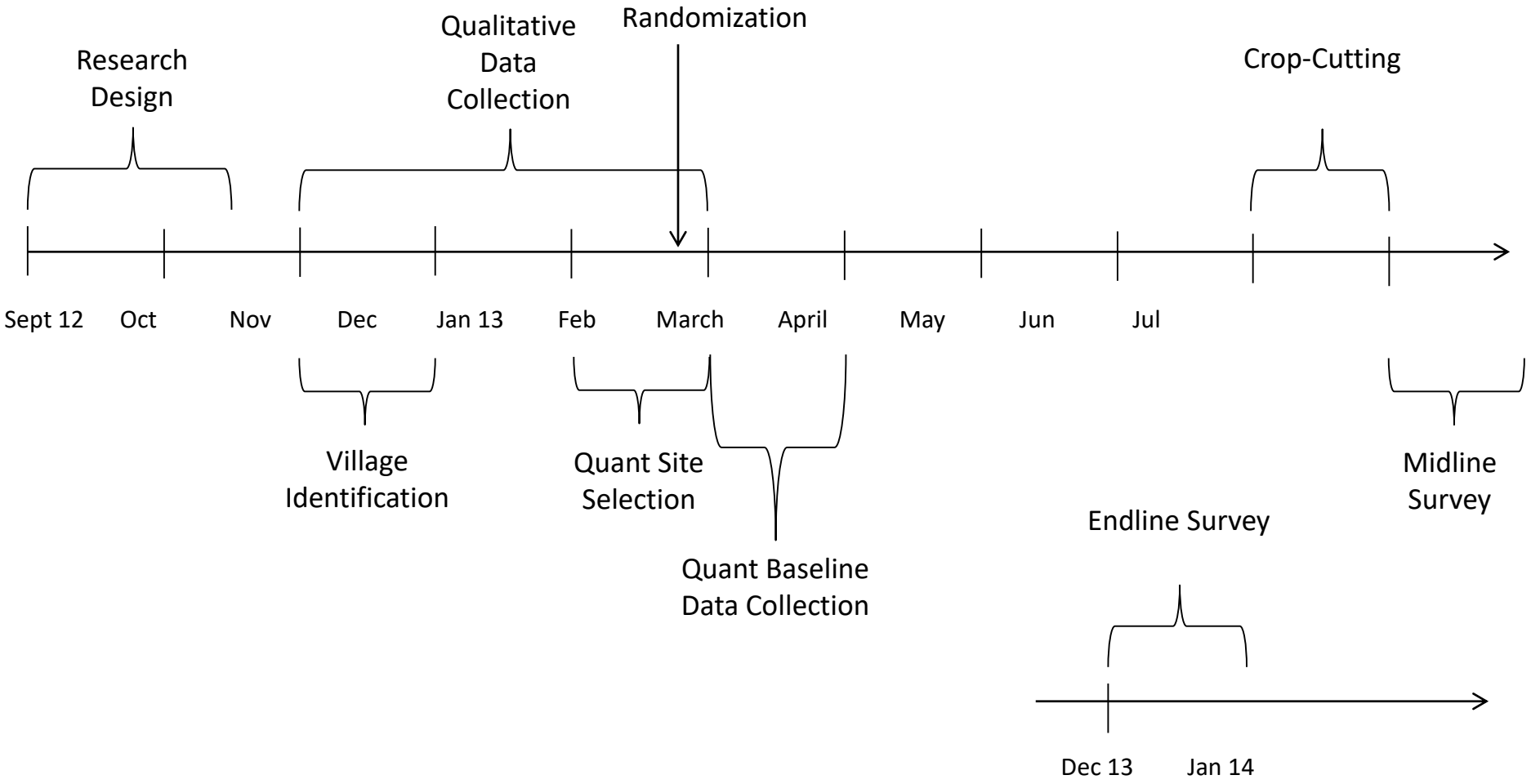
Schematic Diagram of Research Phases



First Research Challenge: Short Phase-out Time Horizon

- Our local partners have been planning, and have begun implementing, 6-month phase out periods
- Phase out periods were decided by BRAC-Uganda (our local partner) before our participation; we would prefer longer periods
- Discussions on length of phase out are underway, may not be possible
- We also hope to extend horizon of follow up surveys; this seems likely to be successful

Timeline


Research Design
Qualitative Data Collection
Randomization
Crop-Cutting
Sept 12
Oct
Nov
Dec
Jan 13
Feb
March
April
May
Jun
Jul
Village Identification
Quant Site Selection
Quant Baseline Data Collection
Midline Survey
Endline Survey
Dec 13
Jan 14

A Key Research Design Challenge

- Total impact
  = sustainable impact + unsustainable impact
- Reverse RCT: shows extent of any unsustainable impact
- Challenge: If phasing out the agriculture program does NOT have significant impact on agriculture practices, how to interpret the results?
- Sustainable impact - or no impact to begin with?
- Need to develop control group that never had program
- Problem is developing this type of no-programs control group cannot be done as a pure RCT

Research Design Challenge: Detail

- Let $I_{T,t}$ be the impact at time T after t periods of phasing out.
- We will measure $I_{T,0}$ and $I_{T,j}$ for j=1,2,3.
- If we are <u>able to reject</u> $I_{T,0} = I_{T,j}$ we can estimate an extent of unsustainability
- If we are <u>unable to reject</u> $I_{T,0} = I_{T,j}$ how do we know if both of them are not zero?
- Solution: Develop a pure control group

Developing the No-Programs Control Group

- The program was not originally implemented as RCT
- So, we are working now with our local research partners to generate and surveying a control group without any agriculture intervention
- However, initial conditions in villages without agriculture intervention may have differed from the reverse-RCT treatment villages
- We will utilize a previous panel dataset (used in an RDD study of and Pan, Smith, and Sulaiman) to quantify differences, if any, using matching techniques (in progress)

Developing a “Pure” (Never had either program) Control Group (Continued)

- We have 11 overlapping branches between the prior agriculture survey (used in our RDD study) and the baseline of RCT panel
  - Districts of Bugiri, Busia, Buwenge, Iganga, Kaliro, Kamuli, Kumi, Njeru, Pallisa, Sironko, Soroti
- This overlap provides up to 1800 potential control group households in approximately 72 villages

Additional Pure Control Group Approach

- RCT baseline survey of the pure control is missing
- Retrospective questions in the midline survey are being used to get information about households' agriculture practice in the season of July-Dec 2012
- We are testing the memory of households by asking some questions regarding data we collected previously

Additional Pure Control Group Initiatives

- Recollection for the season of July-Dec 2012 spans 2 lags instead of 1
- Pilot survey of 176 households in one branch (Kumi) was undertaken in May 2013
- Questions about the previous cropping season of July-Dec 2012 (1 lag), which is also covered in the midline survey later (2 lags)
- Compare the pilot survey results and the midline survey results for the same cropping season at different survey times

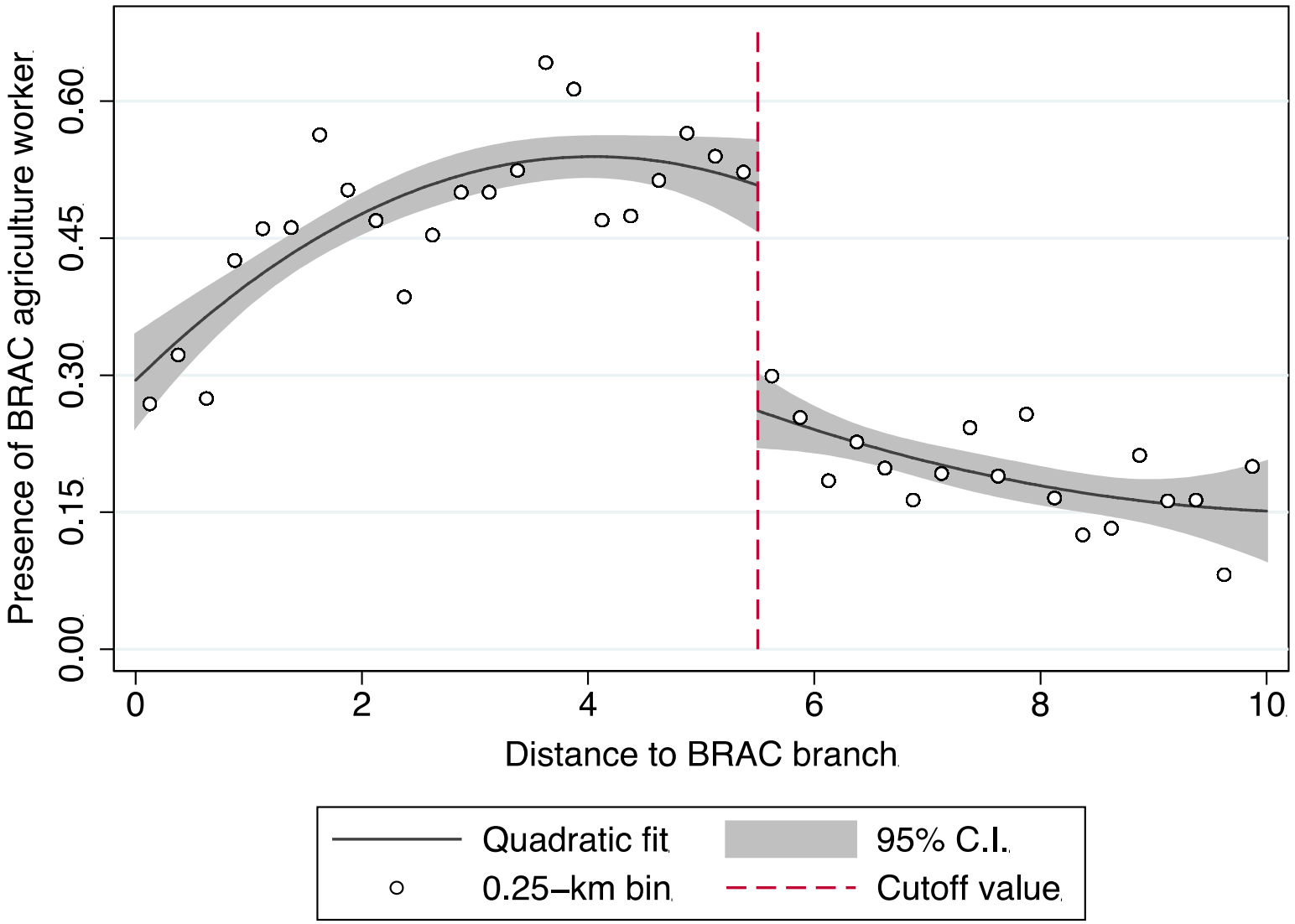
Previous evidence on impact

- We have reasons to expect that comparison with our control groups will indicate that the program did in fact have a positive effect
- From previous research, there is fairly credible evidence of program impact, even if not RCT-based
- Proloy's PSM results (next slide)
- Our RDD study: subsequent two slides

Previous Panel study by Proloy Barua (BRAC RED)

- Barua employed PSM to assess early impacts of intervention
- Positive impacts in use of modern inputs, cultivation methods
- PSM estimates show statistically significant increase in improved seed use and vaccination services (27 and 24 percentage points respectively) for participants compared to matched controls
- Line-sowing cultivation methods increases six percentage points
- Mixed-cropping practices decreases by 10 percentage points
- Some indirect effects on nonparticipants of technology adoption such as improved seeds, following line sowing and weeding
- Insignificant impact on commercialization - participating farmers not more likely to earn profits by selling agricultural produce

First Stage Discontinuity: Agriculture



Some RDD results

- Presence of ag worker in village slightly increases usage of improved seeds, but the effects are not significant.
- But he presence of the MFI in the village significantly increases adoption rate of improved seeds - by 86.6 percentage points
- Highlights possible credit constraints faced by farmers in adopting “advanced” (market-purchased) agricultural inputs
- Also –presence of BRAC ag workers in the village significantly increases manure usage - by 28 percentage points.
- The estimate increases to 35.9 percentage points when including additional controls
- Note: manure inputs are “free” in sense that collected and not purchased on markets for money
- However, small and insignificant effect for usage of intercropping

Thank you