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The Leakage and Livelihood Impacts of Payments for Environmental Services



In brief

- Payments for environmental services are a growing source of public sector expenditures in developing countries. While numerous interventions that target smallholder farmers claim both environmental and poverty alleviation impacts from environmental payment programs, little rigorous evidence on the impacts on the farmers or on possible spillovers to other land use outcomes (leakage) is available.
- This study analyzes the impact of an afforestation program in Malawi on poverty alleviation and the leakage effects of the program.
- The program subsidizes tree planting on private land for carbon sequestration and other environmental services. Landlords were required to plant trees on half an acre of land (one-tenth of the average landholding of the study population). Each year, the contract paid up to one-tenth of average household income, based on tree survival.
- On-farm leakage has the potential to undermine the environmental benefits of payments for environmental services program. Leakage may occur through equilibrium effects associated with changes in price or through household or community-level constraints such as a reallocation of land use.
- Contracted landlords may not directly benefit from payments for environmental services programs. Farmers may choose not to default on a contract that fails to offer welfare improvements due to negative repercussions concerns or behavioural reasons.
- Leakage and livelihood impacts are likely to be both site and project specific. Farm leakage may depend on local land and labor markets and livelihood impacts depend on the size of the payment relative to the opportunity cost of the contract.

Policy Motivation

“COMESA recently launched a carbon fund expected to raise 500 million USD for investment in carbon emissions mitigation and sequestration in its member countries”

Payments for environmental services, and payments for carbon offsets in particular, are a growing source of public sector expenditures in developing countries. For example, the Common Market for Eastern and Southern Africa (COMESA) recently launched a carbon fund expected to raise 500 million USD for investment in carbon emissions mitigation and sequestration in its member countries. While numerous interventions that target smallholder farmers claim both environmental and poverty alleviation impacts from environmental payment programs, little rigorous evidence on the impacts on the participating farmers or on possible spillovers to other land use outcomes (leakage) is available. In addition, the study analyzes these impacts after three years of contract implementation is therefore relevant to effects over the longer term.

Policy Impact

A unique opportunity to generate rigorous evidence on both the poverty alleviation and leakage effects of an afforestation program in Malawi provides findings relevant to both governments and organizations involved in the design of payments for environmental services and carbon offset projects. As the first rigorous micro-level evidence on these issues, the results will be informative both for the design of these programs and for the rules and regulations that shape project development. To the extent that leakage is a concern, more comprehensive incentive design for the contract landholders can offset within-farm leakage. In addition, complementary programs could be bundled with payments for environmental services to ensure that contracted households directly benefit from the program. Further analysis of the data is needed before conclusive results are available.

Audience

The findings are most relevant in settings similar to where the study was carried out, including rural areas of Southern Africa. Policy makers in agriculture and environment ministries, along with supporting donors and international organizations have the best chance of translating the findings from this study into effective policies and projects.

Implications

“Leakage is a concern for any environmental program where incentives are delivered for changes in land use practices”

On-farm leakage has the potential to undermine the environmental benefits of payments for environmental services programs

Understanding potential threats to the environmental impacts of payments for environmental services programs is key for the long run viability of small farmers' involvement in carbon and other environmental service markets. Leakage is a concern for any environmental program where incentives are delivered for changes in land use practices, such tree planting for carbon sequestration. Leakage may

occur through equilibrium effects associated with the changes in prices from the incentive payments, or through household or community-level constraints such as a reallocation land use activities within a fixed land area. The latter type of leakage is a particular issue in settings where land and labour market do not work perfectly. To the extent that leakage occurs, it is likely to reduce the overall carbon impacts of an intervention.

Contracted landholders may not directly benefit from payments for environmental services programs

While most existing payment for environmental services programs, including payments for carbon sequestration, rely on voluntary contracts, small holder farmers may choose not to default even on a contract that fails to offer welfare improvements because of concerns over negative repercussions or for behavioural reasons. The overall poverty alleviation benefits of the program may also be affected by spillovers from contracted households to those outside of the program through, for example, casual labor opportunities.

Brief Summary of Research

The research follows up on a field experiment carried out in Malawi to subsidize tree planting on private land for carbon sequestration and other environmental services. Random assignment of carbon sequestration contracts among a sub-sample of eligible landholders facilitates direct comparisons to analyze the impacts on livelihoods and the environment three years later.

“Of the 537 households surveyed in the baseline, over 90 percent were reached for the follow up survey”

The afforestation contracts were allocated in 2008 and offered annual payments conditional on tree survival. Landholders were required to plant trees on half an acre of land, which is one-tenth of the average landholding among the study population. Each year, the contract paid up to one-tenth of average household income, based on tree survival. The evaluation of program impacts on the environment and livelihoods is based on a survey implemented at the end of the three year contract. Of the 537 households surveyed in the baseline, over 90 percent were reached for the follow up survey. A detailed biophysical analysis was carried out on a sub-sample of plots to further detect evidence of leakage.

The analysis of the follow up data, which is still underway, will focus on the following comparisons. First, among households willing to accept an afforestation contract, do those who (randomly) received a contract change their land use patterns? Specifically, have contracted households brought new land in to production as a result of the project? Do other land use outcomes, such as labor inputs or crop choices, change for these households? Second, in villages where more landholders receive contracts, do casual labor opportunities increase for households without contracts? In other words, are there positive labor market spillovers from the contracts? Third, based on consumption and other livelihood indicators, are contracted households better or worse off because of the contract?

Implementation

“The effect of the program on livelihoods depends on the size of the payment relative to the opportunity cost of the contract”

The leakage and livelihood impacts of payments for environmental services programs are likely to be both site and project specific. First, within farm leakage may depend on local land and labor markets. For example, if farmers are able to rent or to buy and sell land easily, then the payments for environmental services contract may result in the acquisition of additional land, while in settings without well-functioning land markets, the household may reallocate production within their existing fields.

Second, the effect of the program on livelihoods depends on the size of the payment relative to the opportunity cost of the contract. In the program under study, the payment size was set based explicitly on opportunity cost, and so was likely to minimize the additional payment that the landholder received. Other programs that pay substantially above the opportunity cost of the land use change may result in better livelihood impacts for contracted farmers but be able to offer fewer contracts for a given budget.

Further Readings:

Alix-Garcia et al. (2011) “Forest conservation and slippage: Evidence from Mexico’s national payments for environmental services program.” Mimeo.

Chomitz (2002) “Baseline, leakage and measurement issues: How do forestry and energy projects compare?” Climate Policy.

Jack (2011) “Allocation in environmental markets: A field experiment with tree planting contracts.” Mimeo.

Pagiola et al. (2004) “Can payments for environmental services help reduce poverty? An exploration of the issues and evidence to date from Latin America” World Development.

Wu (2000) Slippage effects of the Conservation Reserve Program. American Journal of Agricultural Economics.

Zilberman et al. (2008) “When could payments for environmental services benefit the poor?” Environment and Development Economics.

About the authors

Kelsey Jack received her Ph.D. in Public Policy from Harvard University in 2010, followed by a post-doctoral appointment at MIT with the Jameel Poverty Action Lab and the Agricultural Technology Adoption Initiative. She joined the Tufts faculty in 2011. Her research focuses on the intersection of environmental and development economics and investigates questions from behavioral economics and contract theory. Current research projects study the design of incentives for the private provision of public goods, and are applied to issues of environment and health in Malawi, Zambia and Bolivia. Her research uses field experiments and lab experiments implemented in the field to evaluate interventions and test theory. Prior to graduate school, Kelsey lived in Laos for two years, where she worked for a conservation NGO.

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