OVERVIEW

INNOVATION

An agroforestry adoption scheme that varied input cost-sharing and cash incentives to better understand agricultural technology adoption.

EVALUATION

1,300 farmers were offered an opportunity to join a tree-planting programme. Farmers were randomly assigned to receive various levels of input subsidies and/or outcome-based incentives for tree survival, which rewarded farmers for keeping 70 percent of their trees alive for one season. Take-up, tree planting and tree survival outcomes were used to measure adoption.

RESULTS

Overall, farmers showed high demand for the programme, with 83% take-up on average. At the end of the first year, there was a total of 19,400 surviving trees under the care of 700 participating farmers.

Higher input costs lead to lower participation but do not affect tree planting and tree survival.

Higher cash incentives lead to increased participation, tree planting and tree survival.

Encouraging the Adoption of Agroforestry: A Case Study in Eastern Province, Zambia

Many agricultural technologies, such as tree crops, agroforestry and conservation farming practices, yield long-run benefits but come with short-run costs. Consequently, adoption rates by smallholder farmers can be low. Traditional efforts to increase adoption include training, information provision, subsidised inputs and cash incentives, but little clear evidence exists that breaks down the impacts and cost effectiveness of these approaches.

The programme being studied is an agroforestry adoption scheme with smallholder farmers in rural Zambia. Variations in the programme illuminate the effects of cost-sharing and incentives on the adoption of musangu trees. This allows us to better understand whether upfront liquidity constraints or the lack of short-run benefits are a more important deterrent to the adoption of a new technology. It also makes it possible to measure how much waste occurs when farmers accept the subsidies but fail to adopt the technology.

***Faidherbia albida*, known locally as musangu:**

- fixes nitrogen in its roots and leaves
- loses its leaves during the planting season providing fertiliser and allowing crops to receive sunlight
- is native to Zambia, and grows extensively in Southern Province, but has been slow to take hold in much of the rest of the country.

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POLICY IMPLICATIONS

- Subsidising the price of inputs increases adoption without leading to wastage of inputs.
- Short-run incentives are effective for generating sustained adoption, and may be cost effective if the fixed costs associated with adding additional farmers to a tree planting programme are high.
- Financial incentives do not appear to attract the wrong "type" of farmer.
- We find no evidence that poorer or more marginalised households are unable to benefit from the programme.

In November 2011, around 1,300 farmers, all working with Dunavant in that season, received training on tree planting and care through the *Trees on Farms* programme, a partnership between Dunavant and Shared Value Africa. Farmers were then offered the opportunity to join the programme.

To investigate barriers to the adoption of musangu, some programme features were systematically varied:

1) cost-sharing between farmers and the implementer, from free provision to market value (ZMR 12) and varied at the farmer group level.

2) cash incentive offered dependent on 70% tree survival after one year.

REDD+ stands for Reduced Emissions from Deforestation and Degradation Plus and is the UN's main programme for including developing country land use in international efforts to mitigate climate change. Zambia is one of 12 pilot countries for REDD+. A recent study in Zambia ranked agroforestry first among possible land use strategies for REDD+ [1].

RESULTS

Overall, farmers showed high demand for the programme, with an average of 83% of the farmers across all variations in programme design choosing to take part, and these farmers made significant progress in terms of tree survival; after the first year, there was a total of 19,400 surviving trees, that were cared for by 700 of the 1090 participating farmers. A quarter of all participating farmers received the cash incentive by reaching at least 70% tree survival after one year. Among farmers with any surviving trees, the average number of surviving trees is 28.

- Higher input costs lead to lower participation but do not affect tree planting and survival.
- Higher cash incentives lead to increased participation, tree planting and tree survival.
- Farmer group dynamics affect outcomes but incentives still matter.
- Farmers respond positively to higher incentives within their farmer group.
- Larger and wealthier households are more likely to join the programme but not more likely to earn tree survival payments.

Participation in the programme

When input costs were higher, fewer farmers decided to participate in the programme (Figure 1). A one USD increase in the input subsidy increased take-up by 13%. When a higher cash incentive was offered, more farmers decided to participate (Figure 2). A one USD increase in the incentive increased take-up by 0.4%.

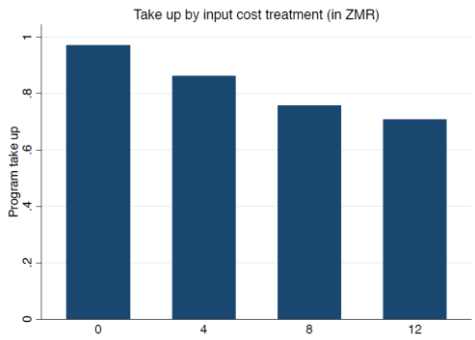

Figure 1. Take-up by input cost treatment (in ZMR)

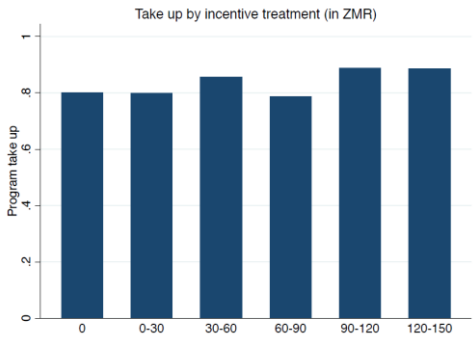

Figure 2. Take-up by cash incentive treatment (in ZMR)

Tree survival

Once farmers have decided to participate, farmers who paid more for the seedlings are no more likely to care for them than farmers who received the seedlings for free. However, Figure 3 shows that when cash incentives are higher, farmers achieve higher tree survival outcomes. A one USD increase in the incentive increased tree survival by 2%, conditional on joining the programme.

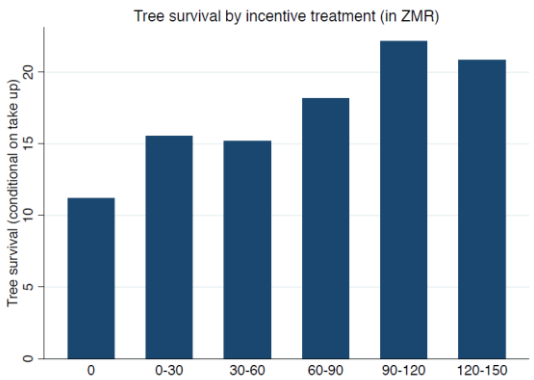

Figure 3. Tree survival by cash incentive treatment (in ZMR)

NEXT STEPS

Further research aims to look at:

What happens once the incentive payments stop?

How can we design effective monitoring programmes?

1. Kokwe, M. (2012) Forest management practices with potential for REDD+ in Zambia. UN-REDD Programme Report.

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