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## Encouraging adoption of climate-resilient seeds: Evaluating financial incentives in a framed experiment in northern Ghana

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### Abstract

Smallholder farmers in Sub-Saharan Africa face multiple barriers to adopting improved agricultural technologies, including financial constraints and uncertainty about seasonal rainfall. Improved seed varieties offer a promising strategy for increasing yields and building resilience against climate shocks. However, their adoption remains limited, partly due to affordability challenges and farmers' exposure to downside risk. This study examines how upfront costs and index-based insurance influence the adoption of drought-tolerant maize seeds among smallholder farmers in three districts in Northern Ghana.

We use a framed field experiment to assess farmers' decisions when choosing between traditional and drought-tolerant seeds under two conditions: the presence of upfront costs and the availability of insurance to mitigate downside risk. The experiment included three insurance designs. One offered coverage to all farmers but imposed a higher premium on those choosing traditional seeds. Another limited coverage to those adopting drought-tolerant seeds. The third implemented a group-based risk-sharing model to spread risk across participants. The experiment simulates real-world trade-offs under uncertainty, using a simplified but realistic decision task with real monetary incentives to encourage careful choices. Participants were shown potential payoffs under two weather scenarios (a good year for agriculture and a drought), along with the associated probabilities, and made decisions accordingly. We also examine how individual risk preferences shape responses, offering insights into behavioural heterogeneity among smallholders.

Preliminary findings indicate that upfront costs do not significantly deter adoption, but insurance conditional on improved-seed use significantly increases uptake. Group-based risk-sharing, when trusted by participants, also shows potential in boosting demand for insurance products. These insights contribute to the discourse on financial instruments for sustainable intensification and highlight policy-relevant strategies to improve agricultural resilience in the face of climate variability.

**Keywords:** Climate resilience, financial incentives, framed field experiment, technology adoption