

Addressing Agricultural Risks:

Review of Ongoing Microinsurance Field Experiments

Innovations for Poverty Action

October 2009

Poverty is defined not only by a low income level but also by vulnerability to shocks, ranging from health to business to political instability. Farmers, in particular, face a unique set of risks. Factors that are almost entirely unforeseeable and outside of their control, such as crop prices and weather patterns, have an enormous impact on their fortunes. Likewise, where risks are great – of weather events or falling crop prices – financial institutions may be less likely to lend for fear of default.

Scientists predict that weather shocks will only become more common, as global warming will increase the intensity and frequency of heat waves, droughts and floods in coming years. Weather events in particular can prove potentially disastrous for the poor as they can reduce crop productivity and yields and often affect all households in a region. As such existing risk sharing mechanisms will not be effective and the communal capacity to respond to such shocks is reduced.

Previous research on the returns to capital in developing countries reveals that the potential for farmers to take on profitable investments may be very high. Reviewing the literature, Banerjee and Duflo (2004) conclude that there is direct and indirect evidence of very high returns on productive investments in developing countries¹. For example, Udry and Anagol (2006) show that the real return to capital in Ghana's informal sector is high, with annual returns ranging from 205-350% in pineapple cultivation, and 30-50% in established food crop cultivation.² And Goldstein and Udry (1999) estimate rates of return on productive investment in agriculture in Ghana to be as high as 1,200%.³ In Kenya, Duflo, Kremer, and Robinson (2008) reveal that certain uses of fertilizer can generate returns of 36% per season and 69.5% annualized⁴.

¹ Banerjee, Abhijit V. & Duflo, Esther (2004). Growth Theory Through the Lens of Development Economics. MIT, Department of Economics.

² Udry, Christopher & Anagol, Santosh (2006). The Return to Capital in Ghana. *Yale University Economic Growth Center Discussion Paper No. 932*

³ Udry, Chris & Conley, Tim. Learning About a New Technology: Pineapple in Ghana.

⁴ Duflo, Esther, Kremer, Michael and Robinson, Jonathan (2008). How High are Rates of Return to Fertilizer? Evidence from Field Experiments in Kenya. *American Economic Association Meetings, New Orleans*.

Nonetheless, many farmers do not take-on what seem to be profitable investments. For example, in a survey conducted in Kenya, despite large potential returns to using fertilizers only 40 percent of farmers in the sample report ever having used fertilizer and only 29 percent report using it in at least one of the two growing seasons before the program⁵. And in 2000, farmers in Ghana were found to be using 8.3 kg of fertilizer per hectare, as compared to 100 kg per hectare recommended by the International Fertilizer Development Center.⁶

The leading presumption for years has been that farmers refrain from investments because they lacked the initial capital to do so and were facing credit constraints. Yet as access to finance in rural areas has increased tremendously in the last ten years, due to the growth of microfinance and other efforts, farmers' investments have remained limited, indicating that credit constraints alone may be an insufficient explanation. Risk, and the fear to making investments that have uncertain returns, could be an important explanation as well. Some farmers may be reluctant to take loans to finance seemingly profitable ideas for fear of not being able to repay. For example, farmers in the eastern region of Ghana explained that one reasons for not borrowing was fear of not being able to repay the loan in the event that prices collapse.⁷ In particular, they expressed concern that in the event that prices fell too low, they would be unable to repay their loans. If this is correct, from a bank's perspective, these are potentially excellent clients, as they are not borrowing out of fear of default. From a policy perspective, this is especially important because it means that simply increasing the supply of loan capital will have limited effects.

In a recent departure from the theoretical literature focused on credit constraints, Boucher, Carter and Guirkingner (2005a, 2005b) argue that in the presence of moral hazard, farmers will prefer not to borrow *even though the loan would raise their productivity and expected income*.⁸ Using panel data from Peru, they identify these "risk rationed" (as opposed to quantity rationed) households as households who never tried to access the formal market and show that risk rationing adversely affects the productivity of these households. Based on this they argue that improvements in the insurance options offered to these households would increase their willingness to participate in formal credit markets and raise household welfare.

This suggests that insurance products that protect farmers against weather risks such as a drought, excessive rainfall, fast wind, flood or other agricultural risks such as pest or crop price may help farmers cope with such shocks, and encourage them to make more profitable

⁵ Duflo, Esther, Kremer, Michael and Robinson, Jonathan (2008). How High are Rates of Return to Fertilizer? Evidence from Field Experiments in Kenya. *American Economic Association Meetings, New Orleans*.

⁶ A. K. Braimoh & P. L. G. Vlek (2006), "Soil quality and other factors influencing maize yield in northern Ghana", *Soil Use and Management*, 22, pp. 165–171

⁷ Karlan, Udry, Kutsoati, and McMillan. Forthcoming Paper.

⁸ Boucher S., Carter M. and Guirkingner C. (2005a) *Risk Rationing and Activity Choice*.

Ms. University of California –Davis. Boucher, S., Guirkingner, C., and Trivelli, C. (2005b). Direct elicitation of credit constraints: Conceptual and practical issues with an empirical application. mimeo, University of California - Davis.

investments. However, with the exception of life insurance, in some countries, insurance products are rare among poor households. Weather or crop insurance products are even less common, and in some countries, inexistent. For example, no formal agricultural insurance options exist in Ghana where where 52% of Ghana's population lives in rural areas and 44% of the rural population lives below the poverty line.⁹

The absence of such products reflects issues on the supply side as well as on the demand side. On the supply side, concepts that are familiar with all insurers, namely adverse selection, the possibility clients with higher likelihood of loss or higher risk are more likely to enroll, and moral hazard, when behavior becomes riskier once protected by insurance, are exacerbated in the case of the poor. Exposure to Moral hazard is particularly high in the case of crop insurance. In addition to the issues of adverse selection and moral hazards, providing insurance products to farmers, as is the case for other financial products, implies high transaction costs, in particular transportation costs and salaries of agents who spend time going to the field. These issues are likely to make providing insurance to poor farmers challenging, and prohibitively expensive, therefore discouraging providers to even consider those as possible markets.

On the demand side, insurance is a difficult concept. The regulation of insurance has increased significantly in developed countries precisely because even well educated financially savvy clients often struggle to understand the details of the fees and coverage. Recognizing insurance is a complicated but important protection, some types of insurance (e.g health insurance or old age pension) are required by employers, where employers automatically enroll their employees. In the absence of such employers or government schemes, taking up insurance products has to be voluntary. Given the difficulty of the concept, it is likely that such products may not seem attractive to farmers. In addition, in many developing countries poor households have been victims of several scams where fraudulent organizations (called "fly by night" in India) collected money and never gave it back. In these cases the burden is on the insurance provider to not only explain the concept and need for insurance, but also to prove the legitimacy and reliability of the organization.

Given constraints on the supply side, and the limited exposure to insurance in many parts of the world, it is understandable that poor farmers often do not benefit from insurance products protecting against agricultural risks.

I. Promising developments

There have been in the past ten years several promising developments on the supply side that have the potential to address some of the constraints outlined above. In particular, important innovations have been made in terms of product development. The concept of index-based

⁹ World Bank, Ghana Poverty Reduction Strategy, February 2003.

insurance, a weather derivative recently developed by the World Bank in conjunction with an Indian insurance company, eliminates traditional issues faced by insurers such as adverse selection and moral hazard by providing a payoff based on monsoon rainfall measured at a nearby weather station. Because of this feature, payouts cannot be influenced by household decisions

In a paper that studies this product in India, the authors show that rainfall in the survey areas is close to uncorrelated with systematic risk factors, such as stock market returns, that are relevant for determining required risk premia for a well-diversified investor (Giné, Townsend and Vickery, 2007).¹⁰

However, a number of developments need to take place before this product changes the insurance landscape for the poor. First of all, it relies on the presence of weather stations at established intervals. Yet the availability of weather stations is a limiting factor. In Ghana, where Innovations for Poverty Action has developed and is testing a similar product, there are six major rainfall stations for the northern region of the country, and five major and minor weather stations are recording rainfall levels in three districts as part of ongoing research. In the current study, beneficiaries must be within 30 km of a rainfall station to be eligible for the promotional product. Developments in meteorological technology are also beginning to present possible alternatives for measuring rainfall, such as satellite photography. Agricultural researchers in northern Ghana have been using such images from the Famine Early Warning System (FEWS) to predict harvests. FEWS uses satellite photographs of cloud cover to derive rainfall estimates and gives an estimate for each 8 km by 8 km square. However, this technique is only appropriate for areas with the appropriate type of cloud cover.

In addition, the products themselves require further development to be best adapted to the needs of the poor. For example, the formula that links the payouts to rainfall levels is often not optimal, as the correlation between rainfall and crop failure is not linear. Moreover, crop failure is not necessarily due to bad or excessive rainfall. Optimal products would combine protection against rainfall as well as wind and temperature, for example. However, the more complicated the product, the more difficult it is to explain it to potential beneficiaries. While the formula is related to objective weather data, more work is needed to understand the exact needs of the households, and design optimal products that fit those needs. The expansion of weather stations and additional product development will require important investments from donors as well as governments.

¹⁰ Giné, Xavier; Townsend, Robert; and Vickery, James (2008). Patterns of Rainfall Insurance Participation in Rural India. *The World Bank Economic Review* 2008 22(3):539-566.

Developing good products is of course only part of the response, as products must be delivered to those who need it. Providing financial services to rural populations, often spread-out and far from main transportation systems, has been a challenge for many financial providers, be it for loans or savings products. In the last ten years however, microfinance organizations have demonstrated that it is possible to reach out to large number of people in rural areas, and to scale up rapidly. While microfinance interest rates are generally high, these organizations have managed to reduce otherwise prohibitive costs by using social networks and social knowledge, and by using low-cost staff. Commercial banks have also started reaching out to the poor. In some countries such as India, commercial banks use local non-governmental organizations as a channel to reach out to the poor, recognizing that NGOs have an intimate knowledge of these area and populations, cheaper operating costs, and often established connections and trust. These developments suggest interesting delivery mechanisms for insurance products: insurance companies could use Micro Finance Organizations to sell products through their networks, or where MFIs do not have very high penetration rates, other non-governmental organizations as well. Such strategies have indeed started being used.

MFIs also have the potential to encourage participation by making the product compulsory and linked to the loan. This is of course particularly interesting in the case of products that are exposed to high adverse selection issues such as health or crop insurance. But even in the case of products such as the weather derivative, making it compulsory could be attractive, not only from a public good perspective, but also from a business perspective – when farmers who are not likely to repay lose their crops they receive protection. However, as it turns out, MFIs and financial institutions are often less wary of this than of people dropping out or taking loans from other MFIs because they are not interested in paying for insurance. MFIs would therefore need to be persuaded that providing insurance products along with loans protects them against default risks, and that the cost investing in developing and marketing these products will be offset by the benefits of improved repayment, or higher retention.

Another recent development that could change delivery issues even more radically than the microfinance movement is the rapidly growing number of cell phones, in urban as well as in rural areas. At the beginning of 2009 it was estimated that there were 4.1 billion mobile phone users worldwide.¹¹ And Africa has the fastest growing cell phone market in the world presently. Cell phones and the associated mobile banking movement have the potential of reducing dramatically transaction costs of providing financial services in rural areas: for example, marketing could be done through cell phone messages, farmers could pay their premiums through mobile payments and receive payouts the same way.

II. A puzzle: low take-up

¹¹ <http://www.guardian.co.uk/technology/2008/sep/26/mobilephones.unitednations>

While numerous actors in a wide variety of fields, ranging from climate studies to micro-credit, are enthusiastic about the development of new index insurance models, there appears to be less confidence from potential borrowers. In three field experiments conducted in Malawi, India and Ghana, take-up of free or subsidized index insurance products has been very low.

In a field experiment in Malawi, Xavier Gine and Dean Yang studied whether the provision of rainfall insurance induces farmers to borrow to invest in new varieties.¹² In 2006 and 2007, Gine and Yang looked at the impact of insurance on technology adaption and investment among 800 maize and groundnut farmers in Malawi. And their research shows that take-up for a farmer loan insured against weather was 13 percentage points lower than take-up for a standard agriculture loan without insurance.

In India, Cole, Gine, Tobacman, Topalova, Townsend and Vickery (2008) set up two experiments, in the States of Gujarat and Andra Pradesh, to observe the demand for an index-based rainfall insurance product, and understand how to increase take-up.¹³ The product they study is an index-based weather derivative, which as described above is very attractive from insurers' point of view since it gets rid of moral hazard and adverse selection issues. The policy could be sold in very small units (as small as 46 rupees - \$1.10 US), making the product accessible even to relatively poor households. However in the baseline, they found that while the product was clearly attractive from the insurance point of view, like in Malawi the take-up was very low: 5-10% of households in the villages where it was offered purchased it, and those that did, tended to purchase only one unit of insurance, no matter how large their risk exposure, which hedges only 2-5% of expected agricultural income. It is therefore essential to understand what causes low adoption of such products, and how to increase it.

In Ghana Dean Karlan, Edward Kutsoati, Margaret McMillan, and Christopher Udry conducted a study in the eastern region of the country to understand how farmer risk aversion affects investment decisions, and whether a loan product with an insurance component that mitigates farmers' risk encourages farmers to take, and benefit from, credit. Initial research found that more than half of all of the farmers interviewed reported a willingness to pay a substantial sum of money to guarantee that the price of their crop would not fall below a specified amount. In this region of Ghana weather variation is not likely to be the main source of risk, however prices which are determined in centralized local markets are thus outside the individual farmers' control and prove to be a greater risk. However, demand for loans was not higher, and in fact smaller, for farmers who were offered indemnified loans. A pilot of a simple product involved 169 maize and eggplant farmers. Of those that attended the marketing meetings, 74.1% applied for an indemnified loan while 81% applied for the regular loan.¹⁴ This high demand was in part due to the temporary relaxation of

¹² Gine, Xavier & Yang, Dean, (2007). "Insurance, credit, and technology adoption : field experimental evidence from Malawi," [Policy Research Working Paper Series](#) 4425, The World Bank.

¹³ Gine, Xavier, Robert, Townsend, and Vickery, James, "Patterns of Rainfall Insurance in Rural India," Xxxxxx. 2007.

¹⁴ Karlan, Udry, Kutsoati, and McMillan. Forthcoming Paper.

previous eligibility requirements for accessing credit. This was despite the fact that farmers' understanding of the perceived riskiness of the loan is an important determinant of loan take-up – farmers in both the control and treatment groups are less likely to apply for a loan if they think that a price decline is likely. So, while risk does seem to be an important factor, providing insurance did not lead to a higher take-up for crop-indemnified loans.

These experiences confirm the fears of some financial institutions that bundling loan products and insurance products might affect their take-up rates, even though insurance products could protect both the farmers and the financial institutions, given experiences to date current models are not proving sufficient and the most likely outcome is that these products won't be offered.

III. Key questions

The recent innovations in terms of product design and delivery channels, and the constraints outlined above, suggest two broad avenues for research: 1) What is the impact of insurance products on the beneficiaries as well as on delivering organizations? And 2) How can we develop products and marketing strategies such that farmers will be willing to take up insurance products.

Impact

The rationale for studying and quantifying the impact of development programs is that resources are scarce and need to be allocated the most cost-effectively. Some would argue that insurance products are purely commercial and do not have to rely on grants or aid money to be viable. However, as mentioned above, in order for appropriate products and infrastructure to be developed, grant investments by donors and governments is necessary. The high frequency of risks and the high transaction costs associated with rural areas (although as mentioned above some innovations may allow reducing those costs dramatically) imply that in order for farmers to be able to pay for such products, some amounts of subsidization may be required. If that is the case, then it is really crucial to figure out whether such products have an important impact on protecting farmers against shocks, their willingness to invest more in agriculture, and ultimately to increase profits and well-being; and, most importantly, how the cost-effectiveness of providing insurance compares with other interventions. Indeed, other strategies such as savings products, investment in irrigation, etc. have the potential to be effective at encouraging farmers to invest more in their farms. From the perspective of financial institutions, who may be interesting delivery channels to providing these products, it is important to know whether they will reduce defaults and increase retention, thereby justifying investments in negotiating with insurance companies, staff training, and marketing. In addition, it is possible that households have other insurance mechanisms, such as savings, loan defaults, social insurance, that make certain insurance products useless, or insurance products may be replacing other less costly

insurance mechanisms, thereby hurting the households. It is important to understand how these insurance mechanisms impact the household: its ability to smooth consumption, to absorb shocks, but also to take up cropping decisions that lead to higher returns.

Product design and marketing

As mentioned above, there is a need to design products that fit the need of households, as well as effective marketing and education strategies to encourage farmers to take up those products. Previous research has shown that many lessons from psychology and behavioral economics are important when targeting poor households, and suggest methods to lead individuals to the decisions they prefer (but may not have taken without some slight nudge, because of temptation, procrastination, etc.). For example, a study in South Africa (Bertrand, Karlan, Mullainathan, Shafir and Zinman (2008-9)) experimented with a lender to measure sensitivity to price for borrowers, by randomly vary interest rates offered to people when sending marketing letters. In addition, they also randomly varied various marketing features such as a woman's photo on the letter, complicated vs simple explanation of loan contract, etc. They find that while interest rates, in line with the economic prediction, have important effects, these marketing manipulations do as well. For example, adding the photo of a woman on the flyer had the same value to men as dropping the interest rate by one third. We need to experiment with various ways to sell insurance and to understand which ones are most cost-effective at encouraging farmers to buy those insurance products.

IV. How to test these questions

The examples above suggest that it is very important to rigorously experiment with products that are appropriate for farmers to determine which ones work. Does credit, when bundled with insurance, have more impact? What can be done to increase trust and take-up of microinsurance products? What balance of simplicity and precision in insurance design is appropriate for the agricultural sector? Answering those questions is made difficult by statistical biases, in particular selection biases. For example, only the most educated and risk adverse farmers may take up insurance products. Comparing those with and without insurance will therefore yield an unsatisfactory measure of impact, because those two groups were different in a number of ways at the outset.

The best way to solve these issues, and to determine which types of interventions and products are effective, is to use randomized controlled trials (RCTs), RCTs determine the true impact of an intervention by comparing the outcome of the intervention to what *would have happened* without it. With an RCT, some people are randomly assigned to participate in the intervention and others serve as a control group. Randomization ensures that the two groups are identical at the outset. Individuals in these groups live through the same external events throughout the same

period of time, and thus encounter the same external intervening factors. The only difference between the two groups is that those in the treatment are exposed to the intervention and those in the control are not. Therefore, any difference in the outcomes between the two groups at the end of the study must be attributable to the intervention itself. Random assignment assures the direction of causality: offering insurance *causes* an improvement for the client, rather than the program selects better-educated clients for insurance products, or better-educated clients choose to insure themselves. Such selection biases, both due to who chooses to join as well as who programs target, often prevent non-randomized evaluations from showing this important causal link.

Randomized trials can and should be used both to measure impact and to conduct product innovation testing. Studying the impact of having access to a microfinance product requires a control group that does not have access to the microfinance product we evaluate. Testing product innovations, in the other hand, involves offering a product innovation to a randomly selected pool of clients or potential clients, while the control group has only access to the standard product. Firms commonly use such techniques to evaluate the success of new products. RCTs can be beneficial in developing and improving products and measuring the impact on account usage, operational efficiency, and marketing. The evaluation process is the same, but the outcome of interest in the latter cases may be different and might not require household surveys. In a pilot of a new product, for instance, the primary outcome being measured might be the number of people who sign up for the product. This information, along with savings balances, number of deposits and withdrawals, etc., can be accessed directly from the institution's MIS (Karlan 2008).¹⁵

V. Impact

VI. Take-up: Why such a hard sell?

While rigorous research on microinsurance in the agricultural sector is relatively limited, studies completed to date offer a great deal of important first lessons. And though crop or weather insurance products seem to be an appropriate response to the risks faced by farmers, interest in and use of these products is very low. Insurance is not an easy sell for those unfamiliar with the concept, and in many countries formal insurance of any sort is not common in rural areas.

There are a number of possible explanations for the low take-up levels. Price is likely to be an important factor, especially given that the target population is largely subsistence farmers (even though as mentioned above, in India the policy was sold in very small units), and so is the

¹⁵ Karlan, Dean (2008). Quality Matters: Some Random Thoughts on Savings in Developing Countries.

availability of funds at the time the insurance policy is sold. Those who do take-up may be those with more financial knowledge and background, who are able to understand the concepts and mechanisms of insurance, or those who have a past experience with financial products and insurance. Trust in the reliability of the insurer is also likely to be an important factor, especially in countries where several poor households have lost money in financial scams. In some cases, trust will need to be earned and farmers may need to experience and observe the system and cycle of payouts before considering enrollment for themselves.

Understanding the characteristics of those who took up in the three studies mentioned above and how they differ from those who don't take-up might help in identifying some determinants of take-up.

In Malawi, farmers with more education were also more likely to take up the insured loan. Trust is also believed to have played a role, as farmers who reported higher trust levels in the insurance company were more likely to take-up the product. Interestingly, farmers who suffered a drought in the past five years were less likely to take out either the insured or uninsured loan. These results imply that the insured loan product was complicated and difficult for farmers to understand but at the same time that weather patterns and risk do impact farmers decisions about financial products.

In India, those who took up the loan product were wealthier, viewed as local leaders and less credit constrained. Farmers who took up the insurance product also had a lower basis risk, highlighting the fact that the new product may not have been seen as assured protection but as it was brand new viewed with some doubts. In addition, farmers that took up had interacted with the NGO marketing insurance previously.

In Ghana, those who apply for the indemnified loan are more likely to be women, have more education, are more likely to have health insurance and are more likely to have a loan history. When we examine the correlates of application rates among farmers we find that among control group farmers, farmers with a loan history (defined as having taken a loan from a bank, relative/friend, purchasing agent, or moneylender) are 17% more likely to apply for a loan. However, among treatment farmers, having a loan history makes you no less likely to apply for a loan suggesting that the indemnified loan may attract farmers who have not previously been able to borrow. We also find that farmers with health insurance are 10% more likely to apply for a loan regardless of whether they are in the treatment or control group. This result is in line with other work that finds that income and ability to manage risk are important determinants of take-up.

Some randomized studies have started providing insights on these hypothesis, and possible interventions to address low demand. The following insights draw from results from the studies

in Ghana, Malawi and India. In India in particular, the authors systematically test whether factors predicted by traditional economic views, such as price and liquidity constraints, explain low take-up. They also test other factors suggested by psychology and behavioral economy, namely whether financial education, trust in the selling agent, and marketing messages affect the decision to buy.

PRICE

Classical economic theories predict that price affects demand, and price is likely to be one of the determinants of take-up. There is still a great deal to learn about appropriate pricing structures for agricultural insurance, for example to what extent would subsidizing products or investing in reducing transaction costs increase demand? Answering such questions is made especially challenging by the lack of take-up for free products to date.

In both Malawi and India, the product was marketed for the actuarially fair price. The Malawi product premium was about six to ten percent of the uninsured principal. And for groundnut farmers the premium was between MK 297.98 to MK 529.77, with the total repayment due at harvest roughly between \$36 and \$38 USD. And for maize farmers the premium was between MK 647.16 and MK1082.29. At this price loan product take up was 13% points lower for the insured loan. In India, the product covers three different phases of the monsoon season, with three separate payout periods. The product was priced to be affordable for farmers with a modest income, coverage for all three phases of the monsoon season was Rs200-300 or \$5-6USD.

In order to test the price hypothesis, Cole, Gine, Tobacman, Topalova, Townsend and Vickery (2008) randomly assign certain households to receive discount coupons for the insurance at the time of marketing in Gujarat. The discount was either Rs5, Rs 10 or Rs 15. Their findings confirm the traditional economic view, price matters - individuals offered more attractive policies are much more likely to purchase them. They find that the price elasticity of demand ranges between -0.66 and -0.88. In other words, moving from a discount of Rs. 5 discount to a Rs. 30 increases the probability of purchase of insurance by 12.5 percentage points, from a base of 26.3%. These results suggest that minimizing transactions and administrative costs, and fostering competition amongst insurance providers, is important to increase penetration rates.

Liquidity constraints, and timing Matters

Another classical economic hypothesis is that liquidity constraints matter. Depending on how much cash one has on hand, the demand for a product at a certain point of time will vary. In order to test the liquidity constraint hypothesis, in Andhra Pradesh(AP) the authors randomly assign certain households positive liquidity shocks, by offering a compensation for their time during the marketing visit. Liquidity constraints bind - farmers who are hit with a large positive

liquidity shock at the time of marketing are more likely to purchase. The size of the cash transfer paid to the household during the marketing experiment is the most important determinant of insurance participation amongst the treatment interventions considered in AP. Increasing the payment from Rs. 25 to Rs. 100 increases the probability of purchase by 34.5 percentage points. In Gujarat, the product with a discounted price is also the one that had the most effect on take-up.

If availability of funds does indeed matter, there are important implications for the agricultural sector. This suggests that given farmers' irregular flow of income, the timing of selling the insurance might matter a lot. The importance of timing and serious constraint of liquidity for farmers was documented by an innovative study completed by Duflo, Kremer, and Robinson (2006)¹⁶ in Kenya. As mentioned above, despite potentially high benefits and high returns from fertilizers, it was observed that their adoption by farmers is very low. Duflo, Kremer, and Robinson explored the reasons for low adoption of fertilizer through a series of experiments testing a variety of hypotheses.

One of the interventions tested in this experiment is based on a simple observation: farmers have a lot of cash at the moment they sell their crop, yet this is not the time they need fertilizer. At the time fertilizer is needed they may not have the cash left to buy it, even though they had intended to buy fertilizers, because they did not manage to save towards this goal. The researchers and the partner NGO, International Child Support (ICS), therefore designed a program, The Savings and Fertilizer Initiative (SAFI), in which the farmer is visited right after harvest (when maize and, potentially, money is relatively plentiful), and is offered the option of purchasing (by cash or selling maize) a voucher for fertilizer. ICS then delivers the fertilizer at the time of planting. This program functions like a commitment savings devices for those farmers who want to buy fertilizer.

The key finding from this study is that when farmers were offered the ability to put proceeds from their harvest directly into the commitment-savings account dedicated to buying fertilizers, they were more likely to use fertilizer in the next planting season (40% versus 21% who were offered fertilizer at planting time). In order to compare the relative importance of timing versus subsidy, the researchers offered one treatment group a 50% subsidy on their fertilizer (but at the time of planting), and compared that to those offered the pre-purchased full-price fertilizer in the commitment savings account at the time of harvest. The take-up rate was the same.

In an earlier pilot, farmers were offered the account (the opportunity to buy fertilizer) but then had to pay mere days later, and in these cases they were much less likely to do so (30%), even though they said they wanted to buy the fertilizer. Of those farmers given the choice of when to

¹⁶ Duflo, Kremer, and Robinson (2006). Understanding Technology Adoption: Fertilizer in Western Kenya Evidence from Field Experiments. *Working Paper*.

be visited, 46.8% asked the field officer to come back immediately after harvest, suggesting that fertilizer is not an impulse purchase encouraged by the field officer, and that farmers are aware of the likelihood that they will not be able to save on their own.

While demand for micro-insurance products is not as straightforward as demand for fertilizer, this study suggests the importance of timing when designing financial products for the agriculture sector, and when making sales and marketing agricultural products. Marketing insurance or any agricultural product should be informed by local agricultural cycles. Agricultural insurance products are important precisely because farmers' access financing and capital is dependent on the growing season and harvest, and therefore not always reliable. And thus these unique and dynamic cycles must be carefully understood and considered when developing and selling microinsurance.

In addition, the importance of liquidity constraints in preventing farmers to buy relevant products or inputs suggest an important role for credit products (where insurance could be repaid in installments), but even more for well designed savings products, or timely marketing.

Marketing

Interesting results have been collected about the effect of the marketing agent on sales of microinsurance. This would not come as a surprise to insurance companies who typically use door to door marketing to sell their products. In India, the authors indeed found that being visited by a door to door marketing agent in itself had a large effect on demand. In Andhra Pradesh, a household visit alone increases the probability of insurance purchase by between 12.1 and 17.7 percentage points depending on the specification.¹⁷ This may be the effect of convenience, the effect of getting some information, or maybe just the effect of having someone making you think about the risks you face.

Indeed, even being surveyed by an independent survey firm and be asked questions about risks can also affect take-up. As part of a study in the Philippines on a public health insurance product, PhilHealth, provided by Green Bank, the authors experimented to examine the effect of being surveyed on the later take-up of the product. The sample for this experiment includes 1,224 individual liability borrower of Green Bank. 80% of the sample was randomly assigned to get a baseline survey (87% of this group was actually reached and completed a survey). The results suggest significant effects of taking the baseline survey on subsequent health insurance purchase. Those taking the survey are 6.7 points (25%) more likely to take-up the insurance. This effect is

¹⁷ India Paper

driven almost entirely by those taking up the initial offer of the product subsequent to the survey timeframe¹⁸.

This suggests marketing visits and information sharing matter and do affect take-up – and thus must be carefully considered when aiming to encourage take-up of a beneficial product.

The Element of Trust

It is not surprising that here, familiarity and trust matter a great deal. Financial scams have increased worldwide, becoming more and more common place. As the number of scams increases, knowledge and fear of such con artists is growing. Such scams have taken on a wide variety of covers in numerous sectors, all making it more difficult for legitimate organizations to operate and garner trust.

In order to test the trust aspect, the India study also varied whether the product is entrusted by a trusted local agent (a representative from the NGO selling the insurance product, someone known and respected in the village; or a local respected farmer, an authority figure). To test the effect of financial literacy training, they randomly assign whether farmers are provided additional education modules that relate unfamiliar concept of rainfall in mms to the familiar one of soil moisture (in AP, only 10 percent of the households in 2004 could measure rainfall in millimeters and yet all the insurance contract terms were set in millimeters). Finally, in Gujarat they vary the presentation of information on probability, as well as the messages associated with the product. One variation is whether the marketing message payout emphasizes the probability the product would pay out, or the probability the product would not pay out. In another variation, the positive treatment describes the benefits of insurance, as something that will protect the household and ensure prosperity. The negative treatment warns the household of the difficulties it may face if a drought occurs and it does not have insurance. The results showed that in AP, endorsement of the household visit by a local NGO representative increases the probability of insurance purchase by 10 percentage points amongst households familiar with the NGO. The act of conducting a household marketing visit also affects household take-up.

Financial Literacy

As mentioned above, that in Ghana take-up is lower for the indemnified loan product indicates a potentially important role for financial literacy training. This is corroborated by the correlation between cognitive ability and loan take-up (or education and loan take-up) which is particularly strong among treatment farmers. Similarly in Malawi, more educated individuals were more likely to take up insurance, suggesting again a role for financial literacy. Given the complexity of the concept of insurance, it seems indeed plausible that such interventions are a necessary

¹⁸ Alix Zwane et. Al. “The Risk of Asking: Being Surveyed Can Affect Later Behavior”. 2009

complements to providing insurance. Indeed, in the baseline in India, the authors found that only 11.6% of farmers in the sample understood the concept of millimeters. Given the fact that the insurance product results in pay out if the rainfall level is below a certain number of millimeters, understanding the product implied an understanding of millimeters.

In India, the authors tested this hypothesis by providing a short financial literacy module to a randomly selected sub-set of individuals. The financial literacy module was administered during the marketing visit by the marketing agent, and was focused on the concept of millimeters. However, they found no effect on demand. This should not however suggest that increasing individuals' financial literacy is not effective at increasing their demand for insurance. Rather, the particular module that was tested was probably too short (it only added 2 minutes in average to each visit), and did not result in a better comprehension of the concepts that were taught. A lot more is needed to understand the effects of financial literacy training.

Conclusion

- Summary of what we know: price matters, marketing matters, trust matters, more to be done on product design, financial literacy potentially important
- Usefulness of rigorous research and evaluations
- Information still to be learned
- Key questions moving forward