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Financing climate-smart agriculture: Evidence from individual and VSLA-mediated cash transfers in Madagascar

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Abstract

Adoption of Climate-Smart Agriculture (CSA) remains limited among smallholder farmers in sub-Saharan Africa, constraining agricultural productivity and resilience to climate shocks. While liquidity constraints are often cited as a key barrier, less is known about how the institutional form of financial support shapes farming decisions. We examine this question using a multi-participant experimental game involving 378 farmers in south-eastern Madagascar, with data from a parallel cluster-randomised controlled trial (RCT). The study compares the effects of cash transfers delivered directly to individuals with transfers channelled through Village Savings and Loan Associations (VSLAs), a widely used rural financial institution in sub-Saharan Africa. We find that individual cash transfers significantly increase adoption of CSA practices (+2.8 percentage points) relative to the baseline. VSLA transfers increase adoption only among participants who actively borrow within the group (+4.6 percentage points), suggesting that group-based finance affects agricultural decisions through the actual use of credit rather than membership alone. The two transfer modalities also generate distinct behavioural patterns in financial decision-making. Individual transfers reduce reliance on VSLA borrowing and lead to higher but more dispersed earnings, reflecting greater autonomy in investment choices. In contrast, VSLA transfers increase borrowing intensity while producing more stable and more equal earnings outcomes, consistent with returns depending jointly on individual loan performance and the evolution of the group savings fund. Patterns observed in the experimental game are consistent with those from the parallel RCT, supporting the external validity of the behavioural approach in capturing farmers' responses to liquidity interventions. Overall, the findings show that supporting Climate-Smart Agriculture requires not only financial resources, but also effective design in how financial support is delivered in rural settings: direct transfers are more effective at relaxing investment constraints broadly, while group-based transfers are more conditional on participants' ability to access and use credit, and may be better suited to contexts where equity and income smoothing are central policy objectives.

Keywords: Agricultural decision-making, cash transfers, climate-smart agriculture, experimental games, Madagascar, randomised controlled trial, rural finance, village savings and loan associations