Encouraging the adoption of agroforestry

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Dunavant Cotton, Ltd
Shared Values Africa

Policy context: REDD+

What is REDD+?

Reduced Emissions from Deforestation and Degradation… Plus

REDD+ in Zambia

- 14 developing countries pilot the UN-REDD programme, including Zambia
- Anticipate benefits for livelihoods and biodiversity
- Agroforestry ranked first among land use practices for REDD+ (Kokwe 2012)

REDD+ Challenges and Questions

- What activities and investments are eligible for REDD+ funding?
- How to monitor and verify actual changes in carbon?
- What legal and policy frameworks are needed?
- How can farmers and forest users be encouraged to adopt REDD-consistent behaviors?

REDD+ and behavior change

Land use change is ultimately about farmer decisions

- Barriers to changing land use practices
  - Knowledge
  - Technology access
  - Tradition
  - Costs and benefits / Incentives

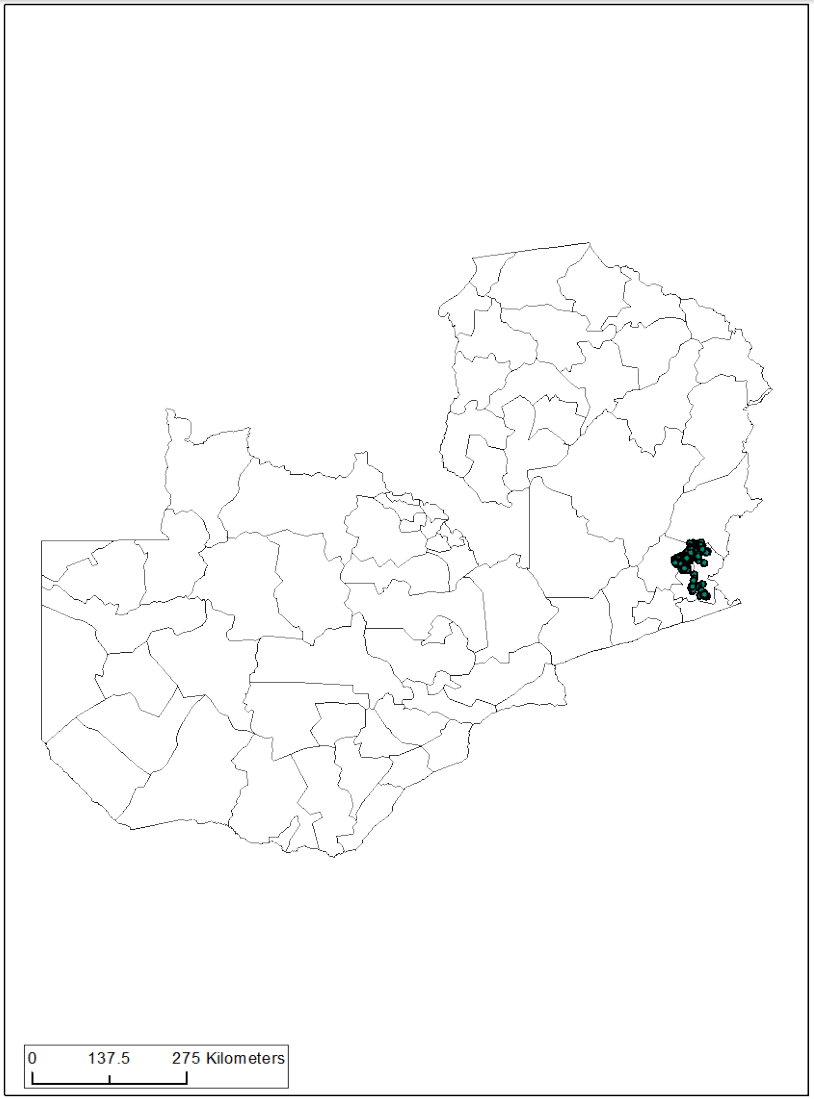
Objectives

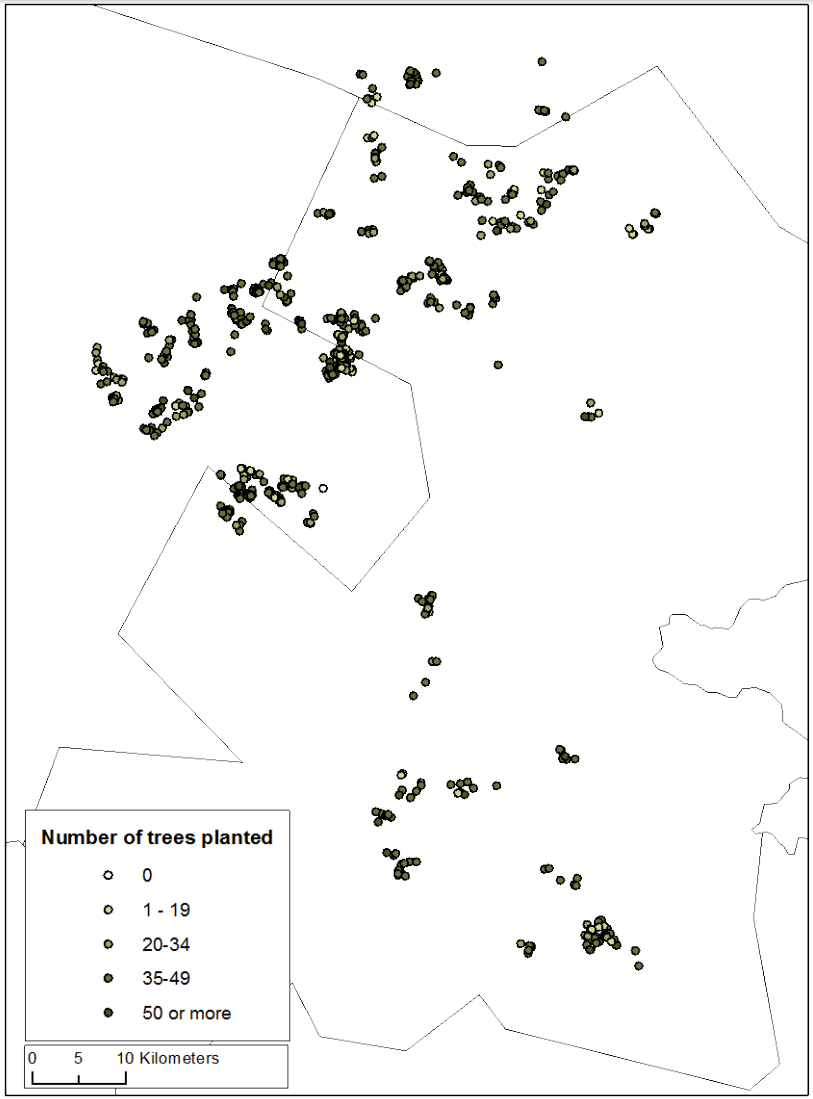
Programme objective: Increase the adoption of agroforestry by smallholder farmers in Eastern Province, Zambia

Study objectives:

- Generate rigorous evidence on the barriers to and determinants of adoption
- Measure both take up and tree survival
- Analyze cost effectiveness and distributional outcomes

Study setting





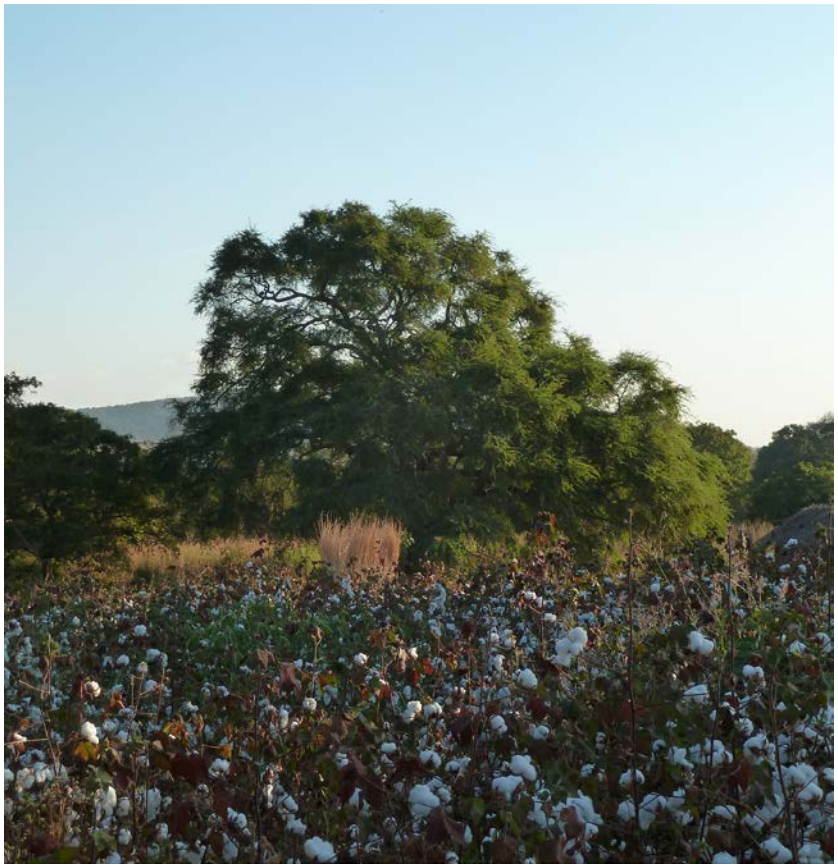
Study setting

Partnership with

- Dunavant Cotton, Ltd.
- Shared Values Africa

- Promote planting of musangu (*Faidherbia albida*) trees by Dunavant farmers
  - Provide training, inputs and incentives

Musangu (*Faidherbia albida*)



- Indigenous to Zambia
- Nitrogen fixing
- Loses leaves during rainy season
- Natural animal protection (thorns)
- Fertilizer benefits take 5-10 years

Research questions

- How do short run costs and long run benefits influence adoption?
  - Do short run incentives increase adoption and tree survival?
- What is the program design tradeoff between access and wastage?
  - Does providing free inputs improve take up? Does it lower tree survival?
- What types of farmers are most interested and most successful?

Implementation

- **November 2011**: Train 1300 farmers in 125 farmer groups on musangu care and benefits
  - Offered a carbon contract by SVA
  - Systematic variation in the contract parameters
  - Baseline survey regardless of take up
- **November – present**: Regularly visit 1/5th of adopters to measure activities
- **April 2012**: Visit all farmers and measure tree planting outcomes
- **October 2012**: Visit all farmers, collect follow up survey data, measure tree survival, pay incentives

Study population

- Dunavant cotton outgrower farmers
- Mean landholding is 7 acres
- 97% of land is under cultivation
- 12% female headed households
- Report 1 month of food shortages
- No formal land title

Study design

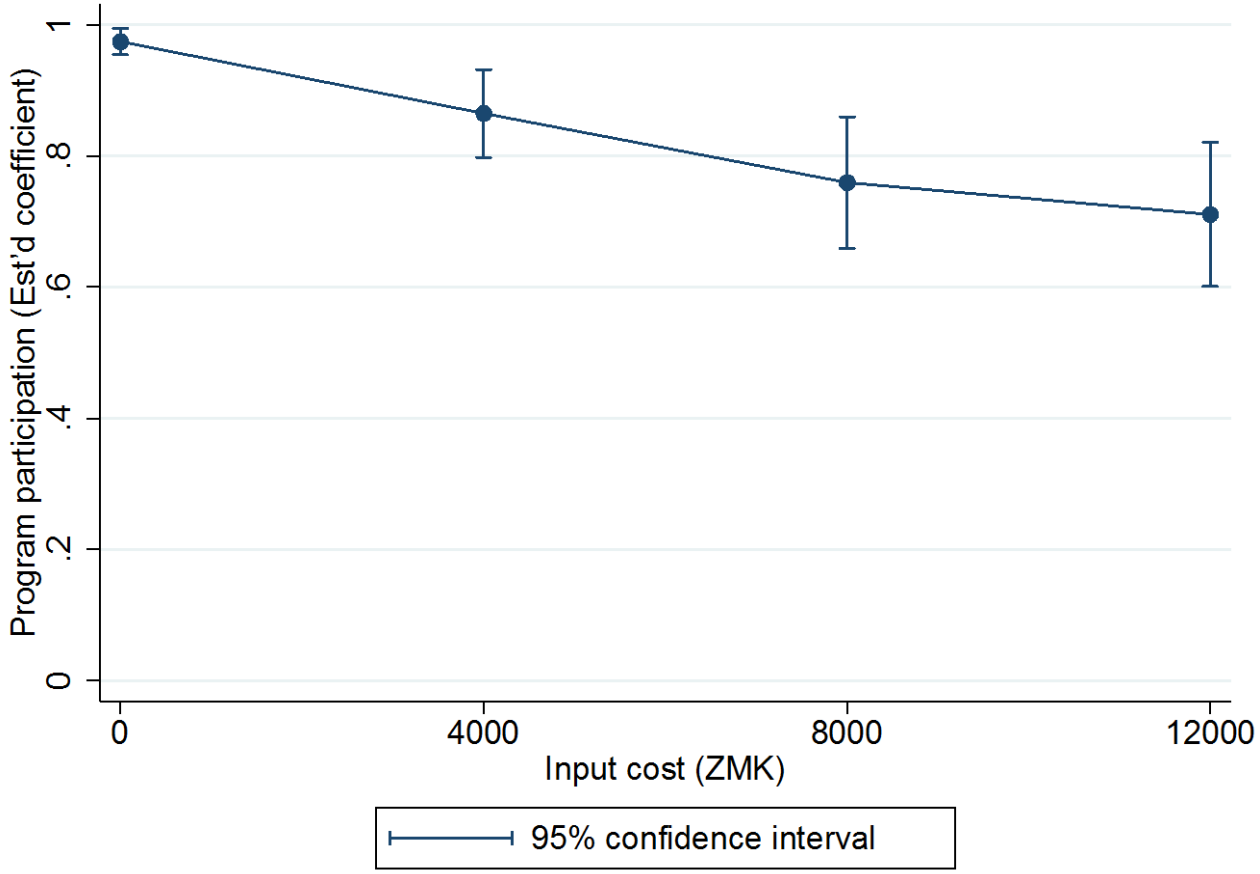
- All participating farmers receive 50 seedlings
- Plant seedlings in maize or cotton fields
- Water, weed, protect from fire and pests
- One-year contract
- Randomization on the following dimensions:

	Variation in input cost (A)			
	A = 0	A = 4000	A = 8000	A = 12000
Reward before take up Reward after take up	Continuous variation in the reward for keeping at least 35 trees alive			
	1/5th receive ongoing monitoring			

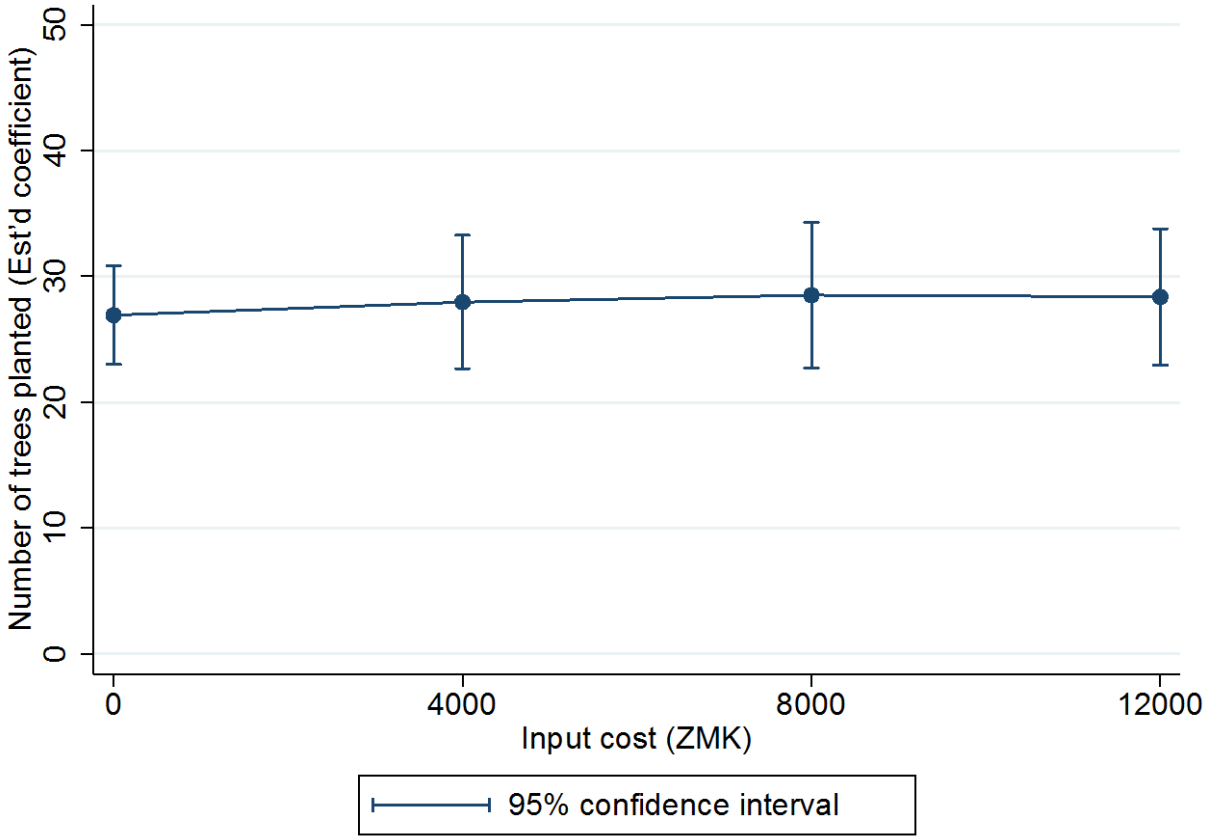
Preliminary results I

- Compare across input cost (A) conditions
  - **Take up**: Do liquidity constraints / input costs deter adoption?
  - **Tree planting**: Do subsidized inputs increase wastage?

Program take up, by input cost



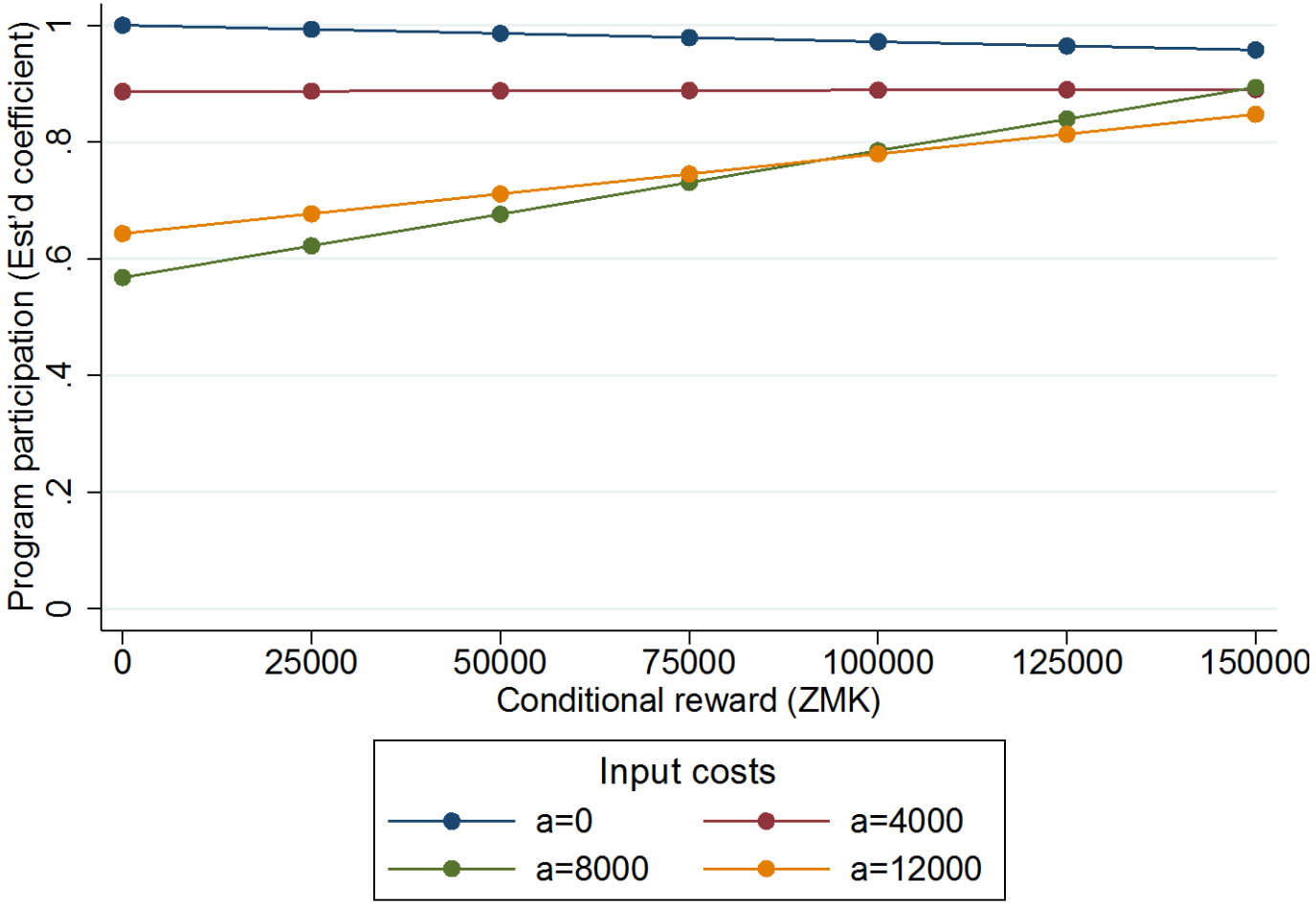
Tree planting, by input cost



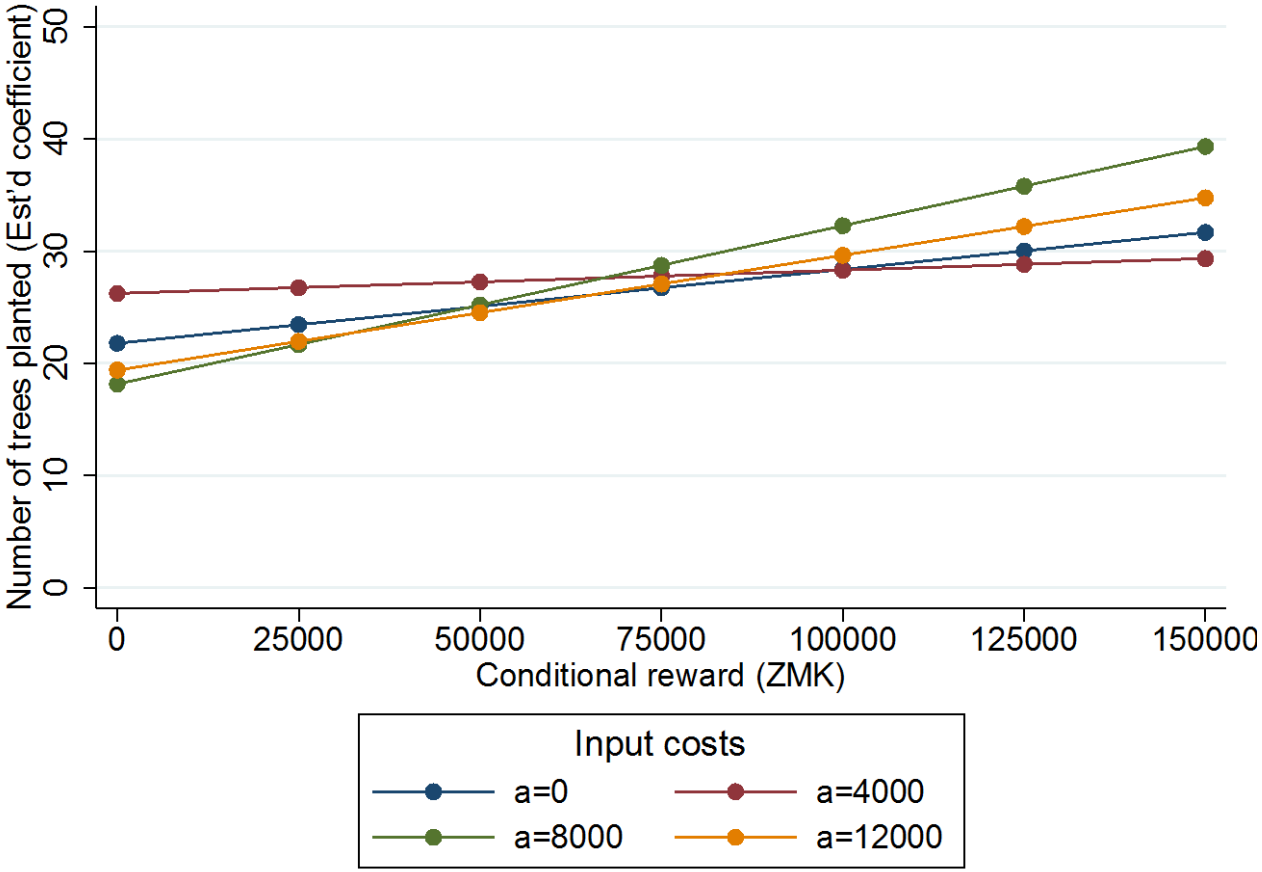
Preliminary results II

- Compare across reward (r) conditions
  - **Take up**: Do short run rewards for tree survival generate more program participation?
  - **Tree planting**: Do short run rewards result in greater effort?
  - Do rewards interact with the input costs?

Program take up, by reward level



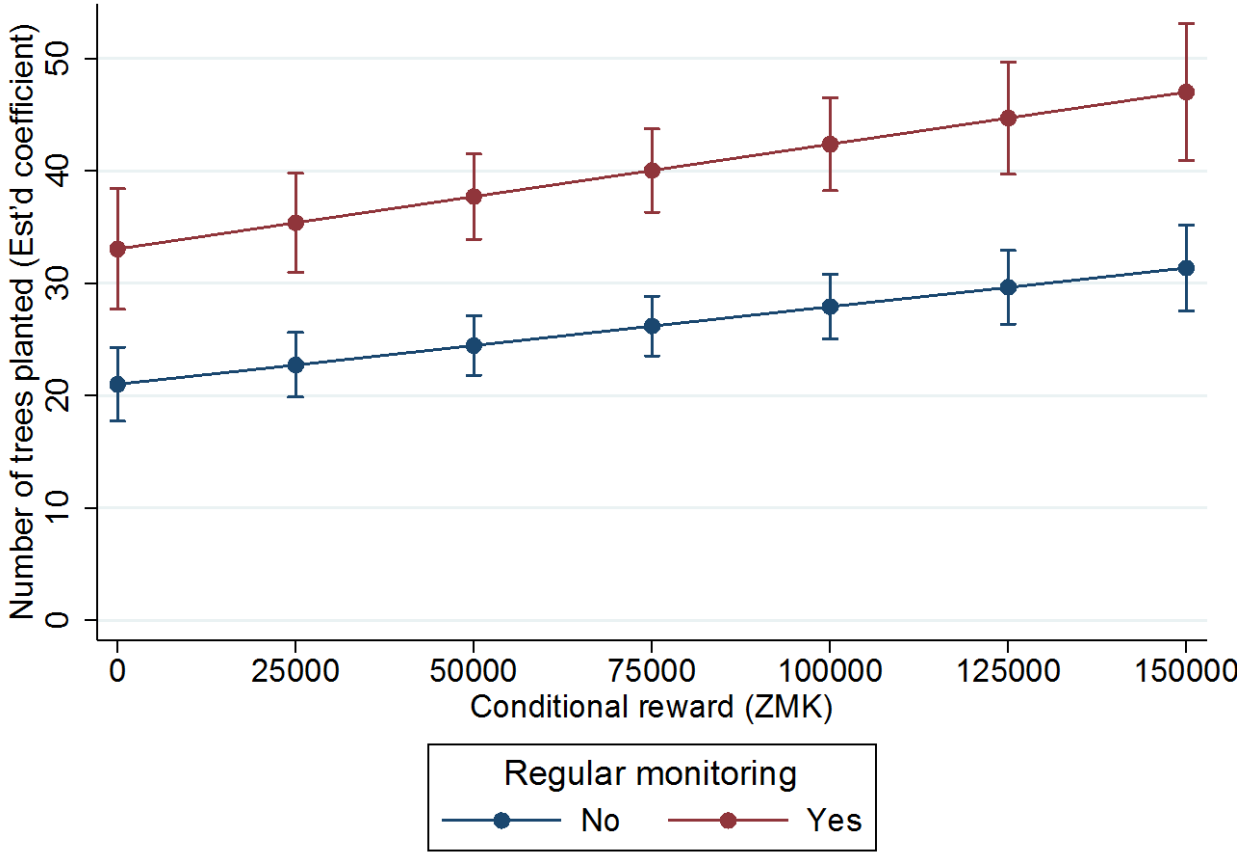
Tree planting, by reward level



Preliminary results III

- Compare by monitoring condition
  - Do regular visits improve tree planting outcomes?

Tree planting, by monitoring



Preliminary results IV

- What types of farmers are most interested in the program?
- What types of farmers are best at completing the contract?

Farmer characteristics and program outcomes

	Take up	Comply[1]
Owns less than 5 acres	-0.002	-0.069*
	[.0236]	[.0359]
Short of food for >1 month	0.0198	-0.009
	[.0329]	[.0544]
Female household head	0.0162	0.0285
	[.0310]	[.0436]
Fertilizer purchased last year	0.0141	0.0903**
	[.0214]	[.0357]

[1] Intermediate compliance outcome: comply equals 1 if the farmer planted at least 35 trees

Summary

Evidence is still preliminary

- Both input costs and short run rewards affect program participation
- Rewards also affect intermediate program outcomes
- No evidence (so far) of adverse selection from rewards

Next steps

- Measure tree survival outcomes and deliver contract payments
- Collect follow up survey data
- Partners are scaling program up this year

- Use results to inform REDD+ policy in Zambia
- Simulate “optimal contracts” for this setting
- Test whether non-compliance is driven by lack of penalties for default

Policy implications (preliminary)

- REDD+ approaches that involve land use change depend on getting incentives right
- Economic theory and rigorous piloting can help inform program design
- Cost effectiveness depends on fixed and variable program costs
- Legal issues (carbon rights and land security) may interact with incentive design

Thank you

- IGC Environment Programme
- Climate Knowledge Development Network
- Innovations for Poverty Action

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