Encouraging the adoption of agroforestry:
Summary of research results

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Shared Value Africa, Ltd

with support from IGC, CDKN, Musika
Policy context: Long run agricultural investments

What are long run investments?

- Agricultural technologies with short-run costs and long-run benefits
  - To farmer and to the environment
  - Examples: tree crops, agroforestry, conservation farming, “climate-smart” agriculture

Agroforestry in Zambia

- Adoption rates are typically low
- Adoption may not be in farmer’s best interest
Policy context: REDD+ in Zambia

What is REDD+?
Reduced Emissions from Deforestation and Degradation… Plus

REDD+ in Zambia
– 14 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)
Challenges and Questions

Adoption of long run technologies
• What technologies generate the greatest benefits?
• What technical assistance and training should be incorporated into extension?
• What input and output markets need further development?
• How do farmers trade off current and future costs and benefits?

REDD +
• 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?
Project overview

Research collaboration with Trees on Farms Programme, implemented by:

- Dunavant Cotton, Ltd.
- Shared Value Africa Ltd.

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

- Indigenous to Zambia
- Fixes nitrogen and sequesters carbon
- Loses leaves during rainy season
- Natural animal protection (thorns)
- Fertilizer benefits take 5-10 years
Study setting
Study population

- ~1300 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
Objectives

Programme objective: Increase the adoption of agroforestry by small-scale farmers in Eastern Province, Zambia

Research objectives:
• Generate rigorous evidence on what determines adoption
• Measure both take up and tree survival
• Analyze which farmers benefit and cost effectiveness
Research questions

• How do short run costs and long run benefits influence adoption?
  – Better to subsidize inputs or shorten the delay of benefits (incentives)?

• Are there tradeoffs associated with subsidies and incentives?
  – Do subsidies increase access but decrease follow through?
  – Do incentives increase effort but attract risky types?

• What types of farmers are most interested and most successful?
The methodology:
Randomized controlled trials in social science

Divide all eligible individuals into two similar groups ... randomly

- Treatment group
- Control group

Only difference between the groups is that the treatment group received the treatment

- Any difference in outcomes can be attributed to the treatment
The methodology: Our study

• During early stages of a programme, test alternative approaches
  – Use findings to inform scale up

• RCTs offer a flexible methodology that generates clear causal results
  – Adds short run costs but improves cost effectiveness later
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

Farmer groups randomly assigned to different input costs (A) in ZMR

A=0  A=4  A=8  A=12

Individual farmers randomly assigned to different incentives (0 – 150 ZMR)

Incentives paid after one year if 35 or more trees survive
Implementation

November 2011
- Training on musangu benefits and care
- Contract offer
- Baseline survey

April 2012
- Survey of planting outcomes

October 2012:
- Final monitoring
- Follow up survey
- Contract payments

October 2013
- Follow up survey, post-incentives
Results

Outcome I: Take up
Outcome II: Tree survival
Outcome III: Results by farmer type
Outcome I: Take up

How do input cost subsidies affect take up?

Take up by input cost treatment (in ZMR)
Outcome I: Take up

How do performance incentives affect take up?

Take up by incentive treatment (in ZMR)
Outcome II: Tree survival – program participants

How do input subsidies affect tree survival?

Tree survival by input cost treatment (in ZMR)
Outcome II: Tree survival – program participants

How do performance incentives affect tree survival?

Tree survival by incentive treatment (in ZMR)

Tree survival (conditional on take up)

0 10 20
0-30 30-60 60-90 90-120 120-150
Outcome IV: Results by farmer type

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participate</th>
<th>Earn rewards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth (land, assets)</td>
<td>+</td>
<td>not significant</td>
</tr>
<tr>
<td>Female headed household</td>
<td>+</td>
<td>not significant</td>
</tr>
<tr>
<td>Larger households</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>More educated hh head</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Older hh head</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Past musangu planting</td>
<td>not significant</td>
<td>+</td>
</tr>
<tr>
<td>Purchased fertiliser</td>
<td>not significant</td>
<td>+</td>
</tr>
</tbody>
</table>

*Controlling for other factors
Summary

1. Input subsidies increase take up
2. Performance incentives increase tree survival
   - Optimal combination depends on fixed costs of contracting

   • Little evidence of unintended negative effects
     - No evidence of subsidies or incentives worsening follow through

   • Less well-off farmers participate and do well

   • Suggestive evidence that regular monitoring improves tree survival outcomes
Next steps

Research next steps
• Return in October to measure what happens after incentives stop (we hope!)

Implementation scale up
• Partners (Dunavant and SVA) are scaling program up this year
• National Tree Planting Programme (DoF) launched recently
Policy and programme implications

• Long run agricultural technologies and REDD+ strategies depend on getting incentives right
  – Positive incentives (subsidies and performance incentives) help

• Cost effectiveness depends on fixed and variable program costs

• Economic theory and rigorous piloting can help inform program design
Thank you

- IGC Environment Programme
- Climate Development & Knowledge Network
- Musika Development Initiatives

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Agenda

- Welcome and meeting opening
- Presentation of results
- Discussion
- Lunch
- Breakout sessions
  - Practical lessons (group A)
  - In depth research findings (group B)
- Closing remarks