

Info Note

Prospects for scaling up the contribution of index insurance to smallholder adaptation to climate risk

Harnessing innovations to protect and promote farmers' livelihoods

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Key messages

- Index-based agricultural insurance is gaining increasing attention as a promising tool for adapting smallholder agriculture to climate risk.
- Although the promise is backed up by evidence in several contexts, several key challenges must be addressed to realize its potential at scale.
- New innovations and partnerships have great potential to overcome these challenges and elevate the role of index insurance in smallholder adaptation to a new level.

Climate change is expected to increase the risk from extreme climate events, such as drought, flooding and heat waves, in much of the developing world (IPCC 2012, 2014). Extreme events erode farmers' livelihoods through loss of productive assets, while the uncertainty associated with climate variability is a disincentive to investing in agricultural innovation. The impacts of climate-related risk contribute to poverty traps that lock many farmers in climate-vulnerable livelihoods, impeding the kinds of transformation that smallholder agriculture needs in order to adapt to climate change.

What is index-based agricultural insurance?

Traditional indemnity-based insurance, sometimes referred to as Multi-Peril Crop Insurance, often requires farm visits to verify loss claims. Although it has been effective for large-scale farms, *adverse selection* (the tendency for insurance to be purchased preferentially by farmers with greater risks, increasing premiums and payouts), *moral hazard* (the incentive for farmers to neglect good risk management in order to receive payouts), and high transaction costs and processing delays associated with verifying claims have made this

type of insurance generally unfeasible to implement at scale for smallholder farmers.

Index-based insurance is an innovation that triggers payouts based on an index that is correlated with agricultural losses, rather than actual losses. Indexes include rainfall during a defined period, yields sampled over a larger region, and remote sensing of vegetation conditions or flood extent. Index insurance seeks to cover specific threats that can be captured by the selected index, generally at aggregate scales rather than at the level of individual farms.

Since its introduction to the agricultural sector in the mid-1990s, index insurance has largely overcome some of the major obstacles to insuring smallholder farmers in the developing world. But it also introduces the challenge of *basis risk*: the difference between the farmer's actual losses and the expected payout on an insurance contract. Index-based insurance has led to a resurgence of effort to develop insurance for smallholder farmers and pastoralists in the developing world, and remains the focus of much of the innovation in agricultural insurance.



Educating the rural nomadic community in northern Kenya about index-based livestock insurance. Credit: ILRI.

How can index insurance help farmers adapt to climate risk?

Index insurance is not a complete solution for all agricultural risks, but it is being used to achieve several specific risk management objectives in particular contexts.

Index insurance can protect farmers' livelihoods. An uninsured shock, such as a drought or flood, can have detrimental long-term livelihood consequences through direct damage to crop and livestock productivity, infrastructure, and sometimes health. Furthermore, farmers employ a range of coping strategies that protect against the possibility of catastrophic loss in the event of an extreme event, but these actions can undermine long-term livelihood opportunity and can trap households in chronic poverty (Oviedo & Moroz 2014). These coping strategies include: liquidating productive assets, defaulting on loans, migration, withdrawing children from school to work on farm or tend livestock, reducing nutrient intake, and over-exploiting natural resources. Index-based insurance generally has the protection of productive assets as its main objective.

In northern Kenya, index-based insurance payouts for livestock following a drought in 2011 reduced distress sales by 64% among better-off pastoralist households. Among poorer households, receiving an insurance pay-off reduced the likelihood of rationing food intake by 43% (Janzen & Carter 2013). In Mongolia, payouts from index-based livestock insurance had a significant positive effect on herd recovery for two years following a one-in-50-year winter weather disaster in 2009-2010, and a positive but weaker effect three and four years later (Bertram-Huemmer & Kraehnert 2015). The insurance payouts reportedly helped herders avoid selling and slaughtering animals and reduced credit constraints, thereby enabling households to purchase new livestock after the disaster.

Index insurance can promote farmers' livelihoods by enhancing the adoption of improved technologies and practices, and facilitating farmers' access to market opportunities. For smallholder farmers, the risk of an infrequent but severe shock is a significant disincentive to investing in improved seeds, fertilizer and other agricultural technologies. Risk also has a negative impact on the development of rural financial services and supply chains, and the availability of credit to smallholder farmers, in ways that further constrain opportunities and reinforce poverty at the farm level. Farmers' willingness to invest in technology is enhanced by their knowing that the insurance will very likely pay out in the event of a climate shock, while insurance increases the confidence of credit providers to lend to smallholder farmers. Increasing uptake of credit, production inputs and improved livelihood opportunities are objectives of several agricultural insurance initiatives.

Evaluation of the R4 Rural Resilience Initiative in Ethiopia showed that insurance allowed farmers to increase their savings, increase the number of draught animals, access more credit, and invest more in inputs such as fertilizers and improved seeds (Madajewicz et al. 2013; Oxfam America, 2014). The ACRE (Agriculture and Risk Enterprise Ltd., formerly *Kilimo Salama*) initiative reported that insured farmers invested 19% more in farm productivity, resulting in 16% more earnings compared to their uninsured neighbours (IFC 2013). Further evidence that index insurance enhances adoption of improved production technologies comes from evaluations and experimental studies with farmers in Bangladesh, India, Ghana, Mali, Burkina Faso, Senegal, Ethiopia and Zambia.

Through its *protection* and *promotion* roles, index insurance can significantly improve the welfare of farm households. Among pastoralists in northern Kenya, holding insurance increased the probability of next-season herd size remaining above an estimated poverty trap threshold of 16 livestock units¹ in both drought and non-drought years; and significantly decreased the probability that children would be severely malnourished during a drought year (Cissé & Ikegami 2016). In an experimental study in Senegal and Burkina Faso, access to insurance increased average yields and farmers' ability to manage food security in the face of shock (Delavallade et al. 2015). In Malawi, Nicola (2015) estimated that weather index insurance could improve average household food consumption by 17%. Analysis of survey data in eastern Kenya showed that Kilimo Salama insurance had a large positive impact on perceived household food security status and on diversity of diet (Isaboke et al. 2016).



Advances such as drone technology expand solutions for assessing and insuring loss. Credit: CCAFS South Asia.

¹ One Tropical Livestock Unity (TLU) = 1 cow, 0.7 camel, 10 sheep or 10 goats.

What are the big challenges to making index insurance work at scale?

Targeting. The diversity of smallholder needs requires different insurance solutions. How do we develop insurance that targets farmers' context-specific needs, packaged at the right scale (e.g., individual farmer, aggregator, national government)? How do we identify farmers for whom insurance is not appropriate?

Capturing the demand side. Giving farmers a voice in insurance design improves uptake and satisfaction, but participatory methods that have proven effective are challenging to scale up. How can farmers' needs and realities be incorporated into the design of tailored solutions at scale, in a cost-effective manner?

Capturing the important risks. Advances in remote sensing, agricultural modeling and "big data" analytics expand the range of options for capturing the risks that are important to smallholder farmers, and for reducing basis risk, but have yet to be fully tested and exploited.

Communication and trust. Because of *basis risk* – the chance that an insured farmer may experience significant loss without receiving a payout – transparent communication is crucial for trust. But index technologies that reduce basis risk can be more complex, and hence more challenging for farmers and other stakeholders to understand and trust.

Bundling. Successful agricultural index insurance initiatives treat insurance as just one component of agricultural risk management, and some bundle insurance products within credit or technology packages. When is it best to bundle insurance with credit and/or climate smart technologies and practices? How can one identify the most suitable technologies and practices in a given context?

Enabling environment. Developing insurance industry capacity to scale index insurance work for smallholder agriculture requires attention to incentives, support through public-private partnerships, and conducive regulatory frameworks. It also requires attention to complex questions about what types of public investment are most effective; whether subsidies should be part of the business model; and about how "smart subsidies" can avoid incentives for mal-adaptation of agriculture and disincentives for private sector development, and be withdrawn at an appropriate time.

Evidence. A sound body of evidence should inform investment in index-based agricultural insurance, but insurance is a challenging intervention to evaluate. While beneficial impacts have been demonstrated in several smallholder agriculture settings, evidence about degree of demand and the potential for scaling remains mixed and

controversial, especially when it comes to equity in terms of what types of farmers are best able to access insurance and whether the insurance product diminishes or exacerbates inequalities in farming communities.

Recent rapid scaling of several initiatives suggests that index insurance has the potential to benefit smallholder agriculture at a meaningful scale, and that progress is being made in developing practical solutions to these challenges (Greatrex et al. 2015). New partnerships and emerging innovations offer promising solutions to the big challenges, and a pathway towards elevating the contribution of index insurance to smallholder adaptation to a new level.

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This brief summarizes preliminary issues and opportunities identified in a working paper by J. Hellin and B. Kramer, in preparation; and a review of published evidence in Hansen et al., "Climate Risk Management and Rural Poverty Reduction," in preparation for a special issue of Agricultural Systems on "Agricultural research for rural prosperity: Rethinking the pathways." It also draws on Greatrex et al., 2015.

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