



## MRR INNOVATION LAB PROJECT IN BRIEF

# EMPOWERING LOCAL DECISION MAKING TO IMPROVE LAND MANAGEMENT IN MALAWI

Farmers working together as communities can transform landscapes. In Malawi, where erosion and sedimentation put pressure on Shire River Basin hydroelectric plants, sustainable land management practices could keep productive soils in place, increasing productivity and resilience while lowering the cost of producing power. MRR Innovation Lab researchers are putting small-scale farmers in the lead in designing the most productive community incentive structures for adopting conservation agriculture and other sustainable practices.

**Lead Principal Investigator**  
Andrew Reid Bell, Boston University

**Project Partners**  
Duke University, Government of Malawi,  
Lilongwe University of Agriculture and  
Natural Resources, UC Santa Barbara,  
World Bank

**Development Innovation**  
Payments for Ecosystem Services (PES)

**Commodity**  
Multiple

**Targeted Population**  
Small-scale farmers

**Country/Location**  
Malawi

**Timeline**  
2020-2022

**Funding**  
\$749,568 (USAID)

### The Challenge

Soil erosion from poor land management in Sub-Saharan Africa is a crisis at multiple scales. Small-scale farmers near watersheds lose productive land and eroded sediment chokes off aquatic habitats and hydropower production.

Sustainable Land Management (SLM) is a suite of soil, crop and livestock management practices widely promoted to address this crisis of soil erosion. These practices include planting trees and mulching crop residues as well as refraining from tilling or planting near watercourses. Despite the widely shared benefits of SLM, uptake remains low,<sup>1</sup> in part because it requires farmers to shoulder significant risks in incurring costs up front for personal benefits that accrue later or perhaps not at all.

SLM is critical in Malawi, where the hydropower provided by ESCOM/EGENCO, which generates more than 90 percent of the nation's electricity, is at risk from sedimentation caused by agricultural runoff in the Shire River Basin. Research supported by Feed the Future has shown that paying farmers to adopt practices that reduce sedimentation should be significantly lower than the costs of removing sediment from electricity-generating turbines.<sup>2</sup>

Paying farming communities in groups, such as through payments for ecosystem

### RESEARCH INNOVATION

A recent global survey<sup>1</sup> showed that payments for ecosystem services (PES) to achieve environmental transformation requires lowering the transaction costs of contracting with individual farmers. Group-level PES programs might effectively lower those costs, yet introduces challenges that might undermine their reach.

For instance, decisions about how groups distribute PES benefits can be a challenge. Individual farmers who contribute to village compliance need to trust that everyone who contributes also shares in the group reward. However, if payments are distributed equally regardless of contribution, free-riding can undermine participation.

Group-level local choices can contribute to cooperation in village schemes. Local choices, such as the ability to manage membership and individual choice about participating may help. Research with experimental games shows that auctioning a chance to play alternative versions of a game can promote cooperation by matching group preferences across players.<sup>3</sup>

<sup>1</sup> Salzman, J., et al. 2018. "The Global Status and Trends of Payments for Ecosystem Services." *Nature Sustainability*.

<sup>2</sup> Hauge, K., et al. 2019. "Sustaining Cooperation through Self-Sorting: The Good, the Bad, and the Conditional." *PNAS*.

<sup>3</sup> Bohnet, I., et al. 2005. "Compensating the Cooperators: Is Sorting in the Prisoner's Dilemma Possible?" *Journal of Economic Behavior & Organization*.



services (PES) programs implemented at a village scale, has the potential to significantly lower the transaction costs of payments programs. Within such PES programs, downstream beneficiaries like ESCOM/EGENCO would pay farmers who provide environmental services by adopting SLM practices that minimize runoff and sedimentation.

Yet this approach has implementation challenges, considering the distributed network of millions of smallholder farmers. Given the costs of writing and enforcing so many contracts, is unclear if PES funding is sufficient to motivate farmers to adopt relevant SLM practices.

### Research Design

In Malawi's Shire River Basin, MRR Innovation Lab researchers are expanding an existing field trial led by the Lilongwe University of Agriculture and Natural Resources (LUANAR) to further test PES as a means of encouraging farmers to adopt SLM practices. The LUANAR field trial is part of the comprehensive \$125 million Malawi Resilient Productive Landscapes Project (RPL) funded by the World Bank and implemented by the Government of Malawi.

The MRR team has added a treatment group to the trial that puts small-scale farmer groups in the lead on choosing community incentive structures for adopting SLM practices. The team is examining how farmers making use of their local information, knowledge and social capital might expand the scale and coverage of PES programs.

However, when farmer groups themselves create structures without limits, there is no way to know in advance how they will be designed, making it difficult to measure the impacts of those incentive structures. To help overcome this, the team is conducting a powerful yet inexpensive framed field experiment (FFE) that first measures how individual farmers value different SLM practices.

The second part of the FFE is an experimental game that provides a forum to test many combinations of payment levels, distribution processes and adoption targets for promoting cooperation. Participating farmers will be compensated for their time at the average wage.

Data collection for this project includes a campaign of high-frequency data collection via mobile phone from both men and women to measure variation in access to food, water and other welfare indicators. This data collection will yield insights on gender and nutrition.

### Development Impact

This project contributes to the rollout of the large-scale RPL to be implemented by the Government of Malawi in part to transform how farmers manage the landscape in the Shire River Basin to preserve long-term hydropower potential. It will also, more broadly, directly contribute to Government of Malawi policy regarding PES programs and engagement with the regional hydropower supplier Electricity Supply Company of Malawi (ESCOM) and generator Electricity Generation Company of Malawi (EGENCO).

Even more broadly, poor land management resulting in the erosion of productive topsoil is a critical problem across Sub-Saharan Africa. The Shire River Basin is an ideal context for testing an innovative PES program to address erosion by empowering local decision making that both benefits local groups and preserves broader systems by sharing the investments and benefits of PES inclusively and equitably.

<sup>1</sup> Emerton, L., et al. 2018. "Rethinking Sustainable Land Management Planning: Understanding the Social and Economic Drivers of Farmer Decision-Making in Africa." *Land Use Policy*.

<sup>2</sup> Bell, A., et al. 2018. "Transformative Change through Payments for Ecosystem Services (PES): A Conceptual Framework and Application to Conservation Agriculture in Malawi." *Global Sustainability*.



### Development Opportunity: Malawi

- 18.1** : Population in millions (2018)
- 70.3%** : Poverty rate at \$1.90/day, 2011 PPP (2016)
- 15** : Rural population in millions (2018)
- 71.9%** : Total employment in agriculture (2018)
- 26.3%** : Prevalence of undernourishment (2016)
- 37.1%** : Prevalence of stunting for children under 5 years (2015)

Source: World Bank

Malawi's rain-fed subsistence maize farming is particularly vulnerable to droughts. Moreover, land, water and forest degradation and vulnerability to climate change have adversely affected energy and water security, agricultural productivity and livelihoods.<sup>1</sup> The Malawi Resilient Productive Landscapes Project seeks to break the cycle of land, water and forest degradation by increasing the adoption of resilience-enhancing landscape management practices in targeted watersheds.

The project area includes 500 micro-watersheds located in degradation hotspot areas of the Shire River Basin. This includes a total of 305 micro-watersheds supported under the Shire River Basin Management Program and 195 new ones to be selected upstream of existing and proposed hydropower plants.

<sup>1</sup> World Bank.

*This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID) cooperative agreement 7200.AA19LE00004. The contents are the responsibility of the Feed the Future Innovation Lab for Markets, Risk and Resilience and do not necessarily reflect the views of USAID or the United States Government.*

FEED THE FUTURE INNOVATION LAB FOR MARKETS, RISK & RESILIENCE   
[basis.ucdavis.edu](http://basis.ucdavis.edu)

2133 Social Sciences & Humanities  
University of California, Davis  
1 Shields Avenue | Davis, CA 95616  
(530) 752-7252 | [basis@ucdavis.edu](mailto:basis@ucdavis.edu)

[www.feedthefuture.gov](http://www.feedthefuture.gov)

The Feed the Future Innovation Lab for Markets, Risk and Resilience generates and transfers knowledge and innovations that promote resilience and empower rural families, communities and markets to share in inclusive agricultural growth.