STUDY SUMMARY

Environmental Investments on Private Land: Planting Trees in Chipata

Many climate change programs that target small-scale farmers seek to change farmers’ agricultural practices, whether to sequester additional carbon or to improve climate resiliency. Farmers are often hesitant to adopt new practices as they often entail high upfront costs. Climate change programs therefore generally provide inputs or incentives for adopting and complying with the program’s objectives. Yet it is unclear how much farmers respond to inputs and incentives, and to which they respond more favorably. This study in Zambia assesses the impact of two programs, one that provides incentives to farmers to grow a nitrogen-fixing tree, and another that provides inputs.

Policy Issue

Financing for carbon offset investments is growing quickly. The voluntary market for carbon offsets traded over 700 million dollars worth of emissions reductions in 2008, a third of which came from land use projects.¹ These investments have the potential to benefit smallholder farmers, not only by creating revenue from selling carbon credits, but also by incentivizing more climate-resilient agricultural practices and technologies to increase production. Many climate change programs that target smallholder farmers seek to modify current agricultural practices, whether to sequester additional carbon or to improve climate resiliency. Because these changes often impose costs on the farmer, many programs provide upfront inputs or incentives for adopting and complying with the program’s objectives.

However, in spite of a growing number of NGO- and government-led adaptation and climate resilience projects, farmer adoption remains a challenge and concerns persist due to the high cost of inputs, training and monitoring in comparison to the value of the credits earned from sequestered carbon. A more rigorous understanding of the relationship between input costs, compliance incentives and program outcomes may help improve the success and cost effectiveness of both carbon offsets and climate resiliency programs. To date, none of the numerous programs that offer landholders inputs or performance payments have systematically varied contract design to

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COUNTRY
Zambia

PARTNERS
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PROGRAM AREA
Agriculture

TOPICS
Cash Transfers, Environment, Technology Adoption

TIMELINE
2011-2012
generate causal evidence on the determinants of program success. This study proposes to address this knowledge gap in the context of a program promoting fertilizer trees in Eastern Zambia.

The project implementation is designed to allow the researchers to investigate (a) the role of option value in shaping farmer decisions, and (b) the effect of cost sharing and performance incentives on selection into the project and on long-run performance under the contract.

**Evaluation Context**

**Details of the Intervention**

The partner organization, Mitengo Zambia promotes a fertilizer tree (Faidherbia albida), locally known as the masangu tree, both for its carbon sequestration potential and its ability to help farmers adapt to a changing climate. Faidherbia fixes nitrogen in its leaves, providing benefits to farmers, including better soil fertility, maize yields and resilience to climate change. To grow the tree, seedlings must be purchased and raised, and then planted among low-growing crops, weeded and watered. These adoption costs are highest in the first year and tree survival is low.

Mitengo Zambia has partnered with Dunavant Cotton to investigate the carbon sequestration and soil fertility potential of encouraging agroforestry adoption among Dunavant farmers. Findings from the research phase will be incorporated in program scale-up with Dunavant Zambia Limited, a leading cotton ginning company in Zambia.

Around 2,000 outgrower farmers associated with Dunavant cotton in Chipata, Eastern Province, Zambia receive training and subsidized inputs (seedlings) for growing Faidherbia on their land. Most Dunavant farmers produce on a small-scale, with a mean landholding size in the study sample of around one hectare, and have access to loans for cotton inputs from Dunavant. The company organizes the farmers into groups of approximately 15 geographically clustered farmers. Each group has one lead farmer who, under the Dunavant system, is responsible for training his farmer group on cotton production and, under the Mitengo Zambia program, on Faidherbia planting and management.

Lead farmers organize trainings on Faidherbia for their groups of farmers, which are attended by Mitengo Zambia and IPA staff who assist with administration of the treatments and the baseline survey.

After their training, farmers decide whether to join the program based on two factors:

1. Variation in input prices – Farmer groups will be randomly assigned to receive one of four input prices that range from fully subsidized (free) to the cost-recovery price for the implementing organization (approximately $2.50 US). A transport allowance (of $2.50), provided to the farmers to remunerate any transportation costs of attending the lead farmer’s training, ensures that farmers have enough cash to make a participation decision based on willingness to pay, not on liquidity constraints. Variation in input prices allows researchers to test hypotheses on risk and on cost-sharing. Specifically, how the probability of take-up changes as the input prices increase, controlling for
individual characteristics and incentives, will be assessed.

(2) Variation in incentives – Individuals will be randomly assigned to receive different levels of incentive pay, which farmers are informed of either before or after making their take-up decision. The range of incentives is based on project pilots from the previous year, which ranged from $0 - $30 (0 - 150,000 ZMK). The use of scratch-off cards to reveal the incentives ensures that incentives cannot be manipulated and that the variation is perceived as fair by the participants. Incentives will be paid after one year, conditional on 70% tree survival. All farmers received 50 seedlings. The variation in incentives will allow researchers to test the causal effect of incentives, by comparing the probability of take-up and the rate of tree survival for farmers at different incentive levels, controlling for individual characteristics.

At the time of training, farmers receive a detailed baseline household questionnaire that includes modules on demographics, socioeconomic status, agriculture and environmental knowledge. The survey is administered to all farmers who attend the training, regardless of their decision to participate. One year after contracts are initiated, all participating farmers will be visited and the number of surviving trees recorded, an incentive payments delivered on the basis of tree survival.

**Results and Policy Lessons**

Results forthcoming.

Read detailed findings from an in-country event with cross-sector stakeholders from the Zambian government, private sector, international donor and research community, and leading non-governmental organizations [here](#).

**Sources**