WEATHER INDEXED INSURANCE FOR SMALLHOLDER FARMERS: A SURVEY OF EVIDENCE*

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In the absence of formal insurance, most farmers with small land holdings in the developing world rely on community safety nets for risk management. During droughts or other extreme weather events these informal mechanisms tend to break down often forcing smallholders to sell valuable assets, cut back on health spending and take their children out of school. Anticipating these risks, some farmers employ risk-averse production strategies such as growing lower risk and lower yield crops that lock them into low income levels. Weather indexed micro-insurance has the potential to be a cost effective mechanism to protect farmers against climate risks, help them shift to high yield crops, move out of subsistence farming and encourage market participation. This policy brief provides a summary of a recent systematic review of the available empirical evidence on weather indexed insurance and finally some recommendations for the way forward for policy and research on this topic.

WEATHER INDEXED INSURANCE

Insurance linked to an objective weather index, typically local rainfall levels, can overcome the main barriers to supplying insurance to smallholders. The benefits of these new indexed insurance designs include:

Effective risk management: Linking payouts to an index overcomes the problems of moral hazard and adverse selection. The former is the risk that once insured the farmer reduces effort, which leads to a poor yield, and the latter is the risk that farmers more likely to suffer crop failure sign up for the insurance product. Index linking also allows local weather risks to be easily diversified to global markets. Together these factors help provide financially viable risk cover to smallholders.

Cheap implementation: Payouts can be objectively determined using predetermined index thresholds, eliminating the costly claims filing and verification process of traditional crop insurance. This substantial reduction in transaction costs, combined with advanced mobile banking services that are rapidly proliferating in the developing world can help smallholders to cheaply manage risk and quickly receive payments in the event of severe agricultural shocks.

Flexibility and accessibility: Although design and coverage may vary, these products typically cost farmers around $3/hectare and have simple eligibility requirements and no limits on number of policies purchased.

In spite of these benefits there has been limited take-up of this product, which is the subject of the small but growing literature synthesized in this review.

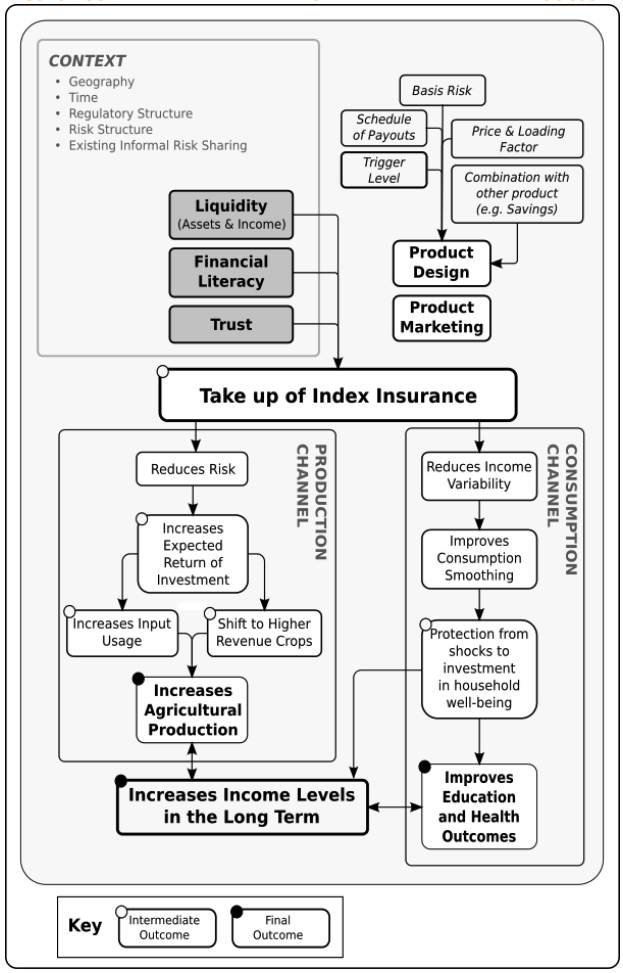
FACTORS INFLUENCING TAKE UP AND IMPACT

Access and purchase of weather index insurance has the potential of influencing decisions at sowing time, such as the type of crops to grow, amount of fertilizer to use etc., as well as harvest time such as investments in health and education, and household consumption.

Exhibit 1 below outlines the processes and contextual factors that affect both take up of this type of insurance product and its potential impact on outcomes. Customer characteristics, product design, marketing strategy and trust in the seller are important determinants of take up. Once a customer has purchased insurance cover, the ability to take higher risk and higher return decisions and protect against short and medium term consumption shocks,

facilitates asset accumulation and investments in human capital which in turn leads to long term increases in income.

Exhibit 1: A causal model of the impact of weather indexed insurance on outcomes



SYNTHESIS OF EXISTING EVIDENCE

Of the thirteen studies included in this systematic review, eleven studies examined determinants of take up and two studies evaluated the impact of access to insurance. Keeping in mind the difficulty of generalizing from a small number of studies, the synthesis did identify some notable patterns. Various measures of wealth, income, and liquidity tend to be positively associated with take up. Risk aversion is negatively associated with take up, perhaps because of lack of trust in a new and potentially complex product. Educational efforts, prior experience with insurance and marketing, as well as more past exposure to risk are positively associated with take up whereas more risky surroundings are positively associated with take up. Substitutes to insurance, such as income diversification and holdings of productive assets are negatively associated with take up. In terms of the impact of insurance, the results are even more limited and mixed; more research is needed before strong conclusions can be drawn about impact.

Exhibit 2: Summary of Evidence

FACTOR	Effect [Studies] *Take-up*[a]	*Impact*
Access to insurance		– [5] + [7]
Liquidity and credit	+ [10,9,4]	
Income	– [1] + [13,10]	
Income diversification	– [10]	
Wealth	+ [6,4,2]	
Productive assets	– [1] + [1,9]	
Unproductive assets	– [1]	
Weather & yield variability	+ [12,11,9]	+ [7[b]]
Historical risk	+ [13,11]	
Expected risk	+ [1]	
Financial literacy	+ [3,2]	
Experience with insurance	+ [9,2]	+ [7[b]]
Familiarity with external agent	– [2] + [4]	
Trust in peers/network	+ [1,4]	
Risk Aversion	– [2]	+ [7[b]]
Cost of product	– [13,9]	
Past payouts	+ [11]	
Marketing [c]	+ [2]	
Experience with fertilizer		+ [7]
Non-free product		+ [7]

Notes: (a) Study [8] also focuses on take-up, but finds inconsistent impact of human and physical capital or debt levels for their sample. (b) Result of interaction term between specified factors and access to insurance. (c)

FACTOR	Effect [Studies] Take-up[a]	Impact
Framed in terms of production vulnerability and group responsibility		

In terms of interaction effects, insurance appears to have a larger impact on amount of fertilizer used by households who had prior experience with fertilizer and by customers who had to pay for the insurance product.

RESEARCH AND POLICY IMPLICATIONS

Roughly half the studies in our review examine hypothetical contracts that were not actually marketed in the field and used solely for the purpose of research. Although these studies offer valuable insights into the factors that determine take up. However, future research efforts should focus on the impact of real world insurance products. Additionally, better reporting of details such as loading factors, marketing strategies and nature of collaboration with local institutions would provide a clearer picture of the contextual factors affecting take-up and impact.

Combining efforts to market weather indexed insurance with policies focused on improving financial literacy and addressing liquidity constraints are likely to increase take-up. Additionally, there might be a case for combining the weather indexed insurance product with credit; savings or group liability products to improve take-up and future research efforts should consider constructing parallel experiments that test the impact of such combinations. The very limited evidence available indicates that the impact of the product on smallholder's ability to manage weather related risks does improve.

LIST OF INCLUDED STUDIES

[1] Chantarat S, Mude A, Barrett C (2009) Willingness to Pay for Index Based Livestock Insurance: Results From A Field Experiment In Northern Kenya. Nairobi

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