Agricultural Microinsurance

Global Practices and Prospects

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Editor Robert Berold

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Acronyms

ADR-TOM	Association pour le Développement de la Région de Toma
CGAP	Consultative Group to Assist the Poor
CIMA	Conference Interafricaine des Marches d'Assurance
FAO	Food and Agriculture Organization (of the United Nations)
GRET	Groupe d'Echange et de Recherches Technologiques
IAIS	International Association of Insurance Supervisors
IFAD	International Fund for Agricultural Development
MFI	Microfinance Institution
NAIS	National Agriculture Insurance Scheme
NGO	Non Governmental Organization
SHEPHERD	Self Help Promotion for Health and Rural Development

About this book

This book has been written for people who would like to know how agricultural insurance could play a role in improving the livelihoods of the rural poor. It will be useful for development agents such as donors, development banks and development workers in NGOs, co-operatives, credit unions and microfinance institutions (MFIs). It is written for a reader who has no prior knowledge of insurance.

The first chapter introduces the principles of insurance (if you have a good sense of how insurance works, you could probably skip this chapter). We explain some of the challenges inherent in the design of insurance products and show how these challenges become greater when insurance is applied to agriculture – and greater still when applied to agricultural microinsurance. We discuss the supply of agricultural insurance and the various parties involved in the supply chain. We also discuss the demand for agricultural microinsurance.

The second chapter presents four agricultural microinsurance case studies, using the principles described in the first chapter to analyze the successes, failures and challenges of providing agricultural microinsurance in practice. The first of case study is of large NGO in India that works in partnership with a commercial insurer to provide livestock insurance for its members. The second one, based in Burkino Faso, is an example of how livestock insurance can be run on a small scale as a mutual insurer. The next one was a microfinance institution (MFI) in Vietnam that created a scheme for farmers to insure pigs that had been bought with loans from the MFI. These three case studies are all examples of livestock insurance. We were not able to find microinsurance schemes specifically covering crops. But a new type of insurance known as index based insurance has some application to crop microinsurance, and the fourth case study looks at an index insurance scheme in the Ukraine aimed at low income crop farmers.

The third chapter summarizes a comprehensive literature survey to establish what kinds of agricultural microinsurance products exist worldwide, and how they function. It finds that there is very little agricultural microinsurance in existence. Most of what does exist, are products that are scaled down versions of traditional agricultural insurance, delivered through conventional distribution channels i.e. agents. A situation that is far from ideal.

The fourth and final chapter discusses whether, given all the challenges, agricultural microinsurance can play a role in improving the livelihoods of the rural poor. The chapter concludes by looking at what kinds of microinsurance interventions are most likely to succeed in improving rural livelihoods.

Introduction to agricultural microinsurance

Some definitions

This book is about agricultural microinsurance. Microinsurance is "...insurance that is accessed by the low-income population, provided by a variety of different entities, but run in accordance with generally accepted insurance practices ... Importantly this means that the risk insured under a microinsurance policy is managed based on insurance principles and funded by premiums" (International Association of Insurance Supervisors 2007). In essence agricultural microinsurance is about providing agricultural insurance to small-scale farmers in developing countries. Most of the principles and practices of providing regular agricultural insurance apply in this sector. There are however some differences, but before exploring these differences, it is useful to examine some of the fundamental principles of agricultural insurance.

The basics of insurance

[1]Insurance can be described as the reimbursement of an individual or business for all or part of the financial loss caused by an unpredictable event or risk. This protection is accomplished through a pooling mechanism: each person who is vulnerable to the risk pays a small amount of money (the premium) into the pool, which is then used to compensate those who suffer a loss. The risk-pooling mechanism makes it possible for the benefit amount to be much greater than an individual's premium payments.

Thus for example, a group of 1 000 farmers may get together and put aside $12 per month for insurance to cover the death of their animals up to a value of $1 000 per animal. Each month the pooled premiums come to $12 000, which is used to pay claims. Without the pooling mechanism provided by insurance, it is very hard for a low income farmer to find the $1 000 he would need to replace the lost animal.

Insurance thus offers certainty by replacing the potential hazard of large losses with the payment of small, regular premiums. For farmers, especially farmers in tropical zones which are prone to extreme weather events, such a promise of certainty is particularly appealing.

Any insurance product has to explicitly identify four elements:

- *The insured event:* The trigger event (in our example, the death of a cow) that leads to the payment of a claim.
- *The benefit amount:* The amount that becomes payable if the insured event happens (a fixed sum per dead cow of $ 1 000).
- *The beneficiary:* The party who receives the benefit amount (the farmer).
- *Term of cover:* The period within which the insured event must occur in order for a claim to become payable.

1 This section derives from a book co-authored by the writers of this text. For more details on the basics of insurance see (Churchill *et al.* 2003)

These four basic elements are addressed in every insurance policy, which is the legal contract between an insurer and the policyholder (the insured).

What is (and isn't) an insurable event?

Not all adverse events are insurable. To be insurable, an event has to have these characteristics:

Randomness: The event must occur unpredictably. If the event is predictable, then the risk pooling mechanism cannot work. No insurer will insure a farmer against floods if the farmer's lands are on a floodplain which regularly floods every year.

Low chance of occurrence: There should be a low probability that an event will occur to most of the members in the risk pool within the period, otherwise the cost of the insurance will be very high.

Independent: The event should be statistically independent. This means that the chance of it happening to one person should not be affected by the fact that it has happened to another person.

Uncontrollable: The event should not be under the direct control of the insured person, otherwise he or she would be able to manipulate it so as to get the benefit.

Adverse financial consequences: The insured event must result in a financial loss for the individual. If the insured party does not suffer a financial loss, why should they receive a financial benefit?

Unequivocal: It should be easy to determine whether the insured event has occurred or not. If the occurence of the event cannot be easily proven, it could lead to insured individuals making false claims.

Ideally, all insured events should meet all the above criteria. In practice, however, things are seldom so simple. The provision of insurance is associated with several complications, the most common being adverse selection, fraud, moral hazard and covariant risk.

Adverse selection

Adverse selection (also known as anti-selection) describes the situation where those who are most likely to be negatively affected by an event are the ones who purchase insurance. An example would be if only those farmers with poor soil applied for crop insurance. Adverse selection would be further reinforced if those farmers with good soil opted out of the insurance scheme because, in their perception, the scheme gave them poor value for their money.

Adverse selection can have a destabilising effect on an insurance system, because the principle of risk-pooling will not work if only those negatively affected buy the insurance. To control adverse selection, insurers have to screen prospective policyholders – a process known as underwriting. In our example, the farms could be checked by the underwriter and the soil type assessed, or the farmers may be required to sign a declaration indicating their yield history attesting to the good health of their crop enterprise. High-risk farmers may then be excluded or charged more.

Adverse selection is also controlled through *exclusions*. For example a livestock insurance

policy might refuse to insure cattle which already suffer from disease. Another useful means of controlling adverse selection is to stipulate a *waiting period*. For livestock cover, there could be a waiting period of a month or more between the time when the policyholder begins paying premiums and the date when the livestock cover is valid. This would reduce the risk that someone whose cow is about to die will purchase a policy.

Fraud

Individuals who participate in adverse selection are not doing anything immoral or illegal – they are simply pursuing a sensible path of self-interest according to their assessment of their risk profile. Fraud, by contrast, is deliberate misrepresentation by the insured person, claiming that an insured event has happened when it has not, or providing false answers to the insurer's screening questions. One way to manage fraud is through claims verification: checking that a claim event has actually happened.

Moral hazard

Moral hazard is the term given to the situation when the fact of being insured creates incentives for policyholders to behave in irresponsible or undesirable ways. In other words because they are insured, they take less care, and there is a greater likelihood of the insured event occurring. For example, insured farmers might ignore the need to vaccinate their animals or not be bothered to seek appropriate medical treatment.

Moral hazard is usually managed through exclusions that remove the financial gain from the undesirable action. An example would be if a livestock insurance policy only paid claims on livestock that had been vaccinated. Another way to discourage moral hazard is through what are known as co-payments and deductibles, which is a way of ensuring that policyholders incur some costs when making a claim. Thus a crop insurance policy might pay only 80 percent of the value of the damaged crop, and the policyholder's co-payment would have to cover the remaining 20 percent.

Covariant risk

Covariance occurs when risks amongst policyholders are not independent of each other. It means that when a single event happens, it is likely to give rise to multiple claims. For example households who live in a region prone to earthquakes are likely to experience the same risk at the same time. Covariant risk can result from epidemics or other natural disasters. Covariant risk can be managed through exclusions, such as excluding livestock death caused by an epidemic. This however defeats much of the real value of agricultural microinsurance. Another way a microinsurer can manage covariant risk is to purchase reinsurance. This is discussed below in the supply chain discussion.

Agricultural insurance

Agricultural insurance presents a number of particular challenges to insurers, because of how the complexities listed above apply to farmers:

- *Uncontrollable:* Ideally the occurrence of an insured event should not be under the direct control of the insured person. But this is not always the case with many kinds agriculture insurance. For example, one farmer may not care for his livestock as diligently as another. Neighbouring farms with identical soil conditions may have very different crop yields if one farmer is more skilled or experienced than his neighbour.
- *Unequivocal:* Assessing agricultural loss can be very difficult, as the loss could be caused by a combination of the insured-against events and other events. This can make loss adjustment (establishing, the cause, extent and value of the loss) a difficult and costly exercise.
- *Fraud:* Farms are often physically remote, which creates opportunities for fraud. Without witnesses, a farmer can slaughter livestock and fraudulently claim they were stolen.
- *Moral hazard:* Physical remoteness makes it hard for an insurer to check whether insured farmers are diligently taking care of their crops or livestock.
- *Adverse selection:* The insurer may know the climate conditions for a region, but a particular part of the region may have a microclimate that results in lower yields. The insurer may not know this, but the farmer will. In such cases farmers with more challenging microclimates might be more inclined to apply for insurance than farmers whose miroclimate is average.
- *Covariant risk:* In agriculture, covariant risk is frequently an issue because droughts, pests and animal or crop epidemics are likely to affect many farmers at the same time.

The great tomato insurance fraud (Burnett 2005)

In 2004, in the fertile valleys on the border of North Carolina and Tennessee, the United States government discovered the largest case of crop insurance fraud ever uncovered.

Interviews with investigators, prosecutors, farmers, watchdog bodies and government regulators revealed a culture of cheating that had grown up among a small group of farmers who exploited the nation's government-backed crop insurance program. Among these were Robert and Viki Warren, who were among some the largest tomato growers east of the Mississippi. Along with eight others the couple pleaded guilty to swindling the government and insurance companies out of more than $9 million in bogus insurance claims from 1997 to 2003.

One of the Warrens' farm managers helped the couple to make it appear that their tomatoes had been destroyed by hail. On the Warrens' orders he threw the ice over the tomato field to look like the aftermath of a hailstorm. He then got a labourer to beat the leaves off the plants, which he photographed.

Loss adjustors were dispatched by the insurance company to inspect the field after the Warrens claimed a disaster. They were there for only a short time and did not carry out a thorough inspection.

Robert and Vicki Warren each received some six years in a federal prison. The federal indictment states that the insurance agent coached the Warrens, in detail, about how to perpetrate the fraud. The adjustor testified that his supervisor at the insurance company – Firemen's Fund Agri-Business – instructed him to lie on the crop-damage forms for the benefit of Warrens. The adjustor and the insurance agent were charged and convicted.

United States officials estimate that around 5 percent of indemnities paid out each year go to false claims.

All these factors, together with the costs of loss adjustment, can make agricultural insurance a very costly business, difficult to make profitable or indeed to break even. In fact hardly any agricultural insurance programs anywhere in the world cover their costs (indemnity payments + administrative costs) from premiums. Almost all have to be subsidized. This is borne out by Table 1, which shows the ratio of indemnity payments (I) and administrative costs (A) to premiums (P) in selected countries and different time periods. In this table one can see that the costs of providing agricultural insurance, that is the pay-outs combined with the costs of administering the schemes, are greater the premiums they manage to obtain. A ratio of 1 would be a break-even ratio and anything less than 1 would indicate a profit. In all cases the ratio is significantly larger than 1.

Table 1: Agricultural insurance programs – costs vs. premiums

Country	Time Period	Costs (I + A)/ Premiums (P)
Brazil	1975-81	4.57
Costa Rica	1970-89	2.80
Japan	1947-77	2.60
Japan	1985-89	4.56
México	1980-89	3.65
Philippines	1981-89	5.74
USA	1980-89	2.42
USA	1999	3.67

Source: Skees (2003)

So from Table 1, we learn that the costs of providing agricultural insurance are in the cases tabled above, greater than the revenue they receive in the form of premiums. So where does the additional revenue come from? Mostly from subsidies. Figure 1 shows the extent of government subsidies necessary to back agricultural insurance in the United States. Without these subsidies, US insurers would simply be unable or unwilling to provide agricultural insurance.

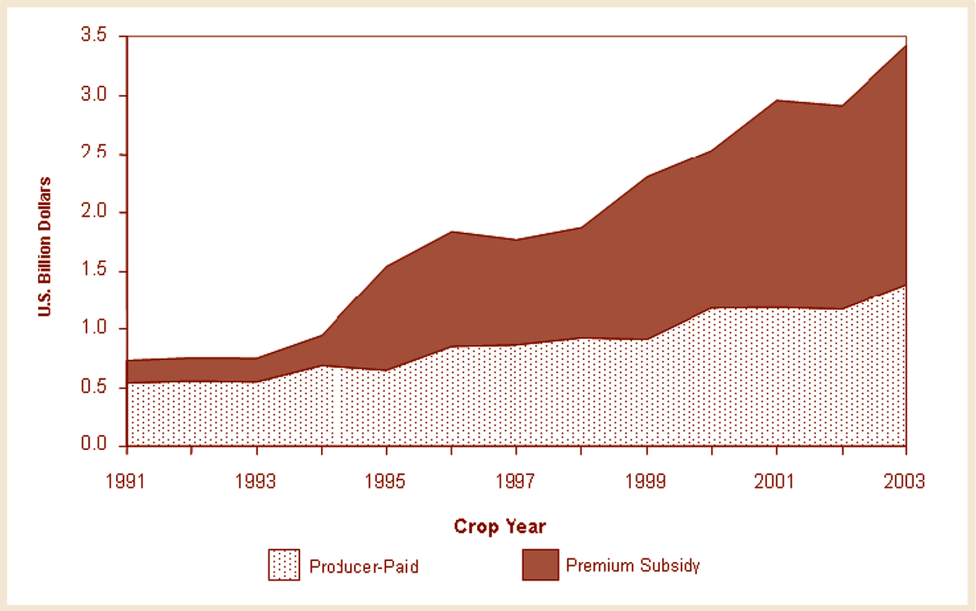


Figure 1: Subsidies provided to insurers by US government for agricultural insurance 1991-2003

Source: Global Conference on Insurance and Reinsurance for Natural Catastrophe Risks, Istanbul, 2005

In a strictly business sense, one has to conclude that agricultural insurance is inherently non-sustainable. But it another sense, it is sustainable – as agriculture is often a very politicized sector, subsidies are commonly seen by governments as a necessary means of winning political support among the sector.

Given the difficulties in providing agricultural insurance in developed countries, one would expect even greater difficulties in providing agricultural microinsurance for poor people in developing countries. Because the poor cannot afford high premiums, agricultural microinsurance has to carry all the costs of agricultural insurance but with the added burden of low premiums.

Some would argue that any form of insurance that helps reduce risks for a farmer can be classified as agricultural insurance – from covering the lives of the farmer's family (who are very often also the workers on the farm), to coverage of cash in transit, to insurance of physical property such as fencing, livestock and farming equipment.

For the purposes of this study, we confined ourselves to the two main categories of agricultural risk – *animal risk* and *plant risk* (crops and forestry). Agricultural insurance covers these risks in two ways – *indemnity cover* which covers the actual loss suffered, and *index insurance* which helps hedge against the uncertainty of weather-related risk.

Animal insurance

Livestock insurance can cover losses resulting from death, disease and accidental injury to livestock. It can cover an individual animal or a herd. The cover for individual animals is more costly, both because of the increased administration costs and the adverse selection costs. Herd cover is the most common form of cover in the developing world.

Animal insurance can be extended to poultry or fish (aquaculture). Aquaculture insurance can cover losses resulting from death or loss of fish stock due to meteorological events, diseases, pollution, or algae blooms.

Crop insurance

Crop insurance covers the loss of crops due to one or more perils. The event can be a particular named peril, such as hail insurance. The greater the number of perils covered, the more complex and expensive the insurance becomes, and the greater the likelihood of its needing to be subsidized.

Crop losses can be covered in a number of ways – yield loss (a lower-than-anticipated yield), quality loss (crops of a lower quality than anticipated), revenue loss (due to price fluctuations), or a combination of these. It can be *restrictive* (e.g. product quality has to be proved to be below the commercial standards established by the reference markets) or *wide* (e.g. any loss caused by any peril). The two most common types of crop insurance types are named-peril and multi-peril insurance.

Forestry insurance is a special type of crop insurance, which covers timber and plantations against fire and windstorm damage. It may include flood, hail, weight of snow, insect infestation, and damage caused by domestic and wild animals.

Named-peril crop insurance

Named-peril policies include policies for hail, frost and fire, and account for a large proportion of crop insurance worldwide. Hail is the most common named peril, and hail policies have been in existence since 1733, in Germany.

Named-peril policies pay out according to the actual damage that results. Key features of these policies are:

- The damage resulting from the peril is localized.
- There is low degree of correlation of risk over a given area (these policies are not suitable for perils which can impact over wide areas, e.g. drought, pests, disease).
- The sum insured is agreed upon at the time that the policy is purchased.
- The sum paid is based on a loss adjustor's measurement of the percentage of damage after the loss event.

Multi-peril crop insurance

Multi-peril crop products are based on shortfalls on expected yield, rather than on the damage caused by a particular loss event. These products use a farmer's yield history as a baseline. The shortfall is determined either on an area basis or per individual farmer. Typically the insured yield is between 50 and 70 percent of the farmer's historic average yield.

Multi-peril policies are suited to perils whose individual contributions to a crop loss are difficult to measure, and to also perils which affect a crop over a period of time.

Index-based insurance

Index-based insurance is a way of providing protection against correlated risk such as extreme weather events. It has also been used to protect against poorer-than-expected yields and livestock mortality associated with climatic conditions. It is not strictly insurance, as individual losses are not assessed – instead it pays-out to all policy holders in a geographic area when

certain conditions are reached in the proxy, or index. The index is selected to closely correlate with actual losses e.g. crop or livestock losses, and is based on historical patterns, and should be objective and easily observable.

Index-based insurance generally use one of two types of indices: meteorological triggers or area yield triggers. For example, a specified low level of rainfall as measured in rainfall collection stations would correlate with crop losses caused by insufficient water; a specified high level would correlate with crop losses caused by waterlogging or flooding. However, other indices can be used if they are historically correlated with losses.

For an area-yield index trigger, payouts are made if crop yields in a designated area fall below a particular level. Area yield can be measured in various ways. In India, the government-operated National Agriculture Insurance Scheme (NAIS) pays out policyholders in designated areas based on the shortfall of the measured crop yield relative to a threshold value related to historical yields estimated over a specified window period (generally 3 to 5 years).

In Canada, satellite imagery is used to assess changes in area yields of pasture which fall below expected pasture growth. Pasture is difficult to measure on the ground because it is a perennial crop that is continuously grazed by livestock, but satellite imagery allows estimates of pasture growth according to how much light is absorbed or reflected by the pasture.

In Mongolia, where cattle farming is by far the largest component of the agricultural economy, index insurance is used to cover loss of cattle if caused by adverse weather conditions. The policy pays out according to total cattle death (the index) of a whole area, rather than the actual losses suffered by an individual farmer.

Index insurance solves three of the most difficult challenges of agricultural insurance, and greatly reduces the prospects of fraud. Its solves the problems of:

- moral hazard: the farmer cannot influence an index that is based on weather.
- adverse selection: whether farmers opt in or opt out, this will have no impact on the risk, because the risk would be based on the index, e.g. level of rainfall.
- costs of loss adjustment: it is not necessary for a loss adjustor to visit the farm and calculate losses, as once the index trigger is exceeded, the payment is sent regardless of loss

and;

- reduces the prospects for fraud.

Unfortunately index insurance is not quite a panacea, because it introduces a new problem. This problem is basis risk, which can be described as the mismatch between the amount received because the index has been triggered and the amount actually lost by the client. The greater this difference, the greater the basis risk. Basis risk can make index insurance difficult to sell. Consider the example of a farmer whose farm lies 20km from the rainfall gauge. This farmer may have a different microclimate, so that while there may have been adequate rainfall at the gauge, this particular farmer may have received relatively little – she may even have lost her whole crop. Because of the basis risk effect, she will receive no payment. Basis risk can make index insurance unattractive to potential clients. Improved data collection and product design may be able to minimize basis risk.

Agricultural Insurance versus Agricultural Microinsurance

The differences between agricultural insurance and agricultural microinsurance emerge from the market that they serve. The market typically consists of low-income people, in developing countries, with limited or no previous exposure to insurance. This has a number of important implications. Perhaps the most important of these is that being poor they will not be able afford large premiums. This in turn implies that:

- in order to break-even or make a profit, the provider has to sell large numbers of these policies. This means that the traditional way of selling agricultural insurance i.e. through individual agents, may not be viable and new methods of distribution may be required (such as through microfinance institutions).
- The market will have limited knowledge of insurance so in addition to advertising a particular agricultural insurance product it is necessary to educate the market on the very need for, and the principles of insurance.
- The limited premium means that expensive forms of loss control will need to be avoided.

These and other issues specific to agricultural microinsurance are dealt with in more detail in Chapter 3. It important however to bear in mind that while there are real differences between agricultural microinsurance and regular agricultural insurance, the fundamental principles and practices of insurance apply to both.

The agricultural microinsurance supply chain

Agricultural microinsurance has several levels to its supply chain, each playing an important role.

The supply chain for agricultural microinsurance is shown in the following figure (Figure 2).

Overseeing the participants in the supply chain is the government. The government is often involved in agricultural microinsurance, in several roles. Their primary role is to develop sound laws/regulations on insurance and to train, certify and supervise regulators. In addition they can provide subsidies, reinsurance, and often the coverage of large covariate risk, either through subsidies or, after a catastrophe, through aid.

The government is also responsible for setting up insurance regulators who are charged with the role of consumer protection and maintaining the stability of the financial sector of the economy.

Turning to the supply chain, on the far left is the reinsurer. Then there is the insurer, who collects premiums, investigates and settles claims, and carries the risk (or more accurately, the part of the risk not ceded to reinsurers). Then comes the delivery channel, the public face of insurance: the delivery channel sells the products, collects the premium payments and may help the policyholder to file a claim. Then there is the policyholder, who pays the premium and makes claims. At the end of the chain is the property being insured – animals, crop, land, or expected yield.

The supply chain begins with the reinsurer, a special type of insurer who provides insurance

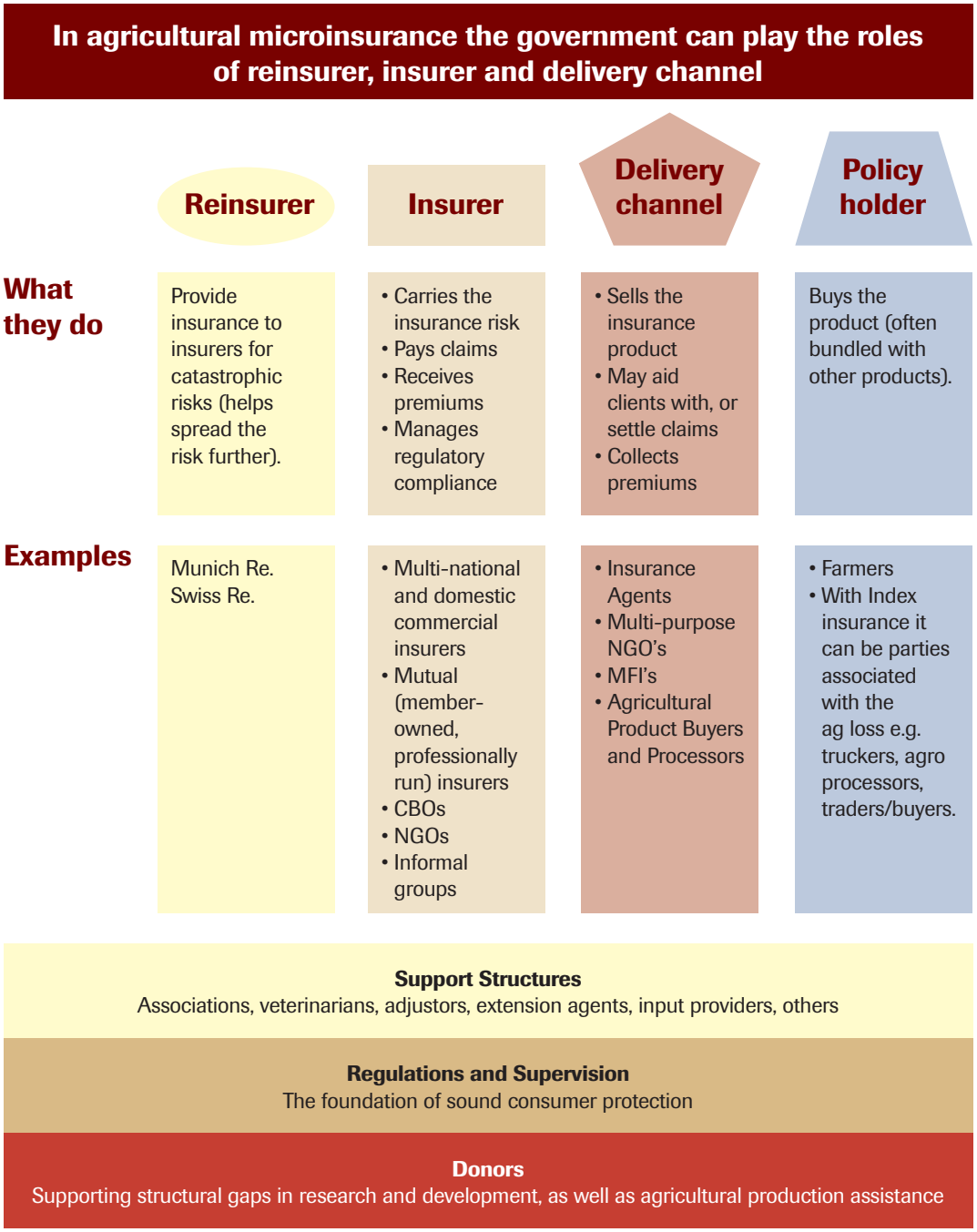


Figure 2: The agriculture microinsurance supply chain

companies with additional risk management and diversification. The reinsurer is especially important in all kinds of agricultural insurance because much agricultural risk is climatic and large areas (and hence large numbers of policy holders) can be affected at the same time. A reinsurer spreads the risk further. Weather risks like storms, flooding, and fire can only be covered in a sustainable manner by having a large risk pool.

The insurer carries the risk and has to manage the risk in order to remain viable. In many fields of insurance, the insurer is usually the delivery channel, but this is not often the case with agricultural microinsurance. Because of the low premiums involved, commissions are also low; so the insurer has to find a delivery channel which gathers enough people at one time.

The microinsurance product is sold through the delivery channel, and it is to the delivery channel that the policyholder goes to conduct his or her insurance business. The delivery

channel can be any person or organisation who interacts with low-income farmers – a school, a farm inputs retailer, a seed or fertilizer salesperson, a wholesaler who collects farmers' outputs, or even an employer (since many farmers also work in formal, income-generating jobs). Microfinance institutions (MFIs), non-governmental organisations (NGOs) or community-based organizations (CBOs) are often well suited to act as delivery channels. What is important is the ability to bring enough like-minded people together who all have the same kinds of concerns or risks.

The delivery channel should be a body that farmers need to interact with regularly, and its staff should be trusted by the farmers.[2] In many cases the delivery channel has a financial interest in mitigating the agricultural risk that their target market carries.

The policyholder pays the premium and makes the claims. A policyholder can be a group or an individual. It is less expensive to sell small value policies in bulk, bundled under one payer in much the same way as employer-sponsored group health insurance is managed.

The demand for agricultural microinsurance

It is easy to see a need for agriculture microinsurance, but it is difficult to effectively estimate the demand for it. As yet, there are very few demand studies. Most of the studies that do exist, for Vietnam and a few other countries, are qualitative. Demand assessments tend to draw inferences from historical trends, and historically people in rural areas of low-income countries have used other means besides insurance for dealing with risk.

It is worth reminding ourselves that insurance is not the only way of dealing with financial risk. There are two broad categories of risk management strategies – *ex-ante* and *ex-post*. Insurance is an *ex-post* risk coping strategy. *Ex-ante* strategies involve taking actions that reduce the probability of the risk occurring. Examples would be building an irrigation system so that water supply can continue through a drought, or applying an insecticide to avoid a crop infestation. *Ex-post* risk coping strategies are concerned with reducing the impact of the risk after it has occurred. Any assessment of demand must take into account how both *ex-ante* and *ex-post* strategies would function in the specific context.

General microinsurance demand studies usually start with qualitative research which focuses on what the risks are and how the risks are currently mitigated. Based on the responses from interviewees, product prototypes are developed and quantitative research is conducted to assess the demand for those prototypes. There are very few demand studies of microinsurance in general, and those that there are, tend to have a strong urban or peri-urban sampling bias. While there is a strong sense among providers of the need for agricultural microinsuance, there are as yet no studies that provide (on a multi-country basis) a quantitative sense of that need.

2 In addition to trust it is also important that the distributer has financial transactions with the potential policy holder and that the distributer itself is able to account for the transactions.

Four case studies of agricultural microinsurance

As we have already seen, there are no easy solutions in agricultural microinsurance. Although operating in different contexts, the four cases described here give a sense of what agricultural microinsurance looks like in practice. Three of the schemes are types of livestock insurance, while one is of index crop insurance. (There are no examples known of non-index based crop insurance designed specifically for low-income clients).

These four case studies show various approaches to managing the core challenges of agricultural microinsurance – moral hazard, fraud, adverse selection, and high administration costs combined with low premiums. Each deals with these problems in innovative ways. But as we shall see, even with innovation and dedication, not all these challenges can be overcome.

Case 1.
Livestock insurance in India

[3]Livestock insurance is fraught with moral hazard and fraud problems. If the value of an insured animal drops below the insurance payout benefit, then the stock owner has an incentive to let it die (moral hazard). Or the famer may be tempted to slaughter the animal or lend it to a neighbour in order to claim the loss (fraud). This case study was selected because it demonstrates the important role that a distribution channel can play (and in many cases will need to play) not just in marketing, premium collection and claims payment, but crucially in risk management.

SHEPHERD (Self Help Promotion for Health and Rural Development) an NGO that runs an insurance scheme in the Tamil Nadu area of rural South India, has found interesting ways to overcome these problems. Its livestock insurance is offered in conjunction with a loan scheme for pur-

The SHEPHERD livestock scheme in India

- **Type of cover:** Livestock
- **Distributor:** NGO
- **Risk carrier:** Commercial Insurer
- **Typical premium:** $9 (4% of value of animal)
- **Typical cover:** $225
- **Typical term:** 1 year
- **Adverse selection defences:** Sell to pre-existing group only, pre-screening of livestock by vet
- **Moral hazard defences:** Ongoing screening, limited loan term, post mortem
- Fraud defences: Cultural taboos on poor treatment of livestock, post mortem, tagging and photographing of animal
- **Keeping costs down:** Many costs absorbed by the NGO, marketing of insurance linked to marketing of loan product, marketing done at cattle clinics by vets

3 This case study has been taken from a paper entitled "Case study 15: Microinsurance and Microfinance Institutions. Evidence from India" authored by Roth, Churchill, Ramm & Namerta. For those interested in the entire paper which contains more background about SHEPHERD and its microinsurance products, the paper can be downloaded for free at www.ilo.org/socialfinance.

chasing cows. Although the insurance is voluntary, it tends to be purchased by about half the people taking out loans.

Moral hazard in the scheme is partly controlled by limiting the term of the policy to a year – in such a short time it is unlikely that an animal's market value will drop significantly below the sum insured. Moral hazard is further controlled by the requirement that a veterinarian has to determine the cause of death, to ensure that the animal did not die from neglect.

For religious and cultural reasons, the likelihood of fraud is fairly low, as the death of a cow in a Tamil Nadu community is an important event. Members of an insurance group invariably know each other and know each others' cattle, especially since they do not own many livestock. Thus a fraudulent claim is unlikely to go unnoticed. And in any case, the insured cattle are tagged and photographed.

SHEPHERD runs cattle care camps, funded by a surcharge on each insurance policy, to promote the proper maintenance of animals and provide free immunization and deworming. The camps are open to the general public as well as insurance scheme members, and all types of animals can be brought, not only cattle. At the camp a veterinarian suggests to people that they should insure their animals, particularly those that yield a lot of milk.

The program experienced a drop in the number of policies between 2001 and 2004 – from 350 policies in 2001, to 302 in 2002, to only 85 in 2003, increasing slightly to 134 in 2004. Some of this can be attributed to drought in the Tamil Nadu area over the period. However according to field staff, there are several other reasons why clients chose not subscribe to the scheme:

Cost: The premium is an annual premium of 4% of the animal's initial value, as determined by a veterinarian. A typical premium is Rs 400 ($9). This is a lot of money for a poor farmer.

"Money wasted": If the animal does not die, its owner may have difficulty justifying the "wastage" of such a relatively large premium, especially since the premiums for life and health insurance for a farmer's family are likely to be lower. For an annual life insurance premium of just under a dollar, a member of SHEPERD can buy life cover with a benefit $125 for two adults.

Term: The policy runs for a full year of coverage, even if the farmer wants to sell the animal during the course of the year.

Formalities: The need for a veterinarian to prepare the paperwork and assess the health and value of the animal deters some potential policyholders, especially if a vet is not always readily available.

Claims: The claims process may discourage demand, again because the veterinarian may not be immediately available – and people do not like having dead animals around their houses.

Despite this problem, the SHEPHERD scheme can be regarded as at least a partial success. Some of this is attributable to SHEPHERD's investment in cattle health camps. The camps were not introduced specifically to lower claims, but they do have that effect. The camps also allow the NGO to market its services to non-members who bring their animals

to be inspected. Prevention strategies of this nature are not given sufficient attention by most microfinance institutions and microinsurers. Of course there are costs associated with providing these services which cannot be met by microinsurance premiums alone, and would have to be subsidized from elsewhere.

Another noteworthy aspect of the SHEPHERD scheme is the trade-off that has to be made between reaching large numbers of people with a simple mandatory insurance product versus (in this case) reaching fewer people with more a complex but voluntary product. The compulsory/voluntary dilemma is discussed in Chapter 4.

Despite the innovative ways SHEPHERD developed to market the product, and its well-thought-out controls of fraud, moral hazard and adverse selection, in its most popular year, the scheme only managed to sell 350 policies. In microinsurance, an insurer normally has to sell tens of thousands of products to begin to break even. Such a small level of sales is not likely to ever be sustainable.

Case 2. Plough oxen insurance in Burkina Faso

[4]Although there are no agricultural microinsurance schemes currently functioning in Burkina Faso, until 1995 there was a scheme which was successful enough to be sustained for 26 years. It was a livestock insurance scheme specifically to replace plough oxen that had died from disease. This case study was chosen because it was very innovative in the way in which it used self-selecting groups to manage risks, in much the same way as Grameen style solidarity credit groups.

The scheme was started in Burkina Faso's Nyala province in 1969 by an NGO, the *Association pour le Développement de la Région de Toma* (ADR-TOM), which operates in the fields of health, credit savings, and agriculture. ADR-TOM's agricultural focus was the effective use of plough oxen, introduced through an integrated plough oxen scheme combining training, financing and insurance.

The Burkina Faso livestock scheme

- **Type of cover:** Livestock
- **Distributor:** NGO
- **Risk carrier:** Small groups of policyholders
- **Typical premium:** 6-7% of value of the animal
- **Typical term:** Length of loan (7 years)
- **Adverse selection defences:** Linked to a new loan
- **Moral hazard defences:** group co-payment, salvage value goes towards co-payment, screening by vet, replacement in the form of another ox rather than cash
- **Fraud defences:** group co-payment, screening by vet
- **Keeping costs down:** Administration done by NGO, underwriting by community groups

The insurance scheme offered loans repayable within seven years – the normal working life of a plough ox. Only married men with children were eligible, and in any given year, trainees

4 This case study has been taken from a paper entitled "Microinsurance in Burkina Faso" authored by Aliber & Ido. For those interested in the entire paper which contains more background about ADR-TOM and microinsurance in Burkina Faso, the paper can be downloaded for free at www.ilo.org/socialfinance

were selected from one or two selected villages and formed into groups. To qualify for a loan, a trainee would be required, at his own expense, to take selected oxen for a veterinary examination. If the veterinarian recommended the purchase, the farmer would be issued with a booklet for each ox, in which all treatments were to be recorded – proof that the farmer was taking reasonable precautions against diseases. Each group had a dedicated savings account for the insurance, capitalized through annual contributions by each member, as well as by occasional subsidies from ADR-TOM. The annual premium was about 6 to 7 percent of the value of the insured pair of oxen.

When an insured animal died, a veterinarian had to issue a certificate clearing the owner of negligence. If the vet certified that the carcass was fit for human consumption, it would be sold, usually with all the members of the group present as witnesses. After this, each member of the group would contribute a nominal sum towards the purchase of a replacement animal (about 1 percent of the value per member) – effectively this was a group co-payment. The group leader would take responsibility for purchasing a replacement animal using funds from the group's insurance fund added to the proceeds from the sale of the carcass and the amount collected from the members.

The scheme functioned well for most groups, but there were some problems. Not all members subscribed equally to the mutualist ethic. Some struggled to grasp the principles of the insurance system. In some groups, not all members made regular contributions.

A more pervasive (but in retrospect, solvable) problem was one of project design. The groups were too small to provide adequate risk pooling. About one-third of the 75 groups formed over the scheme's history had seven or fewer members, which meant that in any given year they did not collect enough contributions to cover the cost of even one replacement ox. Ox mortality was only 1.25 percent a year, so premiums were far in excess (about five times higher) of what was actuarially necessary. The high level of the premium was really an attempt to compensate for the small size of many of the groups. The consequence of this strategy was to leave larger groups with an excess of savings, which probably had the effect of discouraging continuing contributions from members. This probably resulted in overall inefficiency, with some groups under-insured and others over-insured.

With hindsight, if a minimum group size had been established (say around 15 or 20) – or even better, if a mechanism had been established to pool risk across groups – then far lower premiums would have been possible, and the scheme would have been more sustainable. Pooling risk across groups, and thus over a larger geographical area, would also have had the advantage of reducing the exposure to the high covariant risks (for example the risk of contagious disease) of a village-based group.

A second design flaw was that the insurance period ran for the entire length of the loan, i.e. the full useful life of an ox. This was not a good idea, because from the fifth year of an animal's life the risk of death increases substantially, which meant that the scheme was attempting to insure against an event which was becoming a certainty. A more useful approach would have been to define a "premature death period" for an ox and to insure only for this period, or alternatively to scale premiums according to the age of the insured animal.

The primary defence against moral hazard in ADR-TOM's scheme was the mandatory veterinary care during the lifetime of the oxen, and the requirement of a veterinary examination upon the death of an ox. Moral hazard was further diminished by the group dimension of the scheme. The presence of other group members when the carcass of an insured animal was sold ensured that the best price possible was obtained for the carcass, otherwise their common insurance fund would have been more depleted than necessary. The contribution required of all group members towards the purchase of the replacement ox can be considered a "deductible" – a way of making sure that an insured party bears part of the cost of the claim. In principle deductibles always reduce moral hazard, and a "group deductible" would further strengthen the function of the group in controlling moral hazard.

Moral hazard was further reduced by ensuring that the pay-out was in the form of replacement oxen rather than in cash. The fact that the group leader assumed responsibility for selecting replacement oxen meant the animals would be of an acceptable quality. The risk of policy holders who wished to "turn their ox into cash" by allowing it to die through negligence or causing it to die (i.e. moral hazard or fraud) was reduced by not paying the benefit in cash, rather the ox was replaced.

The ADR-TOM scheme clearly was well designed to counter moral hazard and adverse selection, and with a small number of adjustments it could have been further improved. A further improvement would have been to pool the risks of the entire community, and then reducing them further through the purchase of reinsurance.

By transferring the underwriting costs and the costs of risk mitigation to the group, the scheme had resonances of the Grameen-style microcredit schemes which use self-selecting solidarity groups who are jointly and severally liable for the debts of each member. However there are always costs involved in establishing, training and assisting these groups, and it is not clear that this could ever be done in a sustainable way.

Case 3. Index insurance to mitigate the impact of crop losses in Ukraine

Currently there are no *dedicated* non-index based crop microinsurance schemes in existence anywhere in the world. Those that were tried in the past, albeit not termed as microinsurance but aimed at low-income small scale farmers, mostly during the 1970s, have collapsed. Their administration costs were simply too high to make crop microinsurance feasible.

Although there are no dedicated crop microinsurance schemes, there are two kinds of schemes of relevance to poorer crop farmers. In Latin America there are several standard crop insurance schemes aimed mostly at wealthy farmers but also accessible to the poor. The other kind, are index insurance schemes aimed at managing crop risk, such as the scheme we describe here: a World Bank

The Ukraine crop index scheme

- **Type of cover:** Index
- **Distributor:** Agents
- **Risk carrier:** Commercial insurer
- **Typical premium:** 40 UAH (48)/ha
- **Typical term:** 3.5 months
- **Management of basis risk:** The scheme intends having more weather stations in the next round

pilot project undertaken in Ukraine in 2005 (Shynkarenko, 2007).

This example was selected because it had limited success and clearly demonstrates the difficulties of index insurance. Index insurance often appears as a simple solution to the problems of fraud, adverse selection, moral hazard and the costs of loss adjustment. It is unfortunately no such panacea. While not a developing country, the Ukraine example amply demonstrates some of the core difficulties that have beset index schemes set up in a number of locations. For readers interested in index schemes it would be worthwhile to examine in detail, successful index schemes, such as the cattle insurance index scheme in Mongolia.[5]

The pilot project of the Ukraine index insurance scheme, was conducted in Kherson administrative region in the south of Ukraine – a risky region for agricultural production. The area suffers from low temperatures during winter, drought in spring and summer, late frosts in spring, and other weather perils.

The developers of the scheme conducted interviews with potential buyers (50 farmers) within the range of two weather stations. It was decided to concentrate efforts on an index to cover winter wheat, the most important crop in the region. Farmers were mostly concerned about the period from the beginning of May until mid-June, when winter wheat was in its ripening phase. The farmers agreed that high temperature and lack of rainfall were the main risks.

A rainfall index was devised, with a low rainfall trigger. Normal rainfall was 80mm. If rainfall fell below a 50mm trigger, the farmers would be paid out 100 UAH ($20) per 5mm below the trigger limit per ha, with a maximum payout of 500 UAH ($100) per hectare. The premium was 40 ($8) UAH/ha.

Only two policies were sold. The reasons for this seem to be more connected to the marketing than to the popularity or unpopularity of index insurance. As it happened, there were no payouts for the period, partly because rain fell on the last day of the contract, when the farmers did not really need it.

The Ukraine case demonstrates two common problems that beset index insurance schemes. The first is the marketing difficulty. It is hard enough to convince low-income people of the merits of regular insurance where there is a direct link between their loss and the payment they receive. Once the link is removed it becomes a more difficult marketing exercise. Consider the difference in trying to sell regular insurance "...we will pay you the value of your crop loss" as opposed to index insurance "...if there is low rainfall at a weather station 100km from your home during *x* period we will pay you *y* for every mm less than *z* mm of rainfall". The second difficulty is the problem of getting the payment to tie-in with actual losses suffered by farmers i.e. getting the triggers right to reduce basis risk (see the definition of basis risk in the previous chapter in the section on index insurance).

5 For more information please refer to: GlobalAgRisk; Goes, Anne; *Index-Based Livestock Insurance in Mongolia: Potential Impact on Financial Sector Development*, 2005; World Bank: Project Information Document (PID) *Mongolia: Index-Based Livestock Insurance Project*, Washington 2005; World Bank; Skees, Jerry; Enkh-Amgalan, Ayurzana: *Examining the Feasibility of Livestock Insurance in Mongolia*, Washington 2002; World Bank: *Quarterly Progress Report – Period: From July 01, 2006 to September 30, 2006*, Mongolia 2006

It needs to be stressed that the Ukrainian example is a somewhat extreme case, selected as a cautionary tale aimed at those readers who may be overly optimistic about the prospects and possibilities of index insurance. In the Ukraine, only two contracts were sold, public education was poor and there was significant basis risk due to the way the index was designed. In the same year (2005) 250 000 small Indian farm households purchased some form of index insurance for weather risk. In addition, while the pilot project of 2005 did not achieve meaningful results, several Ukrainian insurance companies believe that there is still potential in index insurance and they are considering such products particularly to insure high-value crops on commercial farms. Indeed some farming groups are already thinking about financing weather stations that could be located on their farms to reduce basis risk.

Case 4. Pig mortality insurance in Vietnam

The final case study is an example of livestock insurance that was set up by an MFI that lends to small scale farmers.[6] In Vietnam in 1989, a loan scheme for pig farmers was set up by the French NGO GRET (*Groupe d'Echange et de Recherches Technologiques*).

Soon after setting up the scheme, GRET found that loans were failing because the animal mortality rates were high. This was found to be mainly due to a group of common and mainly preventable diseases called "red diseases". The NGO found that when pigs died of red disease, farmers were borrowing again in order to reinvest in more pigs in order to pay back the first loan. A vicious cycle was set in motion, as pigs bought in the "second round" tended to be of a lower quality as farmers tried to limit their indebtedness. Being poorer quality, the second round pigs had a higher mortality risk. Thus instead of the loan scheme helping farmers out of poverty, it was leading them into a debt-and-poverty trap.

The Vietnam livestock scheme

- **Type of cover:** Livestock
- **Distributor:** NGO
- **Risk carrier:** Small groups of policy holders
- **Typical premium:** 10% of value of the animal
- **Typical term:** 6 months
- **Adverse selection defences:** Linked to a new loan, waiting period and pre-insurance check-ups on animal health.
- **Moral hazard defences:** Post-mortem examinations
- **Fraud defences:** Monitoring by peer group
- **Keeping costs down:** Administration done by NGO

In 1999, in order to break this cycle, GRET created a microinsurance scheme as an addition to its livestock microcredit scheme to insure against the mortality and morbidity of pigs kept for fattening. Over time two different microinsurance products were developed, one of which had an insurance term of six months, the average length of a fattening cycle. The other product insured a sow and/or her 8 to 12 piglets during the rearing process, until the piglets

6 This case study was taken from an unpublished paper by Laura Sochas on Agricultural Microinsurance in Francophone countries. It can be obtained by request from the authors of this book.

were sold off for fattening. The cover duration for this product was also six months.

The risk for each scheme was carried by a group (typically 20 to 30 farmers) who paid premiums and received benefits from their own group insurance fund. Over 40 such insurance groups were created between 1999 and mid-2004. Veterinary services – treatments, vaccines, post-mortem examinations – were delivered by local health workers, who were paid by the insurance fund on a per-animal basis, while the farmers paid them directly for vaccines. Insurance membership gave farmers free veterinary advice, free treatment for "red diseases", and easier access for vaccines and treatments. Red diseases were considered to be insurable as they were widespread, easily identified, could be cured (except for one variety called pig plague) and could be effectively vaccinated against.

GRET set up the insurance funds and established the initial rules, allowing for the rules to be changed by each group at their annual end-of-cycle meeting. The day-to-day management of collecting premiums and paying benefits was the responsibility of each group's management committee. GRET provided training for all those involved (group members, management committee members, village health workers), supervised the whole process, and provided start-up subsidies.

In many ways, the GRET insurance scheme was a success. It returned the bulk of premiums back to policyholders in the form of claims (70%) and had low administration costs (19% of premiums). Its success was due mainly to its emphasis on communication and training. Membership participation was encouraged by the end-of-cycle assessment meetings which allowed changes to the original scheme – such as broadening the scope of diseases covered. The transparency of the scheme, and the effort put into communication, increased the level of trust between fund members, fund managers, village health workers, and GRET.

Risk was managed in a number of ways. For the pig fattening policy, a 21 day waiting period – the length of time it takes for vaccines to take effect – was required between vaccination and the time when the policy came into force. For the piglet policy, the waiting period was one month after birth. In addition, there were pre-insurance check-ups on animal health, and post-mortem examinations to enforce exclusions.

The scheme did have its failures. Of the 42 insurance groups created between 1999 and 2004, 14 had stopped functioning by mid 2004. There were several reasons for this:

- Village health workers were crucial to the proper functioning of the scheme. Some resigned in order to pursue more lucrative occupations. Others did not do their work correctly.
- The technical assistance provided to some of the insurance groups was insufficient or stopped for budgetary reasons.
- Local authorities were not always supportive.
- Insurance demand was highly sensitive to pig selling prices: when these decreased, so did the demand for insurance.
- Demand for insurance also fell when there was a drop in disease prevalence because of the vaccinations and treatments required by the scheme.

The scheme eventually closed because GRET lacked the time and money to keep up its support. Before doing this, GRET tried to make the insurance groups independent and to enlist help from other organisations such as Groupama and the International Labour Organisation. But the insurance funds needed a coordinating body, for which the skills were lacking. The insurance funds would probably also have had to be standardized, and this would have met with resistance from members who were now used to changing operational design to meet local realities.

Concluding comment

None of our four case studies were an outright success. There are however elements from each of these schemes which can be drawn on in the design of an agricultural microinsurance scheme. These will be discussed in Chapter 4.

Methodology

The research team undertook a landscape survey to map the extent of agricultural microinsurance worldwide. Primary research in each country would have yielded the most complete picture, but the costs involved would have been beyond the means of this project. The information was therefore collected from secondary sources. Over a period of three months in 2007 a wide range of secondary sources were consulted. Please see Appendix 1 for more information on the methodology employed.

Survey results: Agricultural insurance

In 2001 the worldwide total of annual agricultural insurance premiums, for developed and developing countries combined, amounted to some USD 6.5 billion, most of which (70 percent) was cover for crop and forestry products. As a proportion of agricultural production value, agricultural insurance is small: premiums making up just 0.4 percent of the value of global agricultural production of USD 1 400 billion.

Agricultural insurance was found to be concentrated in developed farming and forestry regions – led by North America (55 percent of premiums), Western Europe (29 percent), and Australia and New Zealand (3 percent). The whole of Latin America accounts for 4 percent, Asia 4 percent, Central and Eastern Europe 3 percent, and Africa just 2 percent.

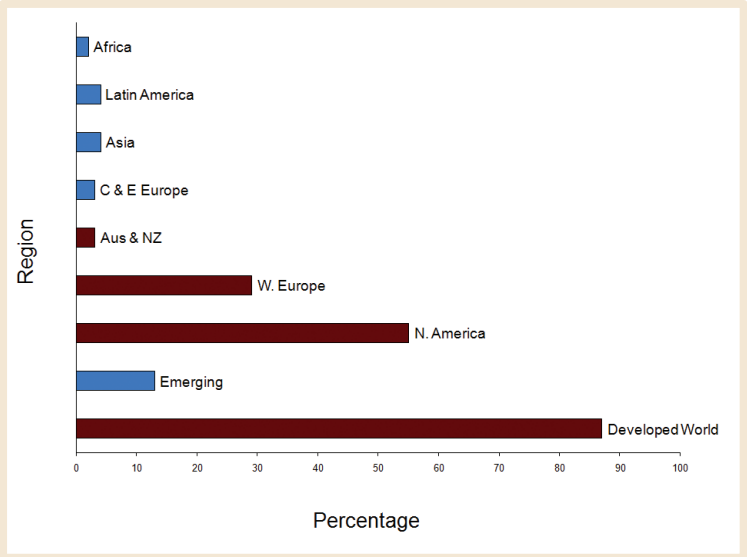


Figure 3 : Worldwide agricultural insurance in 2001 (as percentages of total premiums)

Four years after the above mentioned survey, Swiss Re. Sigma, undertook a survey of agricultural insurance specifically in emerging market. In 2005, the size of the agricultural insurance sector in emerging markets (developing countries) as measured by total insurance premiums was estimated at around USD 1.1 billion (Swiss Re. Sigma, 2007). This was less than 20 percent of the global total of agricultural premiums, even though emerging markets account for nearly 70 percent of food production worldwide. The bulk of the agricultural

insurance that is sold in developing countries goes to covering wealthier farmers, such as wine farmers in South Africa and soybean farmers in Brazil. Appendix 2 shows a breakdown of the sector per country.

Most agricultural insurance – in both developing and developed countries – is heavily subsidized as was shown in Table 1 in Chapter 1. From this we can conclude that developing countries contribute a tiny fraction to the total global premiums of agricultural insurance. But this does not mean that it is inherently non-sustainable. Agriculture is often a very politicized sector, and subsidies are commonly seen by governments as a necessary means of winning political support among the sector.

Survey results: agricultural microinsurance

Agricultural insurance products were classified as microinsurance products if they were specifically aimed at low-income farmers. The definition of low-income was specific to each country. The landscape research found a total of 122 agricultural microinsurance products worldwide. These were being delivered by two distinct kinds of insurance schemes – either schemes with a particular developmental micro-focus (26 percent of products) or standard agricultural insurance schemes with products accessible to low-income farmers (74 percent of products). Thus relatively few products were aimed *exclusively* at low income farmers.

Regional distribution of agricultural microinsurance

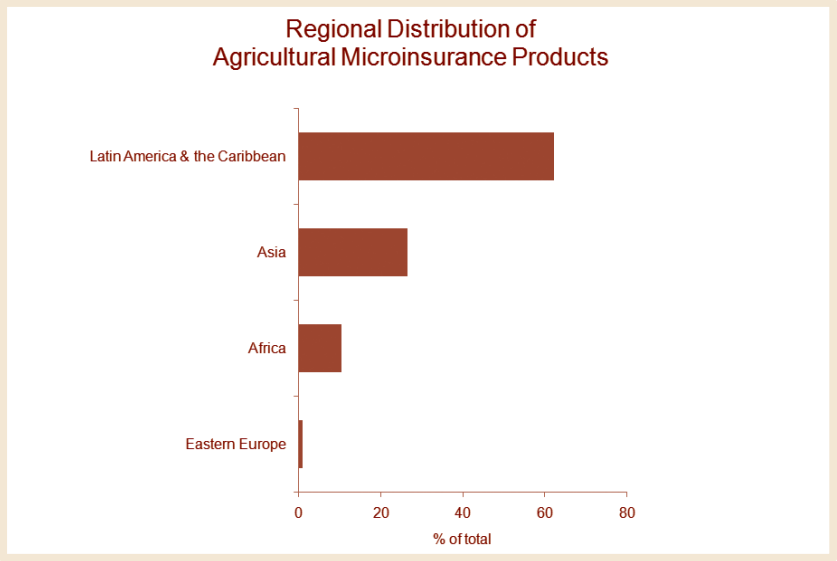


Figure 4: Number of insurance products accessible to low-income farmers by region

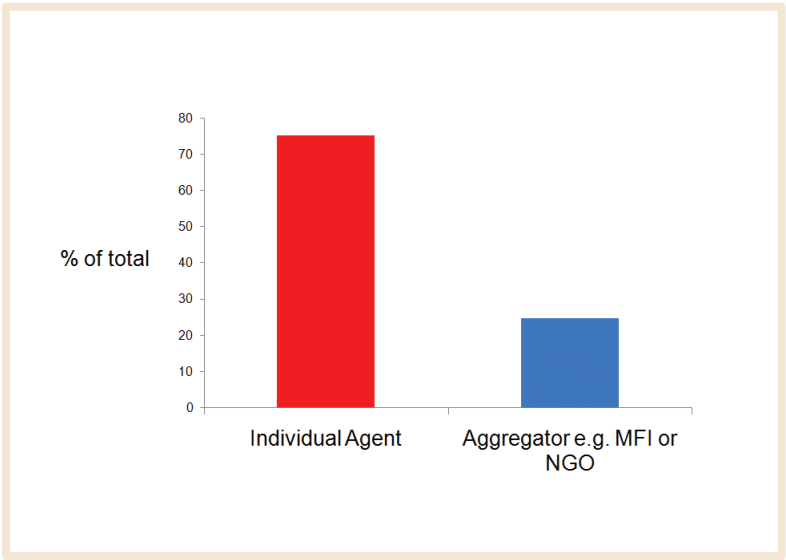
As Figure 4 shows, the vast majority of agricultural insurance products accessible to the poor i.e. specifically targeted to low-income farmers or bought by them in a particular country, were found in Latin America and the Caribbean. In almost all cases these were standard agricultural insurance schemes with some products accessible to the poor.

It is not clear why Latin American and Caribbean schemes should be more willing to make their products accessible to the poor than schemes in other developing countries. A possible answer lies in the fact that almost all Latin American schemes are heavily subsidised by their

governments. It is possible this is because there is political pressure on these governments to extend their schemes to the poor. This assumption would need further research to confirm.

Agricultural microinsurance sales and distribution methods

A key difference between microinsurance and standard insurance is the low level of premiums. Because of its low premiums, microinsurance can only work if it achieves both high volumes and very low costs. These constraints have major implications for the way microinsurance is sold and distributed. Standard insurance is typically sold to individuals by individual agents, but microinsurance, in order to bring down costs, needs to be sold to groups. And unlike standard insurance, it is best sold by aggregators such as MFIs, NGOs, or co-operatives. Where microinsurance is sold through individual agents it is usually not sustainable, although the landscape survey found that by far the majority of policies were sold through individual agents.



Note: products for which the distribution method could not be ascertained were omitted
Figure 5: Agricultural microinsurance – sales method worldwide (percentage of total)

Types of agricultural microinsurance cover

The bulk of agricultural microinsurance covers losses of either livestock or crops. For crop cover, the vast majority of policies sold to poorer farmers are multi-peril.

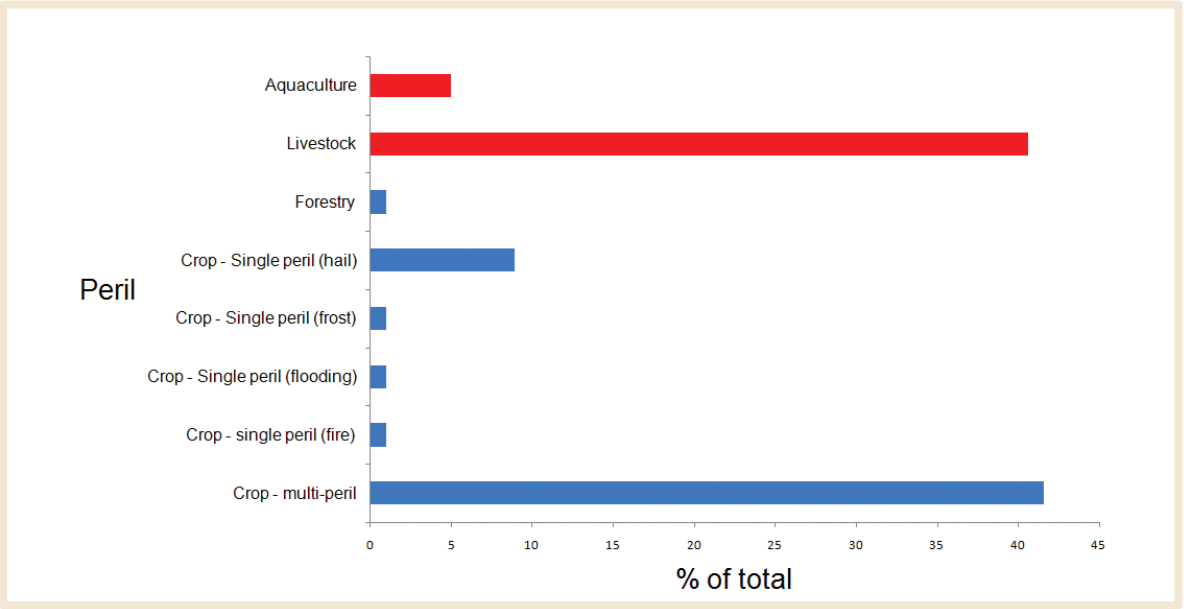


Figure 6: Types of Cover (percentage of total)

In a landscape study of all types of microinsurance in the world's hundred poorest countries undertaken by the MicroInsurance Centre in 2006, coverage by product (measured by number of policies sold) was 35 million life insurance, followed by 14 million accidental death & disability (AD&D), 8 million property (including agricultural insurance), and 7 million health.

Life microinsurance has a mass market wide appeal because insurers can keep down costs. Verifying claims is relatively cheap: it requires no specialised training for an MFI loan officer to verify the death of a borrower or a member of a borrower's family. This is why life products are so common in microinsurance, and conversely why products that require costly and specialised claims verification are much less common.

Determining agricultural losses, by contrast, requires a visit from a skilled loss adjustor. In the case of named-peril crop policies, the loss adjustor has to be skilled enough to ascertain the degree to which the losses were caused by the named peril, and skilled enough to assess the amount of the loss. For multi-peril crop insurance, the insurer must be able first to establish a yield history for the farmer, and then to measure the yield at harvest. All these are costly processes.

For livestock insurance, loss adjustment is also costly. The loss adjustor has to ascertain that the animal has actually died (rather than been sold off, hidden, or otherwise made to disappear fraudulently). The adjustor has to be able to check that the insured animal has died from a cause covered by the policy rather than from an uninsured cause like owner negligence. The benefit then needs to be calculated accurately, taking into account the sale of the carcass, which is possible for cases where the meat is uncontaminated.

For both crop and livestock microinsurance, therefore, the unavoidable costs of loss adjustment presents a severe challenge to the maintenance of low premiums.

Agricultural microinsurance – compulsory or voluntary?

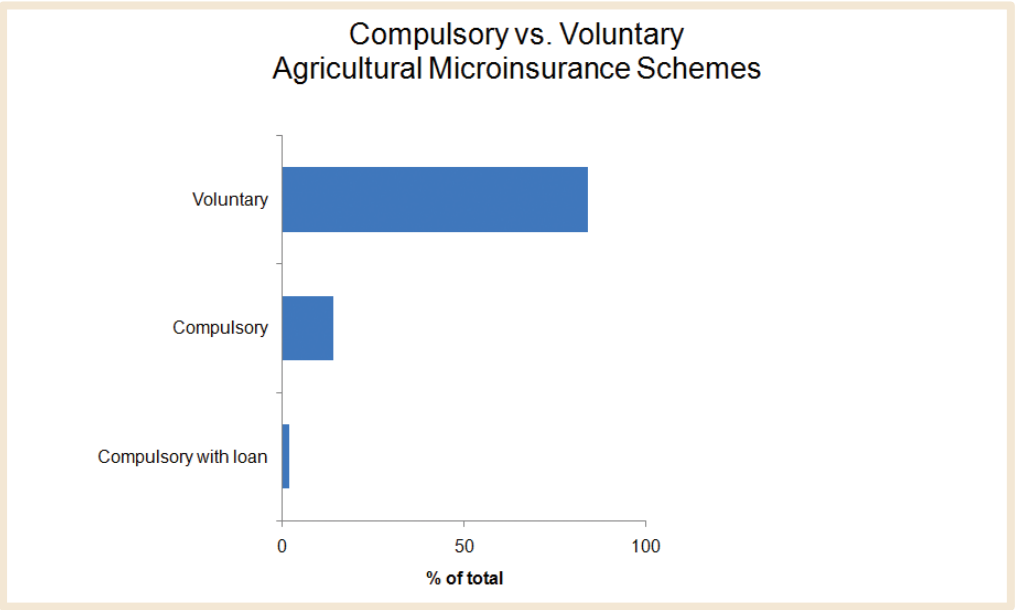


Figure 7: Compulsory and voluntary membership in agricultural microinsurance schemes

As can be seen from Figure 8, membership of the vast majority of the agricultural microinsurance schemes surveyed is voluntary. This is markedly different from credit life microinsurance, where the vast majority of schemes (as surveyed in 100 countries by Roth *et al.*, 2006) are compulsory.

Compulsory membership works in favour of microinsurance because it helps to generate the volumes needed to make the insurance viable. It reduces the costs of sales and manages adverse selection.

Insurance products can be made compulsory by law – an example is third party motor vehicle accident insurance in many countries. They can also be made compulsory by being bundled together with other financial products e.g. credit life with a loan, house insurance with a mortgage, extended warranty insurance with the purchase of appliances on hire purchase. This has been done with some success in agricultural microinsurance (see the box on the right)

Compulsory insurance does, however, create a real dilemma for development agents whose goal is not to sell insurance but to support the livelihoods of poor farm-

Automatic cyclone cover in Mauritius

If insurance can economically and usefully address some of the production risk affecting growers, there may be a case for making crop insurance compulsory or automatic, as this example from Mauritius shows. (The term "automatic" is used in cases where compulsory insurance is one of a range of services being provided as a package).

The Mauritius Sugar Insurance Fund (MSIF) has operated such an automatic scheme for some 50 years. It provides automatic cover against the main peril to the industry, namely cyclones, for all sugar growers on the island. While the compulsory nature of the cover has always drawn a measure of criticism from some growers, the parastatal corporation MSIF has countered this by making sure that growers are represented on the board which oversees the operations of the fund.

Over the years the growers' representatives have been responsible for several improvements to the insurance product, and the product is now generally regarded as being both fair and highly useful. A similar automatic program operates for the large numbers of small-scale banana growers in the Windward Islands in the Caribbean.

(Source: Roberts, 2005)

ers. On the one hand, compulsory insurance may be in some instances the only viable way to sell agricultural microinsurance because it keeps costs down and ensures large volumes. On the other hand, it does not accommodate the possibility that farmers may have other, non-insurance means to manage their risks – for example by guarding their livestock against theft, or maintaining animal health with preventative vaccinations.

Agricultural microinsurance – who carries the risk?

As mentioned earlier, the vast majority of all agricultural insurance is subsidized. The provision of subsidies in agricultural insurance is explicitly allowed for by the World Trade Organisation (WTO).

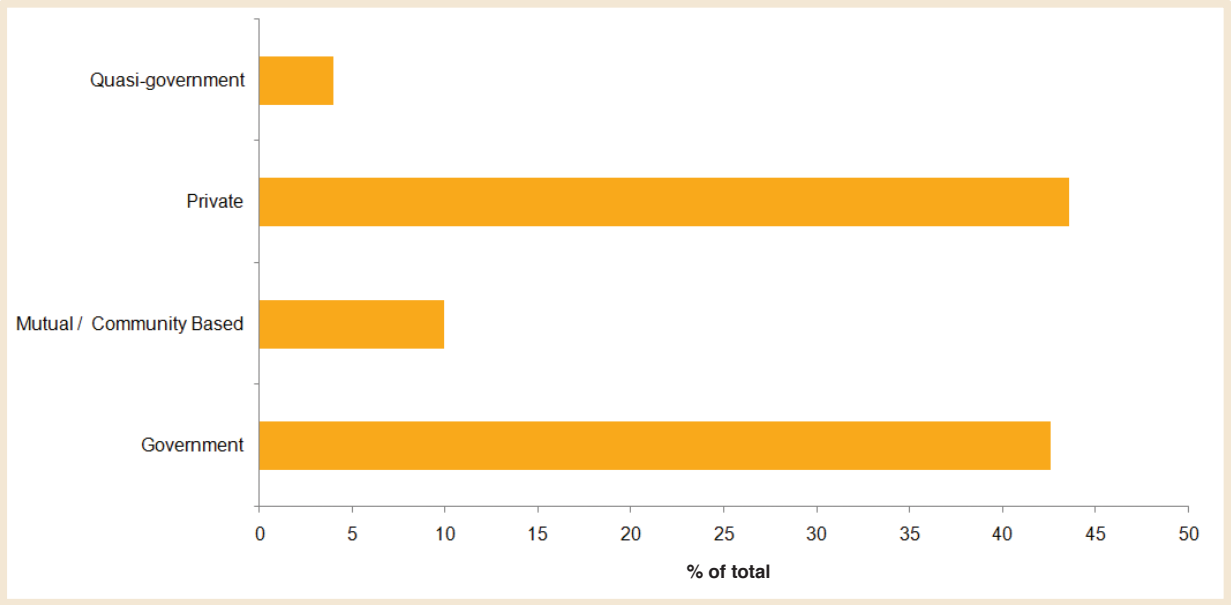


Figure 8: Primary insurers of agricultural microinsurance worldwide (% of total)

Figure 8 shows which economic sectors, among the schemes surveyed in this study, are carrying the risk. Although it appears to be the private sector that is carrying most risk, in the cases for which data was available, these "private sector" risk carriers are often agents with the risk being carried by the state. The likely reason for the preponderance of instances of the state carrying the risk is that agricultural microinsurance is not financially sustainable.

The only way to know for sure whether or not a scheme is sustainable in the normal business sense would be to look through its financial statements. However these are either not available to the public, or in cases where they are, the insurance company does not make a distinction between policies sold to low-income clients and wealthier policy holders.

Nevertheless we can say with confidence that it is exceedingly unlikely that the vast majority of agricultural microinsurance schemes are financially feasible. In order to be feasible we would need to address the following: (1) most schemes currently offer costly products such as multi-peril crop insurance, one would need to provide cheaper less complex products (2) most schemes are voluntary rather than compulsory, notwithstanding the concerns about compulsory insurance, it is a key to financial viability (3) most products are currently sold to individuals rather than groups, one would need to reverse this (4) most products are distrib-

uted by individual agents, they would need to be distributed by aggregators like agricultural co-operatives and (5) almost all products are subsidized. With respect to subsidizes it may be worth examining the impact of manner in which these subsidizes are provided and whether they could be provided in a better manner. For example, many subsidizes reduce the premium directly. This has the impact of creating an anchor price in the mind of the policy holder and it becomes hard to increase the premium to a financially viable one. It may for example make sense to subsidize the creation or improvement of infrastructure such meteorological data collection systems which could have the long term effect of reducing the underwriting costs through improvements in pricing.

Index insurance

In the face of all these challenges insurers and development agents have begun to turn their attention to index insurance schemes. As mentioned in Chapter 1, index insurance overcomes the problem of the cost of loss adjustment. The cover is linked to an index such as rainfall that is entirely out of the policyholder's control. In a simple scheme, if the rainfall levels over certain period fall below a particular trigger point, a benefit is paid. The costs of a visit to each farmer by a loss adjustor are therefore avoided.

In all, 26 index-based insurance schemes were identified by our landscape study: of these, we considered 10 to be accessible to low-income farmers. The 26 index schemes were found to be in different stages of their project life cycles – some were projects that had just been proposed (with completed or pending feasibility studies), some were small pilot projects, some were currently running, and some had closed. The status of the 26 index insurance schemes at the time of the research is shown in Table 2.

Table 2: Status of index insurance schemes 2007

Status	Country and year
Closed (date closed)	India 1979, Ukraine 2005, Ethiopia 2006
Full scheme in operation (date begun)	Mexico 2001, South Africa 2002, India 2003, India 2004, Mongolia 2006, Peru 2006
Pilot (date begun)	Morocco 2003, Malawi 2005, Nicaragua 2005, Thailand 2006, Tanzania 2007, Vietnam 2007, Caribbean 2007
Proposed	Malawi 2006, Bangladesh 2007, Honduras 2007, India 2007, Kazakhstan 2007, Mexico 2007, Peru 2007, Senegal 2007
Status unknown	Argentina (date unknown), China 2001

Two interesting facts can be noticed immediately from the table. The first is that (with the exception of the pioneering Indian Pilot Crop Insurance Scheme, an area-yield insurance scheme that ran from 1979 to1984), all the schemes, irrespective of their stage in the project life cycle, were little more than a few years old. This can be seen graphically in the following figure.

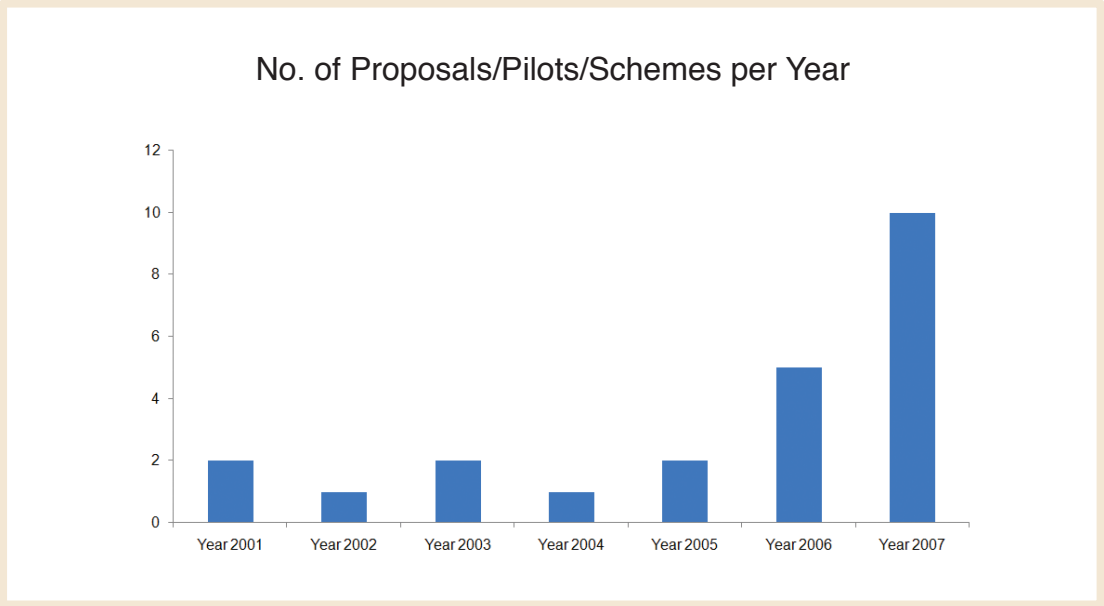


Figure 9: Number of index insurance schemes started per year

The second fact to notice from Table 2 is that very few schemes have progressed from pilots into fully-fledged schemes. For example, the 2006 scheme in Peru – while categorized as "full scheme in operation", was actually not yet in operation – it had only just passed certain regulatory hurdles. The South African scheme is, strictly speaking, not an index (micro) insurance product at all, but rather a product aimed at large commercial farmers. Thus only Mexico, Mongolia and India have projects in full operation which are relevant to poor farmers.

We can draw lessons from the index schemes at all stages, whether proposed, piloted, underway or closed – but realistically it is too early to draw any definitive conclusions. Early indications are that the index model presents some challenges, most notably regarding marketing. This is because the product does not cover the actual loss suffered by the farmer, but rather an abstract proxy for the loss, which may or may not correlate with the actual loss.

The state of agricultural microinsurance regulations

Insurance regulations in general have not addressed the issues of microinsurance (and nowhere is agricultural microinsurance specifically addressed). Only three countries – India, Peru, and South Africa – have explicit microinsurance legislation. The Philippines has legislation for Mutual Benefit Associations (MBAs) which provide some products specifically to the low-income market. Legislation in Brazil offers tax incentives for insurers to move down-market. Several countries are working towards microinsurance legislation, including Mexico, Cambodia, Nepal, and Bangladesh.

In 2006-2007 a detailed review of the Insurance Core Principles (ICP) promoted by the International Association of Insurance Supervisors (IAIS) was conducted by a joint working group of members from the IAIS and from the Regulation, Supervision and Policy group of the CGAP Working Group on Microinsurance. The result of that effort was published as "Issues in Regulation and Supervision of Microinsurance". This document outlines issues for regulations that are relevant to agricultural microinsurance.

A key regulatory issue for microinsurance will be who can sell microinsurance products. In almost every country, any person selling insurance has to be a licensed insurance agent. Insurance regulations normally define who can be an agent, their activities, and qualifications. In microinsurance, agents tend to be unlicensed as they are typically employees of a delivery channel or members of an insured group. Those countries with microinsurance legislation provide specific regulations for these agents, or look the other way, or make *ad hoc* agreements allowing microinsurance to be sold.

Index insurance poses a special challenge for regulation. Indeed, many regulators argue that index insurance is not insurance at all, but rather a derivative, because (1) there is not a directly insurable interest by the policyholder, and (2) the value of the index is not a direct reflection of the loss due to the insurable event. Legislation for derivatives is not common, and although the IAIS has guidance papers on derivatives, these are not commonly applied in developing countries. There are no guidance papers specific to index-based products. Without regulation, expansion and further development of these products could be hampered.

Conclusions

From the landscape survey, we can draw the following conclusions:

1. There are very few agricultural insurance schemes in developing countries with products that are accessible to poor farmers. Our landscape survey found a total of 122 schemes worldwide, and not all of these are fully operationable. This is a very small number if we consider that the International Fund for Agricultural Development (IFAD) estimates that "three quarters of the world's extreme poor live in rural areas, and most of them are dependent in some way on agriculture" (IFAD, 2007).
2. Agricultural microinsurance is concentrated in Latin America.
3. There are very few dedicated agricultural microinsurance schemes in developing countries. Those that do exist make use of existing agent infrastructure thus perpetuating non-viable business models.
4. Agricultural microinsurance is highly subsidized, and run on business models that are not sustainable. Sustainability would require low premium and high volume business.

In terms of trends, there is increasing interest among development agents to introduce or improve agricultural microinsurance. This is partly a result of the confluence of increasing interest in microinsurance generally, as a natural adjacency to microcredit, and partly a sense that the majority of existing microinsurance is life insurance and that

agricultural risks remain a root cause of much global poverty. New investments and developments within the field are centred on index insurance. The results of whole series of pilot index microinsurance schemes are currently being scrutinized. Future investments and directions within agricultural microinsurance are likely to be heavily influenced by the results of these pilots.

Non-insurance interventions

Given all the difficulties and challenges associated with agricultural microinsurance, and its poor record of sustainable success, the reader may by now be asking: Does agricultural microinsurance make any sense as a development intervention? Before tackling this question directly, we should review other actions which mitigate risk but are not insurance. The use of agricultural insurance as an *ex-post* (after the loss-causing event) risk management instrument should always be compared with reducing the risk *ex-ante*.

The most obvious way to reduce risk is to prevent it from happening in the first place. Vaccinating livestock, strengthening systems to prevent stock theft, planting more drought-resistant and pest-resistant crops – these are all ways to prevent the loss-making events from occurring.

Another way of mitigating risk, practised as a matter of course by poor agricultural households all over the world, is for household members to share risk by pursuing multiple livelihoods, including off-farm activities, and pooling their income.

Another common strategy to manage risk is sharecropping. As the name implies, a sharecropping farmer has a contract with a landowner to use land in return for giving the landowner a share of the farmer's harvest. This arrangement spreads the farmer's risk more than a simple rental agreement. It also acts as a credit substitute: the landowner does not need to borrow to hire equipment and labour, and the farmer does not need to borrow to rent or buy land.

There are several forms of sharecropping, each allocating the risk in slightly different ways. Under basic arrangement just mentioned, the landowner assumes some of the quality and quantity risk. Other forms include a fixed rent (in cash) due when the crop is harvested, or the landowner supplying some of the equipment, or the landowner setting a minimum quality and quantity of the crop. As Sharma and Dréze show in their study of sharecropping in a north Indian village, when insurance and credit markets function poorly, sharecropping can generate efficiency gains (Sharma & Drèze, 1996). Similarly Evans *et al.* (1991) found that non-farm income can be used effectively as a substitute for insurance, enabling farm households to carry out risky innovations.

A common non-insurance method of managing the risk of price fluctuations of agricultural products is through the use of forward contracts. Under a forward contract, the seller commits to delivering specified goods at an agreed time. With fixed-price forward contracts, the price the producer receives is determined in advance in a contract between buyer and seller. Typically, the producer is paid on delivery. If payment is received prior to delivery, the contract can also act as a credit substitute.

There are many varieties of forward contract, each with different risk allocation outcomes. A contract could specify, for example, that all the produce in a single area of land would be bought at a particular price irrespective of the quality of the output. In this case the buyer

assumes both quality and quantity risk. Forward contracts are relatively common with poor farmers in developing countries, primarily for cocoa, sugar and coffee crops (UNCTAD Secretariat 2001).

Non-insurance options can mitigate the effects of small losses, but for catastrophic losses, other than intervention by governments and aid agencies, there are few real substitutes for insurance. The mass of low income farmers live in regions subject to extreme weather conditions, from cyclones to droughts. Climate change exacerbates these extreme conditions, making life even riskier for poor people. Thus there remains a case to develop efficient agricultural microinsurance, and it is worth considered where interventions to help this development can best be made.

Interventions can take place at three levels: the macro level (supporting the policy environment), the meso level (supporting the infrastructure necessary to support agricultural microinsurance e.g. institutes to train insurance staff, reinsurers and agricultural support staff), and the micro level (improving the sustainability of risk carriers and distributors). Let us look at each of these levels in turn.

Macro level

Regulation

There is evidence that the lack of regulation or the existence of inappropriate regulation can impede the progress of microinsurance, although there has as yet not been any analysis of the impact of existing regulation on agricultural microinsurance. Evidence of regulatory impediments to the spread of agricultural microinsurance is mostly anecdotal.

Regulatory constraints were mentioned in the CIMA (Conference Interafricaine des Marches d'Assurance) zone by Lhériau (2003), in particular the minimum capital requirement – 500 million FCFA ($1,08m) for for-profit companies and 300 million FCFA ($647 000) for mutual insurers. Another often mentioned difficulty is the regulation of agents, which often makes it difficult for aggregators like MFIs and NGOs to sell insurance.

A useful research project would be to survey providers of agricultural insurance products to get a sense of whether or not their activities have been encumbered by regulations. This could be a precursor to a study of what regulations would be appropriate.

There are no regulations anywhere for index microinsurance. A good project for any intervention would be to examine (a) what kinds of regulations are needed (b) how they could be implemented. A useful starting point would be to examine how index schemes are currently being regulated and what changes could improve current regulation.

Policy

As we have seen, there is invariably a need to subsidize agricultural microinsurance. But what are the most effective forms of subsidies? In its study of microcredit subsidies, the ILO's Social Finance Program found that the kinds of subsidies given, and how they were delivered, made a big difference to the social and financial outcomes of microcredit programs.

For agricultural microinsurance too, there are many different forms of subsidy. The distributor can be subsidized, the risk carrier can be subsidized, the government can take on the reinsurance risk at a subsidized rate, or it can subsidize the reinsurance premiums of private insurers. All of these methods will have different outcomes. It would be useful for those who make of influence policy to know what those outcomes are and which subsidies are the most effective under which circumstances.

Another policy matter is whether to compel insurance companies to sell agricultural microinsurance products. The Indian government has done this with microinsurance, with mixed results. On the positive side this policy has made India the world's largest supplier of microinsurance and an engine of innovation. On the negative side many insurers treat the policy as a "cost of doing business" and provide low quality, poorly serviced products, which in turn undermines the perception of both insurance and the insurance industry among the poor. It would certainly be worth investigating the Indian experience further, to see what it could mean for other countries who may be considering compelling insurance companies to sell microinsurance.

Another policy issue is the use of national disaster funds in performing the role of agricultural insurance in times of natural catastrophic losses. This has been mentioned as a constraint to the development of agricultural insurance by the African Insurance Organisation. In their view, farmers may be unwilling to invest in insurance if they believe that the government will provide emergency aid in the case of loss, even though insurance might offer them better protection. Furthermore, governments themselves may be unwilling to invest in agricultural microinsurance schemes because of the overlap of emergency aid and insurance. This is another issue worthy of further study.

Meso Level

The quantity and quality of agricultural insurance skills

Case studies in other areas of microinsurance always indicate a strong need for trained specialist staff, such as loss adjustors and actuaries. In agricultural microinsurance, additional skills are necessary, particular for livestock insurance. As our case studies in Chapter 2 showed, agricultural livestock schemes rely on veterinarians for several functions: managing risk, underwriting, loss adjustment and fraud control. A greater supply of affordable veterinary services would reduce livestock mortality and, in the long run, have the effect of allowing premiums to decrease.

To begin building specialist insurance capacity, development agents such as donors, governments, development banks, NGOs and MFIs, can undertake landscape studies at country level to establish the supply of agricultural insurance expertise and develop ways to improve it. Further interventions could include:

- Subsidising the cost of specialist services
- Increasing the number of trainers and training institutes that provide these skills
- Investing in the creation of appropriate training material
- Providing bursaries for students to take training courses

Another important area of intervention is improving data collection. With few exceptions, developing countries' data on livestock mortality and morbidity rates, and on weather, are either entirely absent or of a such a poor quality so as to be of no use to actuaries who design agricultural microinsurance products. Lack of data is also a barrier to insurers who may be considering entering the market. Interventions could include:

- Establishing independent weather/rain collection stations;
- Conducting animal census; and
- Supporting satellite data collection efforts.

Consumer education

Lack of consumer education has been mentioned as a constraint for Morocco by Skees (2001), for Madagascar by Lejeune *et al.* (1997), for Burkina Faso by Aliber & Ido (2002), and for sub-Saharan Africa by Baumann (2004).

The consumer education constraint can arise because the people have had no previous experience with insurance, and therefore have trouble understanding the value of a scheme which requires them to forego consumption in the present in exchange for a hypothetical future benefit (Morocco, Burkina Faso). It can also arise because of consumer resistance due to very negative experiences with insurance in the past (Madagascar). A lack of understanding and trust towards insurance will limit demand and impedes the functioning of the scheme even when people do participate. Regulators are often very interested in the area of consumer education and could be a first port of call for those wishing to embark on consumer education campaigns.

Micro Level

Leveraging existing distribution infrastructure

Because of the cost structure of agricultural microinsurance, it is not likely that an insurer that only sells agricultural microinsurance and nothing else will be able to do so sustainably. In order to keep costs down it is clear that agricultural microinsurance products should be sold through an aggregator such as a multi-function NGO that can leverage its distribution infrastructure to reduce the costs of selling and servicing agricultural microinsurance. Examples of the latter are described in Chapter 2. Both ADR-TOM in Burkina Faso, and SHEPHERD in India are example of adding insurance to an existing loan scheme and animal care infrastructure.

Very long product design cycles

This was a constraint for in the establishment of the Ny Havana (1990) scheme in Madagascar, where eight years were spent on an initial study, a feasibility study, and elaborating the final products. It was also a constraint in Senegal, where six years were spent studying the literature on the subject, carrying out demand evaluation, designing the product and setting up the project with donors, reinsurance companies, and local actors.[7] In Madagascar the cost

was entirely borne by Ny Havana, and in Senegal by the government finance ministry.

Few organizations have the means to conduct research studies, which are nevertheless important to appropriate product design. An intervention here for development agents would be to develop guidelines and training courses on feasibility studies for agricultural microinsurance to help governments and NGOs to rapidly assess whether or not to proceed with an agricultural microinsurance scheme, and how.

Affordable reinsurance

Agricultural microinsurers, particularly in tropical regions, are faced with frequent covariant risk events such as droughts, cyclones, plagues and floods. In such cases there is no real substitute for reinsurance.

Our landscape study showed that reinsurance availability is patchy, although it is not clear why. A useful project for development agents would therefore be to understand what kinds of agricultural microinsurance risks commercial reinsurers would be prepared to cover, and which ones they would not. Depending on the results, it would be worthwhile look at new means of providing reinsurance – for example, by setting up a dedicated reinsurer, or subsidizing commercial reinsurance premiums, or working with government to accept some of this risk. It would also be useful to create mechanisms to match the supply and demand of reinsurance, for example through the establishment of a dedicated website.

Better product design

In the design of agricultural microinsurance products, certain errors are commonly repeated. Typically these errors appear because many agricultural microinsurance products are not designed specifically for low income people: in too many cases the insurer merely reduces the premium and benefit of conventional agricultural insurance, while keeping the other features constant.

The consequences of simply adapating existing agricultural insurance products by lowering premiums and benefits leads to products that attempt to provide cover for minor losses, products that tend to be expensive and overly complex. The best microinsurance products are those designed through a process of close consultation with potential policy holders. With regular agricultural insurance those who design the products tend to be drawn from the same social class as the policy holder. There is built into this an intuitive understanding of policy holder demand. With microinsurance products, the policy designers tend to be middle class and do not have an intuitive understanding of the nature of the demand.

Finally, there is the issue of compulsory vs. voluntary. The initial evidence seems to suggest that the more successful products are compulsory, at least initially. Typically these are products that are linked to loans disbursed by MFIs or multi-function NGOs. A compulsory product helps to overcome marketing costs (which cannot be underestimated when selling new products to low-income people) and also eliminates adverse selection. Making products compulsory is one of the few ways microinsurance schemes can reach the high volumes they need to become sustainable.

The downside of compulsory insurance, as mentioned earlier, is that it may force farmers to spend their limited money on a risk management solution that may not be best for them. There is no universal solution to this problem. An NGO or MFI needs to make the voluntary vs. compulsory decision taking into account the needs and capacities of its members.

Mentioned above are some preliminary suggestions of best practice. There is unfortunately there are not yet enough cases of agricultural microinsurance to begin to create a definitive list of best and worst practices. Development agents can nevertheless intervene to improve product design by creating a fund that insurers and others can use to hire specialist consultants to design agricultural microinsurance products. The condition for being financed by this fund could be that the findings of the design process be made public.

Reducing costs

Reducing costs is the final and key issue for the micro level. We cannot avoid the conclusion that micro insurance is a low cost, high volume business. Unless costs are contained, agricultural microinsurance cannot be sustainable. A few interesting cost-contained strategies emerged in the case studies in Chapter 2, and are worth reviewing.

ADR-TOM, in its Burkina Faso plough oxen scheme, made very effective use of its policy holders in reducing the costs of risk management through group co-payments. This is how Grameen-style credit MFIs work – making groups jointly and severally liable for the debts of each member, they shift some of the cost of risk management from the provider to the borrower. Constructing the groups is not, of course, a costless activity. The costs of forming the groups should not outweigh the savings they bring through transferred risk management, but at present we do not have the information to assess this. For agricultural microinsurance, these costs would be lower if the insurance products were attached to existing group structures such as credit solidarity groups. The only costs would then be the costs of the additional training for group members, rather than the full costs of forming the groups.

Technological advances are likely to bring costs down and increase access. The only significant technological innovation uncovered in the landscape survey was the use of sealed low cost weather stations that send their data via satellite for use in index insurance schemes. It would be useful to conduct a survey of the role of technology in conventional agricultural insurance with a view to exploring any innovations that could be used in agricultural microinsurance.

The final lesson for keeping costs down is to learn how aggregators provide access to large numbers of potential policy holders. The cost structure of agricultural microinsurance simply does not allow for products to be sold individually though agents. With life microinsurance, because of the relative simplicity of claims verification, there is a wide choice of aggregators – the products can be sold, for example, through supermarkets offering "tick-the-boxes" forms. Agricultural microinsurance needs more specialized aggregators who are linked in some significant way to the livelihoods of the farmer policyholders. This has meant that rural NGOs and MFIs have been the main aggregators to date. Others need to be explored, particularly the centralized buyers of agricultural produce, who are linked to many poorer

farmers for export crops like coffee, sugar cane and cocoa.

Two examples of buyers that sell agricultural microinsurance products to farmers are the Windward Island Banana insurance scheme and the Mauritius Sugar Insurance Fund. Little secondary information was available on these schemes. It would be useful to explore and develop the buyer distribution channel further.

Conclusions

The very few instances of successful agricultural microinsurance make it premature to recommend a definitive list of best practices. However there are a number of interventions at the macro, micro and meso level that would provide us with better information on best and worst practices and help remove some uncertainties and constraints. These include:

Macro Level

- Improving and creating appropriate regulations
- Thinking through different types of subsidies working towards a set of "smart subsidies"
- Managing *ad hoc* disaster relief so that it does not dampen the demand for insurance

Meso Level

- Increasing the quantity and quality of agricultural insurance skills
- Improving data collection
- Providing consumer education

Micro Level

- Speeding up and improving feasibility analysis
- Facilitating the spread of affordable reinsurance
- Improving product quality
- Reducing costs through technological and other means
- Exploring centralized buyers as a new distribution channel

Like traditional agricultural insurance, agricultural microinsurance is difficult and costly. For development agents wanting to help reduce the risks for low-income farmers, its adoption needs to be considered against a number of potentially easier to implement risk management strategies. These include reducing the chance of the risk occurring in the first place (e.g. vaccinations in the case of livestock), or reducing the impact of the risk once it has occurred (e.g. through the provision of savings and credit facilities).

However useful these strategies are, they cannot deal with catastrophic risks such as droughts, cyclones, floods and plagues, and this is where agricultural microinsurance clearly does have a role to play. As the various interventions suggested show, there is an important role for development agents and other stakeholders to help it become an effective risk management tool.

Appendix 1: Methodology

The research team undertook a landscape survey to map the extent of agricultural microinsurance worldwide. Primary research in each country would have yielded the most complete picture, but the costs involved would have been beyond the means of this project. The information was therefore collected from secondary sources. Over a period of three months in 2007 a wide range of secondary sources were consulted:

- Published books on microinsurance
- Unpublished PhD theses
- Other unpublished articles
- Magazine articles
- Online discussion groups and online conferences
- Peer-reviewed journal articles
- Newspaper articles
- Microinsurance newsletters
- Conference proceedings and presentations
- Reports of international insurance bodies
- Reports and newsletters published by agricultural insurance/microinsurance companies, including microfinance institutions
- Government documents, including regulators
- Publicly available consultancy reports
- Consultancy reports not available to the general public

The data obtained in this way was then sent out to experts within the field – members of the CGAP (Consultative Group to Assist the Poor) working group on agricultural insurance – to check for completeness and accuracy.

Appendix 2: Agricultural insurance premiums in emerging markets

Agricultural insurance premiums per country, with private insurer participation

Estimated 2005 total premiums in emerging markets (USD)	USD	Private insurer participation
Asia	**428m**	
of which: India	141m	low
South Korea	69m	
China	94m	medium
Latin America	**309m**	
of which: Argentina	92m	high
Brazil	111m	low
Chile	3m	medium
Mexico	30m	medium
Eastern Europe and Turkey	**230m**	
of which: Russia	15m	medium
Poland	20m	medium
Czech Republic	30m	medium
Hungary	20m	medium
Slovenia	12m	medium
Slovakia	15m	medium
Turkey	36m	medium
Africa	**103m**	
of which: South Africa	60m	high
Nigeria	1m	low
Morocco	2m	medium
Mauritius	19m	low
Total emerging markets	**1 077m**	

Sources for table : National insurance authorities, Swiss Re Economic Research & Consulting

Private insurer participation

Low: low participation from private insurers, high support from governments

Medium: some kind of government support (e.g. subsidies)

High: no support from government subsidies

Guide to further reading

(All of the texts detailed below can be downloaded free from www.microinsurancecentre.org)

A key text for understanding the basics of microinsurance:

Churchill, C. F., M. J. McCord, J. Roth, & D. Liber. 2003. *Making Insurance Work for Microfinance Institutions: A Technical Guide to Developing and Delivering Microinsurance*: International Labour Organization.

A good introduction to the basics of agricultural microinsurance:

Levin, T, & D Reinhard. 2006. *Microinsurance aspects in agricultural insurance. Munich*: Munich Re. Foundation.

A detailed account of what is involved in implementing crop and livestock insurance in developing countries:

Roberts, R.A.J. 2007. *Livestock and Aquaculture Insurance in Developing Countries.* In FAO Agricultural Services Bulletins. Rome: FAO.

Roberts, R. A. J. 2005. *Insurance of Crops in Developing Countries.* FAO Agricultural Services Bulletin (159).

A basic guide to index insurance:

Skees, J., A. Murphy, and M.J. McCord. 2007. *Innovations in Insurance for Weather-related Losses: Index Insurance.* In Microinsurance Notes. Washington DC: USAID.

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