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Offering rainfall insurance to informal insurance groups: evidence from a field experiment in Ethiopia*

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Abstract

We report the results from a first attempt to market weather insurance products to informal risk-sharing groups. In collaboration with a leading insurance company in Ethiopia, we marketed index-based rainfall insurance products to members of pre-existing risk-sharing groups. Leaders and members of risk sharing groups were trained on risk management and the possible benefits of insurance. Among those trained we randomized training, with some sessions focusing on group benefits and others only on individual benefits from insurance. We found that members of groups whose leaders had received group-focused training had considerably higher uptake. Our results suggest benefits from marketing index-based insurance to insurance groups, at least in terms of uptake.

Keywords: insurance; risk-sharing; Ethiopia

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1 Introduction

Rainfall risk remains a key problem for Ethiopian farmers. In a recent survey conducted in 2009, 44% of farmers reported serious losses in wealth and consumption due to drought in last 4 years, and 22% report losses due to too much rain and floods. Rainfall risk also seems to affect the uptake of modern inputs in Ethiopia. Dercon and Christiaensen (2011) report a strong link between willingness to take up fertilizer and weather risk in Ethiopia. This would suggest that these farmers are likely to be interested in insurance.

Crop insurance, based on offering indemnity against crop losses, is fraught with problems, linked to incentives, costly verification and high transactions costs. More recently, index-based products are increasingly promoted as an alternative, as they offer payouts based on easily observable data, without verification or incentive problems, reducing transactions costs (Skees et al., 1999; Barnett and Mahul, 2007). In this paper, we will study rainfall insurance products that offer a payout when rainfall falls below a particular level, measured at a local rainfall station.

In practice, uptake of index insurance products appears to be low in agriculture in poor settings. For example, Giné et al. (2008) report about 5% uptake for a region in Andhra Pradesh in India; Cole et al. (2009), report uptakes of about 5-10% in Andhra Pradesh and Gujarat. In Malawi, Giné and Yang (2009) report that fewer people take up a loan with insurance than a loan without insurance (20 vs 33%). Uptake patterns are also puzzling, with richer people buying more, and the more risk averse buying less. Explanations offered include the role of trust, credit constraints or poor understanding (Cole et al., 2009).

Trust and poor understanding of insurance are general explanations often offered to explain why people are not taking up insurance in poor settings (e.g. Cai et al. (2009) in China or Dercon et al. (2011) in Kenya). They may also hold true for index-insurance products. The same trust in the insurance company is required, and even though it is easy to understand that the payout is linked to levels of rainfall at a particular location, the presence of basis risk, which is the difference between the losses actually incurred and the losses insured, makes this decision much more complicated. Clarke (2011b) highlights that index products are not standard insurance products and that basis risk means that compared to the original risk distribution faced, there will be states of the world in which the net loss is actually higher (as an actual loss is faced, but the trigger shows that there is no rainfall failure) and states of the world in which gains are made (as there is no loss incurred, but the trigger results in a payout).[1] Basis risk also makes the index insurance product relatively more costly from the point of view of the farmer than a product that is priced relative to actual losses, even if both are actuarially priced relative to the risk that is insured.

One possible way of overcoming some of these problems is to offer products as group contracts. Groups could internalise many problems of understanding the product, improving the quality of decision making. They could also be better placed to enforce contracts. Per policy transaction costs would also likely be lower when insurance is purchased "in bulk" through a group. Importantly, they could also be a means to absorb basis risk, to the extent that not all basis risk is perfectly correlated among its members. If group based contracts could also imply commitments to share risk within the group, then better value can be offered to farmers.

In this paper, we report the results from a first attempt to market weather insurance products to informal risk-sharing groups. To explore the benefits of offering insurance to groups, we collaborated with an Ethiopian insurance company to offer insurance to farmers in three districts (Meskan, Silte and Animelo), about 150 km west of Addis Ababa in 2010. Legal and reputational concerns led the insurance company to insist on contracts with individual farmers. However, the entire marketing was done towards members of an informal insurance group, the iddir, which are funeral societies. These groups are widespread in Ethiopia, with virtually every household a member. Against the payment of a premium, it offers funeral insurance, in the form of support in cash and kind in case someone linked to the member dies. In all communities, a large number of these groups exist, with several dozens of members in each group. They are considered well governed and democratic institutions, with no government or NGO involvement in their functioning (Dercon et al., 2006). They appear very suitable groups to roll out insurance, as they tend to understand insurance and its functioning, and are well respected by their members and in their communities.

As part of a marketing campaign we carried out training sessions for iddir leaders and members. While all training sessions had a similar focus, introducing concepts of insurance and explaining in detail the insurance policies, we varied the content of these sessions across iddirs. Whilst one training focused on the insurance benefits for individual farmers, other training sessions focused on the insurance benefits when risk-sharing activities are considered within a group. Members of the iddir leadership were randomly assigned to training of one of these two types.

[1] One implication is that a highly risk-averse farmer faced with basis risk may be less likely to buy this product than a farmer with low risk-aversion. In related work, Clarke and Kalani (2011) find that Ethiopian farmers make considerable errors in buying such index insurance products, perhaps due to the complexity of the decision problem.

This intervention design allows us to explore the extent to which emphasis on the group benefits of the policies did indeed generate higher demand for insurance. Because all other aspects of the marketing were held constant–the transactional and communication roles that iddir leaders played was identical across both training types–the design allows us to focus on the perceived benefits that result from emphasizing sharing policies within a group, rather than marketing advantages that groups may have as a result of encouraging trust in the insurance product or reducing transaction costs.

We test whether the content of the training sessions matter for insurance uptake. We find that iddirs in which leaders were trained in the group benefits of insurance had substantially higher take-up rates than iddirs in which leaders were trained in the individual benefits of insurance. Demand was some twelve percentage points higher among iddirs in which leaders were trained in the group benefits of insurance. The additional demand generated by group insurance training originated from both iddir leaders as well as trained regular members. We find these estimates to be robust to controlling for community fixed effects, as well as a broad set of farmer characteristics.

Our analysis also shows that these effects are not due to (coincidental) pre-intervention differences across randomised iddirs, nor due to differences in how effective training was in increasing understanding. Rather, training the iddir leadership in the group benefits of insurance encouraged leaders to involve more people in the training exercises and it encouraged those trained to discuss the insurance more with each other, in particular with small groups of farmers. As the main difference in content was an increased focus of the advantages of a group (particularly those related to sharing basis risk), this would suggest that these are things valued by the leadership and members.

New insurance products are not delivered in a vacuum, as poor communities have various mechanisms to cope with risk. Existing risk sharing networks could provide a cost-effective means of spreading innovative risk management mechanisms such as insurance. The paper provides the first evidence that the notional benefits from combining index-based insurance products with risk-sharing groups might be indeed large, resulting in substantially larger take-up rates. The findings suggest that group insurance could be the product innovation that could make micro-insurance products both attractive and affordable.

More generally, the paper shows that the present efforts to distribute index based insurance products may fail unless more attention is paid to the methods of distributing the products: as insurance is not an easy concept, as it requires considerable trust, and as it can be perceived to be costly, finding delivery mechanisms that provide an appropriate link with the target group are crucial to achieve higher take-up. The presence of basis risk in index-based insurance means that even actuarially fairly priced insurance products may not be attractive to risk-averse farmers, and mechanisms to soak up this basis risk deserve further attention as well.

2 Conceptual Framework

Providing insurance through groups could carry a number of possible advantages. Selling through groups reduces the costs of retailing insurance: training can be organized with group leaders; and group leaders can subsequently train members, assemble a list of demands, collect premium payments, and distribute insurance certificates and claims to members. In practice any type of group can be used to retail insurance in this way. As long as contracts are still made in which the coverage of individual members is individually recorded, the purpose of the group is to act as a retailer and nothing else.

Training group leaders in the insurance product also has additional advantages: they are often more literate and numerate than other members of the group so may be able to understand the products quickly in a training session and then communicate the key concepts effectively to other members. And by vouching for the insurance products they can increase trust in the insurance products among other members of the group.

We focus our research question on whether groups can provide an additional benefit in the case of index insurance. All insurance was retailed through groups in our research and all training was initially provided to group leaders. Specifically we ask whether groups can help absorb some of the basis risk inherent in index-based products.

In quite general circumstances demand for formal index insurance should be higher when risks are mutualised within a community. To aid the discussion suppose that each farmer $i \in \{1, \ldots, n_j\}$ in community j has income from agriculture of y_{ij} and the transfer from insurer to insured, net of the insurance premium, is x_j. The residual risk of an insured farmer i, the *basis* b_{ij}, is defined as $b_{ij} = y_{ij} + x_j$. Viewed as a random variable this may be referred to as the *basis risk* of farmer i.[2] This basis risk can be decomposed into two components: the component farmer i shares with others in community j because of the difference between the average performance of the group j and the insurance payout ($u_j = \frac{\sum_{i=1}^{n_j} b_{ij}}{n_j}$), and the idiosyncratic component ($v_{ij} = b_{ij} - u_{ij}$) that is

[2] Basis risk could alternatively be defined as $b_{ij} = y_{ij} + x_j + K$ for any constant $K \in \mathbb{R}$, although this would merely shift the distribution of b_{ij} without affecting the shape of the distribution.

unique to that farmer. Basis risk at the community level, $n_j u_j$, could arise because the community is located some distance from the point at which the index is measured, or because the index is not perfectly calibrated to average losses.[3] Any of the following could increase the idiosyncratic form of basis risk, v_{ij}: heterogeneity in cropping practices, differences in the type and slope of land owned (Suri, 2011) or the presence of pests and disease.

If a mutual insurance network can internalize the idiosyncratic part of basis risk (essentially "crowding in" more informal insurance) selling to a mutual group will result in a product with lower basis risk. For example, when the joint cumulative density function for farmer incomes in each community j is symmetric, the set of random income b_{ij} experienced by farmers in the absence of local pooling are second order stochastically dominated by the set of random incomes u_j experienced by farmers in the presence of local pooling of all v_{ij}. Given basis risk causes index-based insurance to be an unattractive prospect for some farmers even when priced at its actuarially fair price (Clarke 2011), a fall in basis risk will cause demand to rise.

The relative magnitude of v_{ij} to b_{ij} will determine how large an effect such mutualization will have on demand. At the extreme, if v_{ij} is negligible, there will be no impact from offering insurance to groups instead of individuals. Additionally, there will be no impact from offering insurance through groups if the mutual insurance groups are already sharing all v_{ij} (for example, in Dercon and Krishnan (2003)).

For such a system to work it requires the group to develop clear payment rules that pay members conditional on an assessment of actual losses by other members within the group. When such rules can be institutionalized, index-insurance can be bought by the group to insure (or reinsure) the group as a whole (Clarke, 2011a). Claims will be paid to the entire group and the group will determine how to disburse claim payments and other payments to their members.

This is very similar to the model of insurance provision that has been successfully applied in Mexico in the case of the Fondos in which indemnity insurance is provided at the group level, and variations in yields within the group are managed by members assessing the losses of fellow members and determining payout rules (Ibarra and Mahul 2005). In this case we will be looking at index-insurance provision, and as such there may also be basis risk that is common to all members of the group, that would not be addressed by this approach.

In our study, we market group-insurance to pre-existing iddirs or traditional funeral societies,

[3] Note that for an area yield insurance contract with the index given by the average yield from a perfect census of farmers from community j, there is no basis risk at the community level; u_j is a degenerate random variable.

which are the most widespread and inclusive of all informal institutions across rural Ethiopia. Historically, iddirs have been informal arrangements aimed at providing support to households at time of a funeral. Members' contributions were mostly made at the time of a funeral, however over the past two decades iddirs have started to formalize and provide more services to members (Dercon, de Weerdt, Bold and Pankhurst 2005; Bold and Dercon 2009). In general the iddir activities are now formalized in that they collect regular premiums, and payout in cash and in kind at the time of a funeral in a member's family. This is the main source of support that iddirs provide, and for most iddirs is the only form of grant (i.e. non-loan) payments made. In addition to providing cash and grain at the time of a funeral, some iddirs have started to diversify into other activities such as livestock insurance, fire insurance and health insurance through a system of emergency loans. Typical size in most of rural Ethiopia is about 50-100 members per iddir. With very few exceptions all households are members of one iddir. Iddirs do not have links with either government or NGOs.

All iddir leaders in our study area participated in a training on weather index insurance products that were being sold. We randomly allocated leaders of some iddirs to attend a training session in which the idea of sharing v_{ij} within a group was suggested. If this was a new idea to these groups (which was likely given the insurance products themselves were new), and if the size of v_{ij} to b_{ij} is sufficiently high then we would expect take-up in these groups to be higher as a result.

In the following sections we describe the treatment in more detail, show the degree to which increasing the salience of sharing v_{ij} increased demand, and explore how and why this increased demand resulted. The mechanism that we have outlined here provides one way by which the training we describe could result in increased demand, if the training increased interest in the insurance product for other reasons the same relationship between training and demand would be observed. Where possible we explicitly test for this.

3 Experimental Design

3.1 Sample selection

Seventeen rural wards (kebeles) were selected in the Meskan, Silte and Anilemo districts (woredas). Each kebele contains 2-3 villages, and an iddir listing revealed 117 iddirs with a membership of a 100 members or more. The iddirs in these kebeles are quite old, established, on average, over thirty years ago. The oldest iddir was established in 1950, and the youngest in 2008. The mean number of member households is 175. The majority of iddirs require regular payments on a monthly or bi-monthly basis with the yearly contribution amounting to 33 Birr on average (about $2 using the current exchange rate of 17 Birr to $1). Households receive about $60 on the death of a member. Focus groups revealed that households are usually members of two to three iddirs and that these iddirs provide a number of other services too, such as payment in the event of livestock death and household fire, and loans for health care costs.

3.2 Weather-index insurance products

Nyala Insurance Share Company (NISCO) offered weather-index insurance policies in the seventeen selected kebeles. The policies offered followed a "building block" approach to product design: eight deficit rainfall products were designed, two for each of the key rainy months of the main cropping season in the area. The policies took the form of monthly contracts whereby a fixed payout would be due if the cumulative monthly millimeter precipitation recorded in the nearest National Meteorological Agency (NMA) station fell short of a particular target. For each month there were two policies with two different targets: a moderate loss target (resulting in a policy that paid out on average once in every five years) and a severe loss target (resulting in a policy that paid out on average once in every ten years). The targets were selected using historic data from the local rainfall stations and knowledge of the agronomic requirements of commonly used crops in the study areas. For more information on the policy design see Hill and Robles (2011). Both types of policy paid out 500 Birr. The moderate loss policy cost 100 Birr and the severe loss policy cost 50 Birr, this was a considerable amount when compared to the 33 Birr yearly contribution to the iddir.

NISCO uses groups in the marketing and contracting of all of its weather-index insurance contracts (Meherette, 2009). NISCO contacts the group leaders, provides them with information about the product, asks them to tell other farmers in the group about the product and to collect information on demand among group members. Interested group members fill in a demand schedule in which they enter their name, the size of the land they would like to insure, the crops they grow and the policies they would like to buy. Group members sign to indicate that they are happy to ask the group leaders to act on their behalf with NISCO. The group leaders present the filled demand schedule to NISCO along with collected premiums and ask NISCO to issue the policy. NISCO issues the policy for the total insurance purchased by the group, appending the demand schedule to indicate who payments are to go to. This policy is signed by the group leaders. Certificates are issued to all members who purchased insurance. These certificates reference the collective policy number. If payouts are made NISCO issues the payment to the group leaders who are to make the disbursements to members as per the demand schedule.

NISCO normally uses this procedure to contract through farmers cooperative unions. In this pilot they agreed to contract through large iddirs (iddirs of 100 members or more) and follow the same procedure. They also agreed to the provision of basic training to iddir leaders on the policies.

3.3 Insurance training

In the areas of study, we identified 117 iddirs with more than 100 members to take part in the insurance training, with an average of 7 such iddirs per kebele. As part of the marketing campaign, training sessions for iddir leaders and leader-nominated members were implemented in all kebeles. Each training session lasted about 4-5 hours with a 1-2 hour lunch break in the middle.

The training sessions discussed general issues of risk and insurance, explained in detail the workings of the NISCO insurance policies, and trained farmers in how to choose the most suitable policy for them. We randomized the content of the training session across iddirs in the following way. In each kebele, we randomly allocated iddirs to two types of training exercises:

- Training A: Framed insurance as an individual decision, focused on the individual benefits of insurance, and illustrated how an individual farmer could choose the right policies for himself.
- Training B: Framed insurance as something that could benefit the community, focused on the benefits of sharing policies in a group, illustrated how a group of farmers could choose the right combination of policies for themselves, and discussed how iddirs could play a role by enabling side-payments within the group.

Randomization took place using a full list of iddirs larger than 100 members. Randomization was done using a single random draw. There was no stratification by kebele. In a number of kebeles the iddirs have developed a federated structure whereby a large iddir has several smaller "sub-iddirs" underneath it. By restricting the list of iddirs to include only iddirs of 100 members or more we were, in most cases, excluding the sub-iddirs and allocating the large iddirs to one training type or another.

All iddir leaders of the large iddir (typically a committee of 3-5), and leaders of any of the sub-iddirs within it were eligible to attend the training session. Selected regular members were nominated by leaders (after leaders had received their training) to also receive training. All members, regardless of the type of training their iddir leaders received, received training A. Thus the element that was randomized was whether or not the leaders received training type A or training type B. In addition, the number of members iddir leaders were asked to nominate for the training the following day was randomized, and this randomization was orthogonal to the training type the iddir leaders received. The length of each training session was kept similar across all types. Training A and B only differed in the framing and the discussion of how to make decisions in the last half hour of the training.

In a few cases, the sub-iddirs had more than 100 members and so were also on the randomization list (this federated structure was not recorded at the time of listing). In some of these cases the umbrella and sub iddir were allocated to the same type of training session, but in some cases the large iddir was allocated to one training session and the sub-iddir to another. Given all iddirs are categorized on the basis of the training received within the large iddir as a whole, for these iddirs there is essentially a third possible treatment category: being in a mixed iddir in which some leaders attended one training type session, and other leaders another.

There are thus essentially three groups of iddirs in our data: those whose leaders attended training A, those whose leaders attended training B, and those whose leaders were mixed between the two sessions. We note here that the probabilities of allocation to treatment varied depending on whether or not an iddir had one of its sub-iddirs on the list. For iddirs with no sub-iddirs on the list, the probability of allocation to treatment A or B was 0.5, whilst for iddirs with one sub-iddir on the list the probability of allocation to treatment A or B was 0.25 and the probability that it would be mixed was 0.5. We control for this de-facto stratification in the analysis by adding strata dummies to all regressions. Additionally, to focus on the difference between iddirs in which all leaders received training A and iddirs in which all leaders received training B, we include a dummy for iddirs that received the mixed treatment.

Aside from the difference in framing and content there was no other difference between the sessions. Each trainer conducted training sessions of each type to ensure that results are not driven by trainer effects. At the end of each training session iddir leaders were given the same demand schedules for their members to fill. While the training sessions were carried out by a team of trainers purposely hired by the research team, the demand forms were collected by NISCO staff. The collection of the demand forms took place approximately two weeks after the training sessions. Policies were issued on the basis of these demand forms.

The intervention design allows us to compare insurance take-up rates across the randomized training sessions and establish whether notional benefits from combining formal index insurance with risk-sharing groups are a reality in rural Ethiopia. To the extent that demand is increased by training of iddir leaders that emphasizes the potential for these policies to be bought as a group and shared within the group, it would constitute first evidence that risk-sharing groups could be used to improve traditional index-based insurance products.

3.4 Verifying randomization and testing compliance

We use two data sources in this paper: a baseline survey of iddirs conducted in December 2009 and January 2010; and data collected in a household survey conducted in June and July 2010. The sampling frame of the household survey was constituted by the full memberships of iddirs that took part in the training exercises. We randomly sampled iddir members whereby we over-sampled farmers that had taken part in the training exercises. From a total of 333 respondents, 204 took part in the training. The sample is representative of all iddirs, but without weighting it is not representative at the individual level. However, given our randomization, our interest is on differential impacts between different training sessions, so this is less of a problem.

We use the data in the baseline survey of iddirs and characteristics of members collected in the household survey that are unlikely to have changed as a result of the training (characteristics of the household head, land ownership etc.) to test whether characteristics of groups, their leaders and their members were balanced across allocation to training type. Table 1 presents results comparing iddirs whose leaders were allocated to training B to the other iddirs, and table 2 presents results comparing iddirs whose leaders were allocated to be split across training sessions ("mixed" iddirs) to other iddirs. We find that there are few differences across treatments in any baseline characteristics of groups or their leaders and members. Of 39 variables tested, only 3 are significantly different at 5% or less.

To test compliance with the training type allocation we compare attendance during the training sessions with the initial randomization. There was no particular order to the training sessions (the order of training session A and B was randomized within kebeles), and there was no advertisement about the type of training session that was to be offered (this information was not shared with the person making the appointments). As such we do not have cause to believe that there was any endogenous choice represented in iddir-leaders choosing which day to attend training (in fact we find that only two iddirs had all of their leaders attend on the wrong day). However, we would be more concerned that there is a difference between iddirs in which the leadership chose to split themselves between training (when they were selected to attend together), and iddirs in which the leadership attended the training together.

In table 3 we assess the degree of compliance with initial training allocation for iddirs included in the household survey. As the table indicates, there was very little non-compliance. We do observe 9 iddirs that chose to split their leaders across training sessions despite being allocated to attend the same session. However, on further investigation we found that 5 of these cases can be attributed to one training team. We do not have cause to believe that there was anything particular about the places in which these sessions were conducted as this mistake happened only in the kebeles visited by one team and this team made the same mistake in all of their sessions. The only sessions that they conducted in which this mistake was not made were sessions conducted with another member of the research team accompanying them. We present results both including and excluding these kebeles, and as will be seen the results do not change.

When these kebeles are excluded, non-compliance rates were only 8%. Only 6 out of 71 iddirs attended the wrong training session: 1 iddir switched from A to B, 1 switched from mixed to B, 1 switched from A to mixed and 3 switched from B to mixed. To further check the robustness of our results to any non-compliance, we also use initial training to estimate the intent to treat (ITT) effect, and use the initial allocation as an instrument for actual training.

In tables 4 and 5 we show that characteristics of individuals and iddirs are also balanced across training sessions attended.

4 Basic results

Basic data on take-up among the three iddir types for both trained and untrained farmers included in the baseline survey is presented in table 6. The data show high demand for insurance among farmers who had heard about the policy. We find that across all sampled farmers 22% had purchased a policy, and that among those that were trained take up was 36%. Take-up was much lower, just 2%, among those that were not trained. Table 6 also explores whether take-up varies across training types. While take-up was 18% among sampled members of type-A iddirs, demand for insurance among sampled members of iddirs whose leaders had received training that emphasized the role of groups is 30%, twelve percentage points or 67% higher.

We test this formally by estimating the average treatment effect (ATE) as follows:

$$d_{ij} = \alpha + \beta_g g_j + \varepsilon_{ij} \tag{1}$$

where d_{ij} is a measure of demand for individual i in iddir j and g_j indicates the training that leaders of iddir j received. Trained farmers were purposively selected (iddir leaders and those they nominated) so we focus the first part of our analysis on the impact of the element of the training that was random—the allocation of the iddir leaders to training type. We are interested in the impact of training type on demand, β_g. We include a dummy for those iddirs that received mixed training such that a test of the significance of β_g is a test of whether iddirs in which all leaders received training B are different from iddirs in which all leaders received training A. Strata dummies are also included in the estimation given random allocation included stratification of iddirs. Coefficients on the mixed training dummy and strata dummies are not reported.

Results are presented in table 7. In columns 1 and 2 we present regression results at the iddir level. The dependent variable in column 1 is the proportion of sampled farmers in the iddir that reported purchasing a policy. In column 2 the dependent variable is whether or not any sampled farmer in the iddir reported purchasing a policy. In columns 3 to 5 we present results at the household level. In column 3 no additional regressors are included, in column 4 characteristics of households that were collected after training but unlikely to have changed over time are included in order to increase precision of the estimates of the treatment effects. In column 5 district fixed effects are also added for the same reason. In columns 3 to 5 we correct for correlation across individuals at the level of the iddir, the unit of randomization, by clustering standard errors within an iddir.

In all specifications we see that allocation of leaders to group take-up substantially increased demand with estimates of β_g positive and significant in all columns. This suggests that emphasizing the role of groups in mediating insurance substantially increases take-up. In table 8 we repeat these regressions this time restricting the sample to exclude the two kebeles where the training protocol was inconsistently followed. This does not affect the results, and for the rest of the analysis we consider this restricted sample.

Taking the iddir level results in column 2, which are representative, we see that the impact of training B was quite sizeable, increasing the probability that someone in the iddir would buy insurance by 31 percent. To check the robustness of our results to iddirs that switched across type we estimate the ITT by using training allocation rather than training received:

$$d_{ij} = \alpha + \beta_\gamma \gamma_j + \varepsilon_{ij} \tag{2}$$

where γ_j indicates the training that leaders of iddir j were allocated to. We also instrument actual training received using training allocation as an instrument. Specifically the estimation strategy used is:

$$d_{ij} = \alpha + \beta_g \widehat{g_j} + \varepsilon_{ij} \tag{3}$$

where $\widehat{g_j}$ is the estimate derived from the following equation:

$$g_j = a + \beta_\gamma \gamma_j + \epsilon_{ij}. \tag{4}$$

The ITT and IV estimates are presented in tables 9 and 10. In both cases the estimates suggest the average treatment effects are robust to the handful of switches between training that we observed. The coefficient on the group B treatment dummy is of a similar order of magnitude and is significant when additional regressors are included.

In table 11 we explore two further measures of demand for insurance: number of policies purchased, and total value insured. We present ATE and ITT estimates for these alternative outcomes, and find that trained farmers in training-B iddirs purchased more policies and insured a higher value of exposure.

These results suggest that leader training which frames insurance as encouraging group risk sharing increases demand. In the following section we explore how this training increased demand.

5 Further exploration

As table 6 indicates there are three types of farmers in our survey: leaders who took part in leader training sessions (either A or B), members who attended member training sessions (A) and members who did not take part in any training. Thus far the analysis has highlighted that iddirs with a leadership that received training B had higher take-up than iddirs with a leadership that received training A. We now examine whether group training increased demand more among trained or untrained members of the group and among the trained members, whether it increased demand more for leaders or members.

Selection into training was not random–iddir leaders were selected to attend the first training session and they chose who would attend the following session. The impact of training cannot be assessed, but it is informative to look at who increased their demand as a result of the messages given to leaders, whether this increased demand among leaders themselves, those they selected to attend training (either through who they selected or discussions they had with them) or those who had not attended training. Table 6 suggests that training that emphasized sharing encouraged take-up among members and leaders alike, but we test this formally in table 12.

Table 12 shows that receiving training is strongly correlated with demand. The results also indicate that when iddir leadership received training B, take-up among the trained in that iddir (both among the leadership and the ordinary trained members who had received training A) increased much more than take-up among the non-trained. In fact the results suggest that, among the non-trained, the type of training received by the iddir leadership did not affect demand. Increased take-up resulted solely from those trained–the leaders themselves and the ordinary members.

A further interaction of iddir leadership, receipt of training and iddir type shows that iddir leaders and ordinary members were equally likely to increase demand. The equal impact of training B on both the iddir leadership that received it and the ordinary members in these iddirs that had received training A, suggests that the messages communicated in the leadership training sessions had an impact on trained ordinary members. It suggests that either the way ordinary members were selected by their leaders or the discussions that leaders had with these members encouraged higher take-up.

In the following subsections we examine the evidence we have on how training had an impact. We examine whether iddir leaders selected more people to attend the training when trained under training B, we examine whether the individuals selected in training B iddirs were different, and we examine whether trained individuals in training B iddirs were more likely to discuss the training and with whom. Finally we explore evidence for joint decisions on purchases of insurance policies and shared policies.

First, however, we examine whether these discussions improved understanding of the products being offered or whether they increased the salience of the covariate nature of drought risk (given that training B emphasized drought as an event that affected everyone in the community).

5.1 Group training was a better training

A potential concern in our analysis is the possibility that training B might have been different in other ways, beyond the emphasis on the benefits of sharing. While training A and B only differed in the framing and the discussion of how to make decisions in the last half hour of the training, we would like to test whether the different nature of the discussion within the session (or that resulted from the session) might have lead to an enhanced understanding of the product.

In table 13 we explore this possibility. We analyze the effect of training type on two aspects of the insurance that were emphasized in the training: the concept of millimeters and the concept of basis risk. We would expect both of these variables, to be positively affected by training. However, if randomized training sessions did not differ in quality of training, respondents in type-B iddirs should not have a better understanding of these two issues than respondents in type-A iddirs.

To measure understanding of millimeters we asked whether farmers had ever heard of millimeters before and how many millimeters were likely to fall in an hour of heavy rain. Results using the combined response are presented in columns 1 and 2. Measuring whether basis risk is understood is more difficult. We asked the respondent to consider a hypothetical situation in which he had bought insurance and experienced downside basis risk (experienced bad yields whilst the weather station recorded a good reading). We then asked the respondent to state whether or not he would purchase insurance again in the following year. If the respondent had understood basis risk well one could argue that his response would be less affected by the description of this scenario. We test this in columns 3 and 4. For both of these measures we find that the type of training received did not impact understanding on these two issues.

Training B increased the salience of the community impact of weather risk. By doing so it could have encouraged demand for a formal insurance product that was likely to provide support at a time when all households were similarly affected. If leaders in training B also communicated this message to other trained farmers in their iddir this could explain the increase in take-up observed. To test for this we examine the response of individuals to a question about how covariate weather risk is in their area. Specifically we look at whether a household responded yes or no to the question "do you think that the rainfall measured at the weather station is a good measure of rain on your field?" If farmers in training B thought this was significantly more likely to be the case this could explain the difference in take-up observed.

Results presented in table 14 and indicate that this is not the case. Farmers in type B iddirs perceive the geographically covariate nature of rainfall no differently than farmers in other iddirs. When basic characteristics and district fixed effects are added, training B becomes significant at 10%. However, when exploring this further (columns 3 and 4) we observe that this is only the case for the farmers that were not trained. Training increased a farmer's perception of covariate risk (perhaps somewhat concerning), and in type B iddirs non-trained farmers' perceptions of covariate risk were similarly higher. This may be indicative of better information sharing within type B iddirs, something we explore further in the following section, but it can not be behind the higher demand that we observe. Table 12 shows that although non-trained members in type B iddirs may have had more information they did not increase the amount that they purchased.

5.2 Impact of training type on selection and discussion of insurance

On completion of their training, iddir leaders were asked to select a certain number of members from their iddir to attend a training course about the insurance the following day. Each iddir was given a randomly determined number of members to attend the course the following day. In table 15 we compare the number assigned with the number that showed up and assess whether there is any systematic deviation in the number of people that attended.

We find that the number of people assigned to attend the training session the following day does predict the number of people that turned up the following day, but we also see that there were systematic deviations depending on the type of training the leadership of the iddir had received. In particular we see that the number of people attending is higher when the iddir leadership had received training B. This could reflect a higher level of enthusiasm among iddir leaders about the insurance products after having received the training.

It could be the case that iddir leader training also had an effect on who was chosen for training, not just how many people were chosen. We compare observed baseline characteristics of those selected for training by B-leaders to those selected for training by non-B leaders. We use the same variables used in tables 1 and 2 which cover aspects of human, social and physical capital. We find no observable differences (results not reported given the similarity with table 1), however it is quite possible that individuals selected varied on other unobserved characteristics.

In table 16, we analyze the effect of training type on how much the trained farmers spoke to others about the insurance policies. In column 1 the dependent variable is a dummy that takes the value of 1 if the farmer reported that he told others about the insurance. Only farmers that were in the training were asked this question, so the individual level regression is restricted to trained farmers. We find that farmers who were in training B iddirs were significantly more likely to discuss the insurance with others.[4]

In columns 2 and 3 of table 16 we examine how the number of people spoken to varied across iddirs. In column 2 we regress the number of people spoken to on iddir type and find that although farmers in training B iddirs were more likely to speak to others, on average they were not likely to speak to more people. However it appears that this is driven by a handful of respondents who reported speaking with upwards of 80 other farmers (perhaps in some type of iddir wide information session). Trained farmers in type A iddirs were more likely to be in this category. When we examine

[4] We do not observe that this holds true when we consider only leaders or only members.

who was more likely to speak to a small group of between 1 and 15 farmers (column 3) we observe that individuals in training B iddirs were more likely to speak to this type of small group.

In the final column of table 16 we examine whether awareness of non-trained farmers about the insurance policies being sold was higher in type B iddirs. This gives some indication of whether the increased discussions about the policies in type B iddirs were between trained and non-trained farmers resulting in higher awareness of others about the policy. We find that they do not. This suggests that the increased discussions in type B iddirs were not with non-trained farmers. This corresponds to the finding that type B training did not increase purchases among non-trained farmers.

It thus appears that although training B increased the probability that farmers would speak to each other about insurance, it is discussion among small groups of farmers that is encouraged. This means that if training B is increasing risk-sharing within groups it is amongst small groups of farmers.

To test whether or not the number of people that received training was the mechanism by which training B increased demand we re-run the ATE regressions including the number of people that received training. Results are presented in table 17. In columns 1 and 3 we consider the number of people that were allocated to received training (randomly determined). Although it seems that allocation has some impact on demand, it does not seem to be the only way as it does not weaken the effect of the group treatment. In columns 2 and 4 we examine the impact of the number of people actually trained on demand and do see that it has an impact on demand, but again, it does not seem to be the only way by which training B affects demand in that the type of training received by the leaders has an effect even when controlling for the number of people trained.

Finally we examined the nature of decisions about insurance purchases. We examined whether individuals in type B iddirs were more likely to discuss the decision with other farmers, make a joint decision with another farmer or shared policies. By emphasizing the benefits of sharing the policies, we expect that those who bought a policy will have a higher likelihood of discussing the purchasing decision, making a joint decision, or sharing policies. These questions were only asked to those farmers that bought a policy, so the sample is quite small (74 farmers), and—-perhaps because of the small sample size—-we found no effect (results not reported).

6 Conclusions

In this paper, we report the results from a first attempt to market weather insurance products to informal risk-sharing groups, and find that demand among trained members was substantially increased when groups were exposed to training that encouraged sharing of policies within groups.

We propose that one mechanism for this higher level of take-up may come from the ability of groups to mitigate some of the basis risk inherent in these products. The emphasis on group insurance was not intended to raise knowledge and understanding about the products and survey results indicate that it did not do so. Instead we found that leaders that had received training on sharing policies within groups encouraged more members to attend a subsequent training session. Additionally, when the leadership was trained on sharing policies within the group it also resulted in more discussions among trained group members with each other, particularly discussions in small groups.

As the main difference in content was an increased focus of the advantages of a group (particularly those related to sharing basis risk), this would suggest that these are things valued by the leadership and members. The results also suggest that if farmers are increasing informal risk sharing as a result, it is being done in small groups of selected farmers.

References

Barnett, B. J. and O. Mahul (2007). Weather index insurance for agriculture and rural areas in lower income countries. *American Journal of Agricultural Economics 89*, 1241–1247.

Cai, H., Y. Chen, H. Fang, and L.-A. Zhou (2009). Microinsurance, trust and economic development: Evidence from a randomized natural field experiment. NBER Working Paper No. 15396.

Clarke, D. (2011a). Reinsuring the poor: Group microinsurance design and costly state verification. University of Oxford Department of Economics Discussion Paper 573.

Clarke, D. (2011b). A theory of rational demand for index insurance. University of Oxford Department of Economics Discussion Paper 572.

Cole, S. A., X. Gine, J. Tobacman, P. B. Topalova, R. M. Townsend, and J. I. Vickery (2009). Barriers to household risk management: Evidence from India. Harvard Business School Finance Working Paper No. 09-116.

Dercon, S. and L. Christiaensen (2011). Consumption risk, technology adoption and poverty traps: Evidence from Ethiopia. *Journal of Development Economics*.

Dercon, S., J. W. Gunning, and A. Zeitlin (2011). The demand for insurance under limited credibility: Evidence from Kenya. Mimeo, University of Oxford.

Dercon, S. and P. Krishnan (2003). Selection and comparative advantage in technology adoption. *Economic Journal 113*, C86–C94.

Dercon, S., J. D. Weerdt, T. Bold, and A. Pankhurst (2006). Group-based funeral insurance in Ethiopia and Tanzania. *World Development 34*(4), 685–703.

Giné, X., R. Townsend, and J. Vickery (2008). Patterns of rainfall insurance participation in rural India. *World Bank Econ Rev 22*(3), 539–566.

Giné, X. and D. Yang (2009). Insurance, credit, and technology adoption: Field experimental evidence from Malawi. *Journal of Development Economics*.

Hill, R. V. and M. Robles (2011). Flexible insurance for heterogeneous farmers: Results from a small-scale pilot in Ethiopia. IFPRI Discussion Paper.

Meherette, E. (2009). Providing weather index and indemnity insurance in Ethiopia. Brief 8, 2020 Focus 17, International Food Policy Research Institute.

Skees, J., P. Hazell, and M. Miranda (1999). New approaches to crop yield insurance in developing countries. IFPRI Discussion Paper, EPTD-55.

Suri, T. (2011). Selection and comparative advantage in technology adoption. *Econometrica 79*, 159–209.

Tables

Table 1: Test of balance between groups allocated to training B and others

	Not training A	Training B	Test of difference (P-value)
Group characteristics (77 groups, 24 type B)			
Year of creation	1979	1977	0.71
Number of members	182	184	0.93
Share that are women	0.05	0.06	0.93
Requires regular payments	0.69	0.94	0.05
Annual regular payments (Birr)	30	43	0.05
Number of regular payments	15	16	0.95
Entry fee (Birr)	141	100	0.28
Payout on adult death (Birr)	1090	891	0.19
Prop. of members that are farmers	0.96	1.00	0.26
Leader characteristics (77 leaders, 26 type B)			
Age	39.75	42.85	0.17
Gender (1=female)	0.02	0.00	0.48
Can read (1=yes)	0.68	0.59	0.54
Can write (1=yes)	0.68	0.61	0.64
Education (years)	5.18	4.50	0.44
Born in this kebele (1=yes)	0.96	1.00	0.31
Holds an official position (1=yes)	0.27	0.31	0.76
Parents held official position (1=yes)	0.24	0.15	0.41
Relatives hold an official position (1=yes)	0.57	0.42	0.23
Member of a cooperative (1=yes)	0.53	0.62	0.48
Number of iddirs of which a member	2.82	2.92	0.72
Log of land owned (timads)	1.27	1.22	0.76
Own a mobile phone (1=yes)	0.37	0.31	0.58
Member of an eqqub (1=yes)	0.08	0.00	0.15
Has a bank account (1=yes)	0.04	0.04	0.99
Member characteristics(256 members, 90 type B)			
Age	40.61	40.12	0.73
Gender (1=female)	0.02	0.03	0.44
Can read (1=yes)	0.58	0.61	0.68
Can write (1=yes)	0.57	0.62	0.44
Education (years)	4.65	4.83	0.73

Table 2: Test of balance between groups allocated to mixed and others

	Not-mixed	Mixed	Test of difference (P-value)
Group characteristics (77 groups, 11 mixed)			
Year of creation	1979	1977	0.71
Number of members	182	184	0.93
Share that are women	0.05	0.06	0.93
Requires regular payments	0.69	0.94	0.05
Annual regular payments (Birr)	30	43	0.05
Number of payments per year	15	16	0.95
Entry fee (Birr)	141	100	0.28
Payout on adult death (Birr)	1090	891	0.19
Prop. of farmers that are members	0.96	1.00	0.26
Leader characteristics (77 leaders, 11 mixed)			
Age	40.88	40.27	0.84
Gender (1=female)	0.02	0.00	0.69
Can read (1=yes)	0.62	0.86	0.22
Can write (1=yes)	0.63	0.86	0.24
Education (years)	4.83	5.73	0.43
Born in this kebele (1=yes)	0.97	1.00	0.56
Holds an official position (1=yes)	0.29	0.27	0.92
Parents held official position (1=yes)	0.23	0.09	0.31
Relatives hold official position (1=yes)	0.50	0.64	0.41
Member of a cooperative (1=yes)	0.56	0.55	0.93
Number of iddirs of which a member	2.79	3.27	0.20
Log of land owned (timads)	1.29	1.03	0.17
Own a mobile phone (1=yes)	0.32	0.55	0.15
Member of an eqqub (1=yes)	0.05	0.09	0.54
Has a bank account (1=yes)	0.05	0.00	0.48
Member characteristics(256 members, 48 mixed)			
Age	40.70	39.33	0.43
Gender (1=female)	0.02	0.02	0.90
Can read (1=yes)	0.60	0.55	0.61
Can write (1=yes)	0.60	0.53	0.41
Education (years)	4.58	5.31	0.24

Table 3: Training type (number of iddirs covered in household survey)

		Intended		
		Training A	Training B	Mixed
Actual	Training A	38	0	0
	Training B	1	18	1
	Mixed A & B	2	7	9

Table 4: Test of balance between type B iddirs and others

	Not training A	Training B	Test of difference (P-value)
Group characteristics (77 groups, 20 type B)			
Year of creation	1979	1977	0.62
Number of members	185	174	0.67
Share that are women	0.05	0.08	0.69
Requires regular payments	0.71	0.93	0.10
Annual regular payments (Birr)	30	47	0.01
Number of payments per year	15	16	0.78
Entry fee (Birr)	128	130	0.96
Payout on adult death (Birr)	1032	984	0.77
Prop. of members that are farmers	0.96	1.00	0.35
Leader characteristics (77 leaders, 24 type B)			
Age	41	41	0.88
Gender (1=female)	0.02	0.00	0.50
Can read (1=yes)	0.63	0.69	0.70
Can write (1=yes)	0.64	0.69	0.75
Education (years)	4.69	5.57	0.32
Born in this kebele (1=yes)	0.96	1.00	0.34
Holds an official position (1=yes)	0.28	0.29	0.94
Parents held official position (1=yes)	0.23	0.17	0.56
Relatives hold an official position (1=yes)	0.57	0.42	0.23
Member of cooperative (1=yes)	0.55	0.58	0.77
Number of iddirs of which a member	2.77	3.04	0.35
Log of land owned (timads)	1.23	1.29	0.69
Own a mobile phone (1=yes)	0.32	0.42	0.42
Member of an eqqub (1=yes)	0.08	0	0.17
Has a bank account (1=yes)	0.04	0.04	0.94
Member characteristics (256 members, 75 type B)			
Age	41	40	0.56
Gender (1=female)	0.03	0.01	0.49
Can read (1=yes)	0.57	0.64	0.37
Can write (1=yes)	0.56	0.66	0.21
Education (years)	4.60	5.00	0.46

Table 5: Test of balance between mixed groups and others

	Not-mixed	Mixed	Test of difference (P-value)
Group characteristics (77 groups, 19 mixed)			
Year of creation	1979	1977	0.58
Number of members	175	203	0.24
Share that are women	0.05	0.06	0.87
Requires regular payments	0.73	0.86	0.35
Annual regular payments (Birr)	38	26	0.10
Number of payments per year	15	16	0.84
Entry fee (Birr)	149	73	0.06
Payout on adult death (Birr)	1058	926	0.41
Prop. of members that are farmers	1.00	0.90	0.00
Leader characteristics (77 leaders, 18 mixed)			
Age	40	43	0.31
Gender (1=female)	0.02	0	0.58
Can read (1=yes)	0.66	0.62	0.78
Can write (1=yes)	0.66	0.64	0.92
Education (years)	5.03	4.71	0.74
Born in this kebele (1=yes)	0.97	1	0.44
Holds an official position (1=yes)	0.31	0.22	0.50
Parents held official position (1=yes)	0.22	0.17	0.63
Relatives hold an official position (1=yes)	0.51	0.56	0.73
Member of cooperative (1=yes)	0.56	0.56	0.98
Number of iddirs of which a member	2.86	2.83	0.92
Log of land owned (timads)	1.30	1.10	0.20
Own a mobile phone (1=yes)	0.36	0.33	0.86
Member of an eqqub (1=yes)	0.05	0.07	0.94
Has a bank account (1=yes)	0.05	0.00	0.34
Member characteristics(256 members, 96 mixed)			
Age	40	41	0.74
Gender (1=female)	0.01	0.04	0.12
Can read (1=yes)	0.61	0.55	0.37
Can write (1=yes)	0.62	0.53	0.20
Education (years)	4.66	4.82	0.77

Table 6: Purchase rates

	Training A	Training B	Mixed
Leader	0.36	0.47	0.33
Trained member	0.26	0.49	0.36
Untrained member	0.02	0.03	0.00
Total	0.18	0.30	0.18

Training A (B) means that iddir leadership was trained in session A (B);

trained members were all trained in A.

Table 7: Demand for insurance, average treatment effects (all kebeles)

	(1)	(2)	(3)	(4)	(5)
	Group average	Anyone in group	Individual	Individual	Individual
Training B (g_{ij})	0.178**	0.306**	0.123*	0.127*	0.134**
	(0.070)	(0.137)	(0.067)	(0.064)	(0.064)
Constant	0.176***	0.432***	0.182***	0.139	0.167*
	(0.041)	(0.081)	(0.034)	(0.102)	(0.100)
Basic characteristics	No	No	No	Yes	Yes
District fixed effects	No	No	No	No	Yes
Observations	76	76	330	327	327
R^2	0.133	0.100	0.036	0.112	0.120

Training B means that iddir leadership received training B.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Demand for insurance, average treatment effects (less 2 kebeles)

	(1) Group average	(2) Anyone in group	(3) Individual	(4) Individual	(5) Individual
Training B (g_{ij})	0.176**	0.308**	0.122*	0.123*	0.136**
	(0.072)	(0.138)	(0.067)	(0.062)	(0.061)
Constant	0.176***	0.432***	0.182***	0.186	0.209*
	(0.042)	(0.081)	(0.034)	(0.113)	(0.111)
Basic characteristics	No	No	No	Yes	Yes
District fixed effects	No	No	No	No	Yes
Observations	70	70	290	288	288
R^2	0.120	0.087	0.033	0.118	0.125

Training B means that iddir leadership received training B.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Demand for insurance, intent to treat

	(1) Group average	(2) Anyone in group	(3) Individual	(4) Individual
Allocation to training B (γ_{ij})	0.139*	0.278**	0.085	0.107*
	(0.071)	(0.133)	(0.063)	(0.056)
Constant	0.176***	0.436***	0.184***	0.209*
	(0.042)	(0.079)	(0.033)	(0.109)
Basic characteristics	No	No	No	Yes
District fixed effects	No	No	No	Yes
Observations	70	70	290	288
R^2	0.057	0.076	0.015	0.115

Training B means that iddir leadership received training B.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Demand for insurance, IV

	(1) Group average	(2) Anyone in group	(3) Individual	(4) Individual
Training B (g_{ij})	0.154*	0.300*	0.082	0.129*
	(0.083)	(0.156)	(0.084)	(0.071)
Constant	0.169***	0.422***	0.170***	0.198*
	(0.044)	(0.083)	(0.039)	(0.111)
Basic characteristics	No	No	No	Yes
District fixed effects	No	No	No	Yes
Observations	70	70	290	288
R^2	0.074	0.077		0.118

Training B means that iddir leadership received training B.

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Number and value of policies bought

	Number of policies		Value (Birr)	
	(1)	(2)	(3)	(4)
	ATE	ITT	ATE	ITT
Training B (g_{ij})	0.189**		9.182*	
	(0.086)		(4.879)	
Allocation to training B (γ_{ij})		0.149*		7.237
		(0.078)		(4.425)
Constant	0.198	0.198	12.463	12.656
	(0.170)	(0.167)	(9.874)	(9.945)
Basic characteristics	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Observations	289	289	284	284
R^2	0.084	0.074	0.073	0.068

Training B means that iddir leadership received training B.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Who purchased insurance (ATE)

	(1)	(2)
Farmer received any training^{+} (t_{ij})	0.224***	0.192***
	(0.057)	(0.052)
Iddir leader	0.126	0.169
	(0.113)	(0.119)
Training B^{++} (g_{ij})	0.004	-0.026
	(0.031)	(0.045)
$g_{ij} * t_{ij}$	0.238*	0.322**
	(0.141)	(0.130)
Iddir leader $*g_{ij} * t_{ij}$	-0.146	-0.230
	(0.181)	(0.180)
Constant	0.020	0.248***
	(0.020)	(0.090)
Basic characteristics	No	Yes
District fixed effects	No	Yes
Observations	290	288
R^2	0.219	0.304

$^{+}$ For leaders this was training A or B, for non-leaders it was training A.

$^{++}$Training B means that iddir leadership received training B.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Product knowledge and literacy

	Know millimeters		Know basis risk	
	(1)	(2)	(3)	(4)
Training B (g_{it})	0.023	0.003	0.073	0.094
	(0.063)	(0.058)	(0.068)	(0.070)
Constant	0.306***	0.221*	0.694***	0.753***
	(0.046)	(0.115)	(0.045)	(0.118)
Basic characteristics	No	Yes	No	Yes
District fixed effects	No	Yes	No	Yes
Observations	289	287	291	289
R^2	0.004	0.123	0.018	0.104

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Perception of covariate nature of weather risk

	(1)	(2)	(3)	(4)
Training B++ (g_{it})	0.091	0.139*		
	(0.082)	(0.083)		
Farmer received any training+ (t_{ij})			0.200***	0.192**
			(0.067)	(0.077)
Iddir leader			0.074	0.113
			(0.118)	(0.122)
g_{it} * Not trained			0.284**	0.337***
			(0.118)	(0.118)
g_{it} * Leader			-0.161	-0.127
			(0.137)	(0.137)
g_{it} * Trained member			0.023	0.063
			(0.107)	(0.109)
Constant	0.380***	0.477***	0.245***	0.444***
	(0.050)	(0.123)	(0.065)	(0.128)
Basic characteristics	No	Yes	No	Yes
District fixed effects	No	Yes	No	Yes
Observations	290	288	290	288
R^2	0.010	0.053	0.062	0.109

+ For leaders this was training A or B, for non-leaders it was training A.

++Training B means that iddir leadership received training B.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 15: Number attending training in each iddir

	(1)	(2)
Number allocated to training	0.292**	0.254**
	(0.112)	(0.121)
Training B (g_{it})		1.758*
		(1.044)
Constant	2.441***	2.117**
	(0.812)	(0.976)
Observations	70	70
R^2	0.213	0.297

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16: Discussing insurance

	(1) Talked to others	(2) Number talked to	(3) Talked to between 1 and 15	(4) Knew about insurance
Training B (g_{it})	0.117**	-7.060	0.122*	-0.035
	(0.057)	(4.325)	(0.064)	(0.146)
Constant	0.781***	14.754***	0.807***	0.347***
	(0.040)	(4.205)	(0.057)	(0.062)
Sample	Trained	Trained	Trained	Non-trained
Basic characteristics	No	No	No	No
District fixed effects	No	No	No	No
Observations	173	144	144	116
R^2	0.027	0.028	0.032	0.051

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 17: Demand for insurance and numbers trained

	Someone in iddir bought		Individual bought	
	(1)	(2)	(3)	(4)
Training B (g_{ij})	0.303**	0.248*	0.157***	0.142**
	(0.139)	(0.140)	(0.058)	(0.064)
Number allocated to training	0.022		0.013*	
	(0.016)		(0.008)	
Number trained		0.029*		-0.002
		(0.016)		(0.007)
Constant	0.433***	0.440***	0.124	0.218*
	(0.130)	(0.117)	(0.124)	(0.115)
Unit of analysis	Iddir	Iddir	Individual	Individual
Basic characteristics	No	No	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Observations	70	70	288	288
R^2	0.145	0.163	0.136	0.126

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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