

This essay has been written in the context of the European Microfinance Program – EMP, at Solvay Business School, (Brussels: <http://www.solvay.edu/microfinance/index.htm>) for Prof. Marc Labie giving the course “Microfinance: from conception to management”

Its original title is

« Microfinance and agriculture. Could an insurance scheme fill the gap between the need of access to credit for small farmers and a better security of being reimbursed for the MFI?

- What products related to agriculture could be considered/rejected?
- How to organize the insurance scheme?
- Does it reduce the vulnerability of the farmers? »

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## **Introduction**

Agriculture in industrialized economies will not be debated in the paper but, as an introduction, it is worth mentioning events that have happened in the last few years such as the foot and mouth disease, mad cow disease or the more recent bird flu and compare their consequences with the ones in developing countries.

Following those epidemic diseases, large scale measures imposed by western governments have affected the breeding industry but, so far, there has been no major bankruptcy in the sector nor has the consumers suffered extensively, and access to banking services to farmers hasn't disappeared.

The consequences of a similar or even smaller event would and already has had dramatic consequences in the developing world. In case of a drought or a disease affecting either cattle or crops, many if not most farmers in the region won't repay their loans and will go bankrupt, consumers will be strongly affected and, unless external help is provided, small producers will no longer have access to credit.

To understand why consequences are so different, one could consider differences in size and professionalism of both banking systems and farmers, large subsidies given to farmers in industrialized economies etc. But, apart from those differences, the lack of access to both financial services and insurance for small farmers in the transition economies has to be emphasized.

Without playing on words, the relation between the lack of access to banking services and insurance is very strong and is actually like “an egg and chicken problem”: bankers won't give access to credit to farmers if these can not provide good guarantee (insurance could be one) and insurance companies don't like giving insurance to those who can not demonstrate good financial records.

Therefore, with the access to banking services being strongly reinforced by an insurance scheme, the first question should be rephrased as “Why do insurance companies or MFI give such a difficult access to insurance products in rural areas, and especially to small farmers?”

In its first part, the paper will address the question giving the reasons found in the literature why insurance companies or MFI do not give easier access to insurance products to farmers. In its second part, a list of different ways on “how to deal with risks in rural areas” will be given, including new and promising insurance products, while the last section will be dedicated to exploring the future of rural microinsurance, whether it is the most appropriate solution and how to implement it.

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## **Section I: Giving insurance access to small farmers – Constraints & restrictions found in the literature and interpretations**

Financial institutions, including insurance companies, have good track records of finding where the money is and making profit out of it. Small farmers in developing countries pay higher insurance premium or interest rate and yet, rural loans or insurance are rather scarce for them. Does it mean rural insurance/loans in developing countries are not profitable? Examples showing the opposite exist but the constraints and restrictions found and summarized from the literature give more weight in explaining why access to insurance is so difficult for small farmers in developing countries.

### ***a. Asymmetric information leading to higher moral hazard and adverse selection***

The term “moral hazard” “results from asymmetric information, and it describes the opportunistic behaviour of a borrower who exploits the lack of information by the lender” (Biblio # VIII – Hans P). When insured, an individual may take less preventive measure against the risk insured or even provoke the loss to happen, if he estimates the compensation given by the insurer as higher than what he could have had with his current activities.

“Adverse selection in insurance markets refers to the situation where insurers find it impossible or very expensive to distinguish between high-risk and low-risk insurance applicants and thus prices insurances contracts at the average premium for all individuals, which is inappropriate and non-sustainable” (Biblio # XXII). The two phenomenons affect the insurance market negatively, with the consequences that insurance companies may not be willing to enter the market.

In the case of agriculture with small farmers, insurance companies or MFI consider there is a higher risk of moral hazard and adverse selection for three reasons.

First, since they are very small, it is more difficult and expensive both to obtain information and control whether the insured farmers adopt the appropriate behaviour (does he use enough, less or not enough pesticide or fertilizers?) to reduce the occurrence of the risk insured.

Second, as with MFI dealing with many small credits, transaction costs are higher with small farmers because of the vast number of contracts with limited amount of money insured. In addition, with high geographic dispersion of clients in rural areas, the cost of differentiating between the legitimate and fraudulent loss is enormous. Combining those two constraints makes the final insurance costs more expensive for the farmer, in turn giving him a lower benefit. Considering this lower margin, there is a risk that “bad farmers” will be the first (if not the only ones) to take the insurance and/or that the good ones will either not take the insurance or take more risk in order to have a better profit.

Third, dealing with microinsurance very often means working within a rather informal environment. As it is frequently the case with MFI, the market is not very much regulated<sup>1</sup> and insurance/credit officers, if paid in relation to the number of contracts signed, could have a conflict of interest with the MFI or the insurance company: She/he will favour the quantity rather than the quality. With an appropriate insurance regulation, insurance officer must not be paid according to the number of contracts signed.

### ***b. Lack of collaterals - mortgage:***

Without entering into the details of different existing rural collaterals (Biblio # VII), very often small farmers simply can not offer guarantee. Even if they own a property, the insurance company or MFI could face legal frustration as property ownership is not clearly defined, and/or as there is strong opposition to the selling of the mortgaged land from the community, indirectly meaning there is no market for it. In some case, it will not only be impossible for the insurance company to foreclose on someone’s land or agricultural property but financial institutions might even be subjected to political pressures to reschedule or forgive agricultural debts.

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<sup>1</sup> Specific regulation for microinsurance does not exist, and the existing general regulatory framework is not appropriate” according to the Microinsurance NewLetter of December 2004. ADA

c. ***Covariant risk :***

Dealing with small rural communities means that it is difficult to diversify your risk as small farmers are all living in the same and small region and producing similar things. Therefore, in case of a drought, storm, disease etc., the risk is high that they are all affected together at the same time. The same will happen if commodity prices decline or with a natural disaster. In addition, farmers sometimes may collude collectively and claim, as a group, to be more severely affected than it is the case in the reality.

d. ***Difficulties in understanding the reasons why the damage happened:***

If crop production is much lower than expected or cattle die, there is not necessarily a single reason for the damage to have happened and, therefore it is difficult to estimate whether it happened because of a natural hazard or mismanagement from the farmer. This difficulty is higher with small producers, as the MFI or the insurance company will not have the time to make a close follow up for each of them.

e. ***High costs of administration :***

Costs are not only higher because there are many contracts involving limited amount of money insured and the difficult assessment of why the damage happened but also because they have to manage a large quantity of small contracts: verify premium has been paid, send reminder if necessary, paying indemnities, answer questions etc.

f. ***Agriculture is riskier than other sector***

According to (Biblio # XXII), "Portfolio of geographically dispersed crop insurance contracts can be as much as 20 times more risky than an equally valued portfolio of health and automobile insurance contracts"

The above mentioned constraints are not specific to microinsurance but to microfinance products in general and in rural areas especially, given the small size of the clients living close to one another. The next restriction is specific to microinsurance in rural areas.

g. ***The rule of "big numbers"***

While it is possible for a MFI to diversify its credit portfolio with a relatively small amount of loans (for instance 1000 loans in 10 activities that are not much correlated), the situation is quite different with microinsurance, especially if dealing with rural insurances and small farmers.

Because of concentration risks that are highly correlated in small rural areas, the MFI giving insurance scheme will require a much higher capital adequacy. This higher capital is necessary in order for the financial institution to be able to reimburse small farmers in case the damage happens which, with high correlation risk, is likely to be very large. However, a higher capital also means a more expensive premium and, in a context of low profit sector (small farmers in developing countries), may simply be impossible to pay for the poor households.

In theory, there are two ways of reducing those costs while ensuring a good level of diversification:

- Start with very big numbers of clients in different regions or continents. In practice, this solution is difficult, not to say impossible for the microfinance industry which, by definition, is small.
- A second approach is the reinsurance market. This solution is good but is still expensive because the reinsurer doesn't know how to evaluate the risk on the short term (does not know neither the market nor the sound practices of the primary insurer), and for a reinsurance company, a portfolio of microinsurance is very small compared to what they are used to deal with. For those two reasons, the cost of reinsurance will still be high. This approach will be developed in section II.

## **Section II: Different ways the risk is dealt with in rural areas – formal and less formal arrangements**

It is estimated that about 73% of the population of developing countries live in rural areas (Biblio XIII) compared to only 32% in developed countries. So far, MFI are reaching +/- 80 millions of clients out of an objective of 500 millions to one billion<sup>2</sup>, most of the clients reached by MFI live in urban areas and only few MFI provide insurance products in their portfolio. Therefore, the probability of having access to MFI products for small farmers is already low and even lower for access to microinsurance. Microinsurance could have good added value in rural areas but, with difficult access to it, farmers and, more generally people living in rural areas have found ways to cope with their specific needs. Methods may be old or recent, formal or informal, close to what we call insurance or not, invented by cooperatives or banks and may provide guarantee to the producer or the lender. Here is a summary of what was found in the literature:

### ***a. Informal insurance arrangements:***

A first informal insurance arrangement consists on household A to help household B with the opposite being expected later in case of necessity, reciprocal gift exchange or Roscas<sup>3</sup> are also a form of insurance, if we consider that the benefit expected can be received/given at the “appropriate” time. For people receiving their earnings once or twice a year, they can insure themselves either by buying physical assets they don't really need in order to be able to sell them in case of necessity or, in case it is available simply by putting part of their money on a savings account which they will use later when needed. When feasible, small farmers may simply diversify their crops and/or have non farming revenues.

### ***b. More formal institution or titles for the lender but not formal insurances for the farmers***

What follows are not direct guarantees to small farmers but measures or institutions helping them in securing their revenues, or having easier access to the services provided by financial institutions.

#### **i. Guarantee Fund:**

Three systems of guarantee fund will be presented briefly<sup>4</sup>:

The first one consists on a direct guarantee covering the credit risk of the bank toward the borrower. According to IFAD (Biblio VI – H. DommeI), the expected advantages of such a guarantee system (substitution of collaterals, lack of client's information for the bank is compensated, new type of market for the bank and additionality) were not met. The second type is a guarantee of refinancing, covering the risk of bank refinancing a MFI. This sort of guarantee fund has proved to be efficient in helping MFI finance small farmers or even families dealing with agriculture.

Whether the guarantee fund gives its guarantee to the lender against the default of the MFI or the final borrower, in most cases, the money of the guarantee fund comes from external sources. The third system, “the mutual guarantee fund”, will give to the lender a “group guarantee” and differs from the two first ones in the sense that the local community is financially directly involved for the default payments. In case of default payment from one of the borrower, either the community will pay back or the whole community will have no longer access to credit.

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<sup>2</sup> According to CGAP, 3 billions seek access to basic financial services via Alternative Finance Institutions

<sup>3</sup> Rotating savings and credit association

<sup>4</sup> What is guaranteed here is that local bank receives its money back directly from the local borrower or the microfinance institution. Therefore, a Guarantee Fund dealing with the currency risk and often a “weaker” currency will not be considered.

ii. **Mortgage:**

As already mentioned, mortgage exist and are being used by the lender as a good security. However, their effectiveness is reduced by two factors: the ownership is not always clearly defined, and/or as there might be strong opposition to the selling of the mortgaged land from the community. Therefore, unless some legal criteria are met, mortgage in the rural part of developing countries are relative.

In addition, if the intention is to use MFI and the microinsurance to help reaching the Millennium Development Goals, then there is a high risk that small producers owning a few acres of land will lose their property, which will make them poorer than before for reasons that are independent of the work they provide: drought, disease, decrease of world price of commodities such as coffee, cacao etc.

iii. **Warehouse:**

A well developed system of licensed public warehouse and the use of warehouse receipts for storage provide different advantages in the interest of both the agriculture in general and the farmer in particular. Among the advantages of a warehouse<sup>5</sup>, we can mention that it "provides a uniformed and well regulated system for the storage of grain, it is a good protection for the grain depositors (insuring the quality and quantity of the deposited grain) and it introduces the use of warehouse receipts, which are official documents for ownership and can be used as collaterals for short-term loans"(Biblio – expert meeting), allowing the producer to sell his products at the most appropriate time.

Successful examples of warehouse receipt system are numerous (Biblio – expert meeting ICICI in India or NRI Zambia) but it must be bared in mind that a warehouse receipt has to be based on appropriate regulation that will enable a regulatory agency to control the key component of the system<sup>6</sup> and that there should be no conflict of interest between the manager of the warehouse and the producers (for example if the manager has a direct interest in buying the products he stores at a low price).

This technique offers lots of advantages both for the financial intermediaries (good collateral, liquidity of the warehouse receipt etc.) and for the producer (better price stability, access to short term credit etc) (Biblio VI – Wampfer 2) but, apart from the regulatory aspect mentioned, the technique can not be used for products that can not be stored and would be less interesting if prices are stable.

iv. **Risk central – credit bureau**

Five different type of Risk Central exist with their respective advantages and disadvantages (Annex # I) but basically, they all provide information about potential borrowers that are not available on the market. This information can be negative (people who pay with delay or don't reimburse) or positive, providing the MFI with information such as other existing loans, collaterals, activities etc.

In order to develop such a system, some preconditions must be fulfilled: the country must possess national identification numbers for all its citizens, the centrals should be in competition and operate legally, which means that a working judiciary system must be in place and an effective system of "private life protection" should be in place and defined in the constitution. Those three conditions are synonym of heavy constraints in many developing countries.

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<sup>5</sup> For a more complete list see annex # II "Crédit stockage: avantages/désavantages - IMF et producteur

<sup>6</sup> Without going into details, producers has to treat its products in an appropriate way and the quality must be controlled before being stored, price cycles must be understood by the producers and the responsible of the warehouse, maintenance of the warehouse is crucial, security must be high

Good example of the way credits bureau have been managed can be found in bibliography XIX -2 & XVII for Mali and Niger. In the example of Mali, competition between MFI provoked default payments, which was the starting point for the creation of a risk central.

v. **Rural Management Board**

In rural areas, analysis of the various outcomes and incomes shows that cycles are essentially yearly cycles but the principal income and outcome periods do not coincide (Biblio # XV). Therefore, the producer has to anticipate its costs and revenues on a yearly basis (Annex # III). The "Rural Management Board" may help the producer in the global management of his farm and his cash flow in particular (Annex III).

Indirectly, the "Rural Management Board" gives more security to credits given to farmers by preparing with them a yearly cash flow table showing when disbursements and revenues are likely to occur. On the other side, the "Rural Management Board" may also have some added value by giving to farmers some general technical tools or by finding with them potential new cycles with different periods of financial outcomes and incomes.

c. **Formal rural insurances**

In theory, among the different formal agricultural insurance scheme already existing, we should mention: price (revenue), livestock, crop - yield, rainfall or climate insurance. These types of insurances can be combined and used as collaterals by banks. In addition to those types of insurances, the reinsurance market can potentially be used by the MFI or insurance companies to diversify their risk.

In practice, access to these insurances for small farmers will vary. Furthermore, without clear indication of what is insured and how it will be measured effectively and efficiently, these insurances can only play a limited role in reducing the agricultural risk for small farmers because they face the same problems that agriculture credit faces with microfinance institutions: asymmetry of information, covariant risk, moral hazard, adverse selection etc<sup>7</sup>.

However, although limitations do exist, the situation is not as negative as it may appear at first glance. On the one hand, with price insurance, information will be transparent and the risk of moral hazard will be low<sup>8</sup>. On the other hand, with new insurance products and appropriate technology, strong complementarity between credit and insurance can be found. Defining index for the remaining crop, livestock and weather insurance, will reduce considerably moral hazard and adverse selection, covariant risk will be managed via the reinsurance market or new market instruments for sharing risk and, with new technologies such as satellite images, data will be measured more precisely at lower cost, reducing considerably the information asymmetry.

Therefore, complementarity between insurance and credit scheme do exist and there is a potential for profitable insurances in rural areas. Whether these new insurance products can be used for microinsurance in rural areas will depend on the environment with preconditions conditions such as historical data and suitable technology available, appropriate institutional means to deliver such insurances, and a proper legal and regulatory for supervision of insurance companies.

i. **Revenue or Price insurance - Crop Revenue Cover (CRC)**

The concept of this insurance is easy: If price falls during the period insured, the producers receives a payout equal to the difference between the price the producer chose to insure with the price risk management contract and the international market price on the last date of the option coverage" (Biblio IV, page 5).

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<sup>7</sup> As for microcredit, the reasons for this come from the difficult and costly access to reliable information, small size of borrowers and the fact that, in the same region, risks related to agriculture are correlated.

<sup>8</sup> In addition, price insurance is easy and cheap to implement because establishing a price at the beginning of the contract and compare it with the price market when the contract ends is simple.

This insurance can be combined with rainfall and/or crop insurances and can be used as collateral for banks. However, in reality, small farmers often do not have access to such revenue insurance: the minimum size contract traded exceeds the annual production of individual small farmers; lack of knowledge from the farmer that this type of insurance actually exists and finally, the seller is often unwilling to start a business relation with small size producers characterized by high transaction costs.

**ii. Livestock insurance – mortality rate index insurance**

Not many examples of livestock insurance in developing countries were found in the literature, probably because opportunity for fraud and abuse are very high. However, the example found was in Mongolia, country that suffered tremendous losses in recent winter disasters, with mortality rate of over 50%.

The concept is based on an index insurance that would pay all herders in the same region the same indemnity payment, should the regional mortality rate be worse than expected. Therefore, the incentive for herders to work hard on saving his animals during severe weather is maintained but, at the same time, it is reinforced by the fact that herders will compete to have lower than average mortality rates. The fundamental reason why livestock insurance has been chosen instead of individual insurance comes precisely from the mentioned incentive to manage livestock losses carefully: In case the regional mortality rate is higher than the index, all herders, including those who have fewer losses than the average will receive indemnities (Annex # VIII) It is important to say that preconditions to such an index do exist in Mongolia, and consist on weather mortality correlation and reliable historical data.

**iii. Crop insurance – area yield index**

Crop insurance is not an easy issue because there are different factors that will influence the final production. In addition, crop risks are correlated and risks of moral hazard already high in agriculture are even higher with small farmers.

In order to reduce moral hazard in developed countries, between 30 to 70% of the crop insurance premium is subsidized. But, on the one hand, developing countries can't afford such subsidy and, on the other, risk that small producers don't work enough if they consider to be well insured is high because, given dispersion of farmers in rural area, the capacity of control from the insurance is difficult, not to say inexistent.

Area yield index is a good alternative to secure the farmers' revenue while avoiding the above mentioned difficulties. It consists on paying indemnity when the average area yield falls below a predetermined threshold. The area should be large enough to avoid collusion and is generally the size of a county. Area yield index does not only avoid moral hazard, adverse selection and high administrative costs but it encourages individual farmers to have a higher production than the area yield average. In case the area index falls below the established threshold, the given farmer will not only benefit from the indemnity but also from the high price of his products<sup>9</sup>. However, before starting such an insurance scheme, two conditions must be fulfilled. First, there must be some historic yield data available and second, the area yield index has to be measured by an independent individual. In some case, one or both conditions might be difficult to implement and to overcome such problems, weather index, which offers at the same time data that are easy to verify and historical data easy to find, could be considered as a solution.

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<sup>9</sup> It is assumed that price will be higher because of lower area yield

iv. **Rainfall/temperature insurance – weather index**

The key issue with weather index insurance is to have a strong correlation between the index (the rainfall) and the output expected (the harvest).

Assuming that the rainfall is below an established threshold and that the above mentioned correlation is high, the compensation will be calculated accordingly.

Weather insurance have at least three advantages on crop insurance (Annex IV & VI): first, the market is not only open to farmers but to a larger population for whom weather has an impact on their activity<sup>10</sup>; second if there is a slight deviation from the agreed index, then the risk of moral hazard is strongly reduced (rainfall does not depend on the client) and third, the administrative costs will also be lower.

However, weather index insurances have their limitation: First, as microclimate exist, some farmers insured with a rainfall index may loose due to a drought at a micro-location, but not receive indemnity if the measured rainfall at the regional weather stations remains above the threshold. The opposite situation could also happen: farmer is paid, due to the measures at the weather stations, although he hasn't suffered any losses. Second, similar situation could occur if the correlation between the index and the outcome is not elevated and/or not well estimated.

Third, weather index insurance can not avoid completely fraud with, for instance, people trying to modify data measured with ground instruments. Fourth, the intention of such insurance is to give more stable purchasing power to farmers. But if they are not all covered<sup>11</sup>, in case of drought, the ones insured will have a purchasing power allowing them to pay the normal price for the basic products (in short supply) while the ones not insured will simply not be capable of buying the basic products they need. Therefore, should the rainfall insurance not have been accessible to any farmer, the short supply of basic products would have been more equally distributed.

In conclusion, it seems that the general advantages of index based insurance products outweigh by far these "residual risks" (Annex VI). What is certain is that weather index insurance will work very well in case of massive droughts or floods, when moral hazard problems are insignificant and fraud irrelevant. In addition, there is a promising role for technology in providing the needed information at low cost with methods such as: satellite images; weather data from traditional ground instruments; weather data from new system; sampling from grasslands to determine nutrient content<sup>12</sup>etc.

A good example of the way weather index insurance worked successfully in Malawi can be found in bibliography # XXI (Prerequisites for project success in Malawi available in annex # V)

**d. Access to global market for MFI or microinsurance companies**

i. **Reinsurance.**

The principle of reinsurance is that correlated risks at local level become independent at a global level. Therefore, the reinsurance market could be appropriate for rural insurance that can not start very small and slowly scale-up village by village. However, reinsurance has also some limitations. The first one is that there is no price transparency because it is typically a market where there are few buyers and sellers. Second, the asymmetry of information between the buyer (knows much more) and the seller is high. Therefore, to balance and monitor the info given by local insurer, the reinsurer will ask a high reinsurance premium which leads us to

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<sup>10</sup> including clients who have a negative correlation between their activities: shoe producers needs rain while the tomato producers needs sun (provided he has a good drainage system)

<sup>11</sup> or some don't have access to the insurance while other do

<sup>12</sup> These technologies can also be used for crop insurance and, to a certain extend to livestock insurance.

another limitation: The price to pay for reinsurance may simply be too high, compared to what clients are able and/or willing to pay. Third, "while Basel Convention provides guidelines for worldwide banking services, no such international coordination exists for the insurance industry" (Biblio # XX pg 4). Therefore, it will be more difficult for the reinsurance company to understand how his potential client works and assess whether he has the required sound management.

ii. **New market instruments for sharing catastrophic risk.**

Basically, two additional classes of equity instruments to securitize insurance risk have been found in the literature dealing with rural insurances, but will not be analysed in details:

- The Exchange or "Traded Indexes": The conditions are that Indexes must be standardized, verifiable and well understood (correlation between production and the index). They will be largely free of moral hazard since the person using the index should not be able to influence the outcome that determines payments from the contract.

It can be an interesting opportunity for foreign investors from industrialized countries who want to diversify his risk and, for the insured company in a developing country, which may consider that, in case of damage, the chances of being paid are higher with a foreign company than a local one.

- Risk – linked securities: "CAT bonds, just like corporate bonds, are debt instruments providing capital contingent upon the occurrence of a specific event. Those seeking catastrophic coverage pay a premium based on the risk. The premiums generate the interest payments for the bond investors. In exchange for assuming the risk, those purchasing CAT bonds receive a relatively high rate of return if there are no catastrophes." Fund managers may use CAT bonds to diversify their portfolios with an equity instrument that has zero correlation to traditional equity market. "An advantage CAT bonds offers over reinsurance is that CAT bonds eliminate the default risk by holding capital in escrow throughout the term of the bond". (Biblio # XVI – risk management, pg 11)

### **Section III: The future of rural microinsurance in developing countries – adequacy of a rural insurance scheme – challenges**

In the 1980's UNCTAD considered "agricultural insurance as one of the priority needs facing developing countries" (Biblio XVIII). In its study, UNCTAD mentioned different conditions favourable to a successful crop insurance programme. These conditions were basic farmers' understanding; access to a large volume of comparable statistical data regarding crop losses experienced in the past; the farms should not be too small nor dispersed; since insurance is a very technical field, the availability of trained personal was crucial and there should be complementary agricultural programmes such as basic knowledge of farming techniques, healthy market etc.

As we look at these conditions 25 years later, we know that many of the agriculture insurance have failed and the microinsurance market is still far away from those requirements.

Having said this, time and technology have also changed and, on the one side things that were not available to big farmer 25 years ago are potentially available today for small farmers while on the other, microfinance institutions have improved considerably their knowledge and outreach in rural areas.

In this last section, the future of microinsurance covering the activity of small farmers will be analysed from a double approach: is it the most appropriate tool for the client and, if the answer is yes, what methodology should be used to develop it.

**a. Is a microinsurance scheme for small farmers the most appropriate in trying to reduce their vulnerability?**

Is microinsurance in rural areas really what poor households need and are they willing and capable to pay the price for it? In addressing such an issue, the first point to analyze is whether farmers show interest in reducing their vulnerability against a determined risk. The second point consists on assessing whether the cause of vulnerability is insurable. Assuming those two aspects are positive, then comes the price issue. The premium to be paid will definitely be one of the most important issue in understanding whether rural households will consider rural insurance as the most appropriate.

The premium (P) can be extracted from the following formula<sup>13</sup>:  $(A + I) / P < 1 \Leftrightarrow P > (A + I)$

where A = average administrative costs

I = average indemnities paid

P = average premium paid

Without going into details, looking back to section I and according to the literature, we have good reasons to believe the price to pay is likely to be very expensive and this for 3 reasons:

- Agriculture is much riskier than other sector, increasing I (Biblio XXII)
- Providing microinsurance has similar constraints that MFI have to face while giving credit: high administrative costs due to small amount insured in each contract (higher A); high risk of adverse selection (increasing P) and moral hazard (increasing I); concentration/covariant risk, increasing the adequacy capital required and therefore the premium P
- Industrialized countries are subsidizing insurance premium<sup>14</sup>, which makes the premium P comparatively more expensive for small farmers in developing countries, not receiving any subsidy.

Studies show (Biblio II, pg 5) that poor household living in rural areas will require life and/or health insurance before any form of other insurance, including cattle or crop insurance. In addition, if access to savings is available, many will favour savings to insurances because "Savings are more effective than insurance in reducing vulnerability to the most economic stresses, whereas insurance provides more appropriate protection for larger losses that occur less frequently" (Biblio III - part II). Furthermore, in industrialized countries, "most people use insurance as a complement to, rather than a substitute for, savings and credit in protecting themselves against risk. Why should poor households behave differently?".(Biblio II, pg 8).

Therefore, when considering rural microinsurance, the price issue and the adequacy of rural insurance versus its comparative advantages to other solutions should be studied together as a first step before any further investigation. Results will certainly vary from one region to another but, with the above mentioned price arguments and studies, there are good reasons to believe that other tools aiming at reducing farmers' vulnerability will be preferred in some cases.

**b. Challenges of implementing a index microinsurance scheme**

In this paragraph, it is assumed that the premium P, in a given region, is accepted by the client and as it is the result of equation  $P > (A + I)$ ; the premium P must also be viable for the MFI.

As we saw in section I, there are many constraints restraining insurance companies to invest in the rural sector while, at the same time, section II showed that index insurances are promising in reducing some of the market' s constraints such as lowering administrative and management costs, reducing

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<sup>13</sup> Biblio XVI – EPTD Discussion paper

<sup>14</sup> In 2003, 4 billions US\$, which is 56 % of the worldwide agriculture premium were subsidized (Biblio X)

moral hazard etc. It is therefore index insurances that will be discussed further. But, before starting to implement a rural insurance scheme covering the risk related to the activity of small farmers, it must be verified that the following additional preconditions are fulfilled:

- Proper legal and **regulatory system** for supervision of insurance companies. As the banking regulation is not appropriated for all the MFI activities, regulatory standards for large insurance companies are not necessarily applicable to the microinsurance industry, especially when dealing with rural microfinance for small farmers. "New policies and regulatory frameworks are needed to reduce constraints on providing insurance in small amount to low income households without losing the institutional and client protection inherent in existing regulation" (Biblio # III – part II, exec. summary). For example, issues such as the capital requirement, policy details, agent regulation or the adequacy of regulatory authorities and the cost of the regulatory system must be analysed carefully before launching a microinsurance programme.
- **Historical data** are fundamental to model the risk and begin pricing insurance contract that match the risk profile. In some regions, many of the early warning systems have now been in place for as long as 20 years. If it is not the case, historical data from similar environment should be tested and, if considered as statistically valid, they may be used for pricing new insurance contracts.
- A high degree of **Correlation** between a transparent index (e.g. weather index) and the expected output (crop yield or cattle mortality) must be established. In order to establish such correlation, reliable long term data from an independent organization must be available. For example, based on historical statistics we could establish that with continued temperature below 20°C for more than three weeks, average mortality rate of cattle will increase by 15% and the indemnity will be paid accordingly. However, if there is no correlation between, for instance the rainfall and the mortality rate of cattle, this sort of uncorrelated index will be totally useless.
- **Suitable technology** available. Although a rainfall index might be appropriated to insure harvest of a given crop in a given region, if there is no independent mean to measure the rainfall (satellite measure are not available or too costly and local ground measure are not reliable), then insurance scheme will not be used.

Should some of the above mentioned preconditions not be met, the insurance scheme will not be implemented. Provided these additional conditions are fulfilled, the following issues should be analysed cautiously and decisions be made:

- **Partnership**: Because of their proximity to clients and the knowledge they have of rural environment, MFI might be considered as the appropriate partner for an insurance company<sup>15</sup>. Advantages are for insurance company who has access to new clients, the client who has products at lower cost and the MFI which must provide limited capital investment, rapid product launch and scale up etc. However, the challenge for the MFI will be to choose the appropriate partner, especially considering that potential partners are scarce and to have the appropriate level of training for staff.
- **Perils to be covered**: clear strategy must be established as to what perils will be covered, the crops to be covered (criteria related to what farmers are sensitive to, poverty related?), the geographical area to consider (exclude the dangerous ones where frequent flood are observed, the productivity is variable etc.), the amount of indemnification (never 100% but at what level should the franchise be?) etc.
- Insurance **selective for a few or compulsory for all**: J. Morduch (Biblio XI – Rainfall insurance) gives an example of rainfall insurance by which the situation for those who do not have access to it could be made much worse than if the insurance was not available at all. This goes completely against poverty reduction objectives. Therefore, should this insurance be made compulsory for all and, if yes, should we use subsidies?

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<sup>15</sup> Successful partnerships with licensed insurers include FINCA (Uganda) and King Finance (South Africa)

- **Subsidies:** They are many reasons why subsidized insurance premium have failed in the past. Among them, reasons for failure were the result of trying to provide insurance in uninsurable conditions with covariant losses, moral hazard, unspecific coverage, public insurances are not politically neutral etc. However, 4 points must be clarified. First, by knowing the mistakes of the past, we should be able not to repeat them. Second, with index insurance reinsured on the reinsurance market, one of the main causes for failure will be eliminated. Third, with the example of J. Morduch, it appears that under certain circumstances, unless all farmers in a given region are insured with "rainfall insurance", the results were potentially worse for the uninsured than without the insurance. Therefore, the subsidy issue should be raised and if the decision is made to give premium subsidy, then other decisions such as for how long, what percentage of the premium, what region should be subsidized, how to avoid unfair competition with regions not benefiting from subsidies etc. Fourth, a new sort of subsidy might consist on giving free access to satellite information, reducing asymmetry of information which is a good incentive for private insurance companies to give small farmers easier access to their products.
- **Complementary programs:** Most of the paper has so far been focused on giving more security to the financial institution about being financially sustainable<sup>16</sup>. In turn, financial sustainability gives easier access to insurance products. However, another way of giving security to financial institutions, and independently from any insurance scheme, consists on helping small farmers in reducing their risk and indirectly having more stable and secured revenues. While addressing the issue of easier access to insurance scheme for small farmers, the existence of complementary programs should also be analysed carefully and could, for instance include a better understanding of the cycles, empowering the Rural Management Board, strengthen the professionalism of warehouse, helping farmers diversifying their risk and have non agricultural revenues etc.
- Access to the **reinsurance** market. As already mentioned reinsurance market is largely unavailable for micro-insurers, which restricts the growth of existing micro-insurers and hampers the development of new ones. The main reason for this is that basic information related to the market or the management of MFI are very often not available, which restrains reinsurance companies to invest in a market for which they can't estimate the risk. Therefore, while setting up a microinsurance development program, special attention should be paid to making available transparent information on MFI management and reliable data on the risk insured.

### **C. Conclusion**

Better access for small farmers to microinsurance products could to a certain degree fill the gap between their need of access to credit and a better security of being reimbursed for the MFI. Nevertheless, the type of products preferred will be life and/or health insurance before agricultural insurance that would secure harvest. In addition, for many farmers, access to savings will be considered as more appropriate than insurance.

For different reasons the price premium for agriculture insurance is likely to be very elevated and, in many cases simply higher than what small rural farmer can afford. Therefore, if the intention is to reduce their vulnerability, the cost of opportunity of rural insurance must be analysed carefully with special attention to other urgent needs of small farmers.

If, for a given region, the conclusion is that insurance is the best solution to reduce vulnerability, then new index insurance products should be favoured because of lower administration cost and reduced risk of moral hazard. Covariant risk must be addressed, and if available, it should be dealt with instrument such as reinsurance market. However, as a final point, preconditions to the implementation of agriculture microinsurance scheme are difficult to fulfil. If it appears these conditions can not be met, then the program should not start.

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<sup>16</sup> Premium received P superior to administrative costs A and indemnities I paid :  $P > (A+I)$

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## **List of annexes**

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## **Annex # 1: Typologie des centrales de risques**

Source: Wampfler Betty : « Sécuriser le crédit agricole par la centrale de risque ». BIM – 16 novembre 2004, page 3.

### **Typologie des centrales de risques**

Les cinq pays offrent des exemples de cinq types de centrales de risques et d'information.

- ▷ Les centrales de risques publiques : ce sont des structures liées à la Banque Centrale ; l'adhésion y est obligatoire pour les institutions financières formelles ; elles recueillent essentiellement une information négative, relativement standardisée à l'usage des tutelles ; les IMF y participent peu.
- ▷ Les Centrales privées : elles se sont développées en Amérique Latine avec l'explosion du marché du crédit des années 90 ; ce sont des entreprises privées, auxquelles les institutions financières adhèrent volontairement ; l'accès à l'information est payante ; l'information est davantage ciblée sur les besoins des participants ; ces centrales proposent le plus souvent une gamme élargie de services comprenant la gestion de bases de données, la gestion de portefeuille, le scoring, ... ; certains pays comme la Bolivie ont interdit ces centrales privées.
- ▷ Les sociétés de vente d'information publique : ce sont des entreprises privées qui collectent et diffusent différentes formes d'information publique (annonces légales, presse, ...).
- ▷ Les centrales spécialisées : les initiatives dans ce sens sont nombreuses en Amérique latine ; des secteurs spécialisés (banques, grands magasins, microfinance) créent des centrales spécialisées ciblées sur les besoins spécifiques de leur propre secteur ; les initiatives sont notables dans la microfinance qui est mal prise en compte par les centrales publiques et qui a du mal à faire face aux coûts élevés des centrales privées. Par ailleurs, la microfinance est souvent méfiante par rapport aux dispositifs partagés avec les banques, craignant que celles-ci ne soient tentées d'utiliser les dispositifs de partage de l'information pour lui « voler » ses bons clients.
- ▷ Les listes noires informelles : le partage informel de l'information sur les mauvais payeurs reste le recours le plus fréquent des ONG qui sont confrontées à la croissance des défaillances et du risque mais n'ont pas accès aux dispositifs précédents.

## Annex # II: Crédit stockage : avantages/désavantages pour l'IMF et le producteur

### Source:

Wampfler Betty « Sécuriser le crédit à l'agriculture par le « crédit stockage » ou warrant agricole  
Bulletin d'information post séminaire / fiche # 10

#### *A/ Pour l'IMF*

**\*\*Les avantages pour l'IMF sont :**

\* Une protection contre le risque : ce type de garantie qui présente une valeur marchande élevée est attractive pour les IMF, notamment lorsqu'elles prêtent à de nouveaux clients pour lesquels elles ne disposent pas d'historique de crédit.

\* Une moindre variabilité saisonnière des prix : le système de crédit-stockage a pour effet de lisser les variations saisonnières du cours de certains produits sur l'année.

\* Le degré de liquidité de la garantie : contrairement aux propriétés foncières ou à d'autres formes de garanties, la garantie constituée par le stock est liquide. Elle peut être rapidement convertie en liquidités auprès d'une banque ou sur le marché.

**\*\*Inconvénients :**

\* Rentabilité : l'expérience a montré que certains programmes de crédit-stockage contribuent à lisser le cours des produits. Lorsque la méthodologie lie le montant du prêt à la valeur marchande des produits, la baisse du prix entraîne la diminution du montant de prêt auquel peut prétendre le producteur, et du montant d'intérêts collecté par l'IMF.

\* Gestion de l'entrepôt : le système ne peut fonctionner que s'il existe des entrepôts sûrs et bien gérés. Une IMF peut créer ou gérer un entrepôt, mais l'expérience a montré que ce cas de figure est rarement viable. L'IMF doit en outre ajouter le coût de gestion de l'entrepôt au prix de ses services.

#### *B/ Pour le producteur*

**\*\*Avantages :**

\* Rentabilité : le système permet aux petits producteurs de différer la vente de leurs produits, ce qui leur permet de profiter des hausses de prix et d'obtenir des liquidités au début de la saison de moisson.

\* Transparence des prix : un des effets du système est d'amener les groupes de producteurs à établir les prix avec l'entreposeur sur la base de la valeur marchande du produit. Les producteurs sont régulièrement tenus au courant de son évolution et contribuent à fixer les prix au lieu de les subir.

\* Sécurité alimentaire : les producteurs peuvent convertir leur épargne en " rachat " leurs produits à l'entreposeur pour leur consommation courante pendant la saison creuse, lorsque la nourriture est chère.

**\*\*Inconvénients :**

\* Spéculation : le système favorise le comportement spéculatif des petits producteurs. Ceux-ci ont tendance à attendre que les prix atteignent leur point culminant pour vendre leurs produits afin de maximiser leurs bénéfices. Mais lorsque le point culminant est atteint, le flux de marchandises déversées sur le marché fait immédiatement chuter le prix. Les producteurs peuvent ainsi se retrouver avec plus de la moitié de leur stock à vendre au prix le plus bas. Au total, ils sont perdants.

\* Mauvaises techniques de séchage ou de conservation : c'est particulièrement vrai dans les zones rurales, où les technologies sont inexistantes ou trop chères. Les produits stockés sont soumis au risque de vol ou de dégradation. De même l'approvisionnement en produits chimiques nécessaires à la conservation n'est pas toujours fiable.

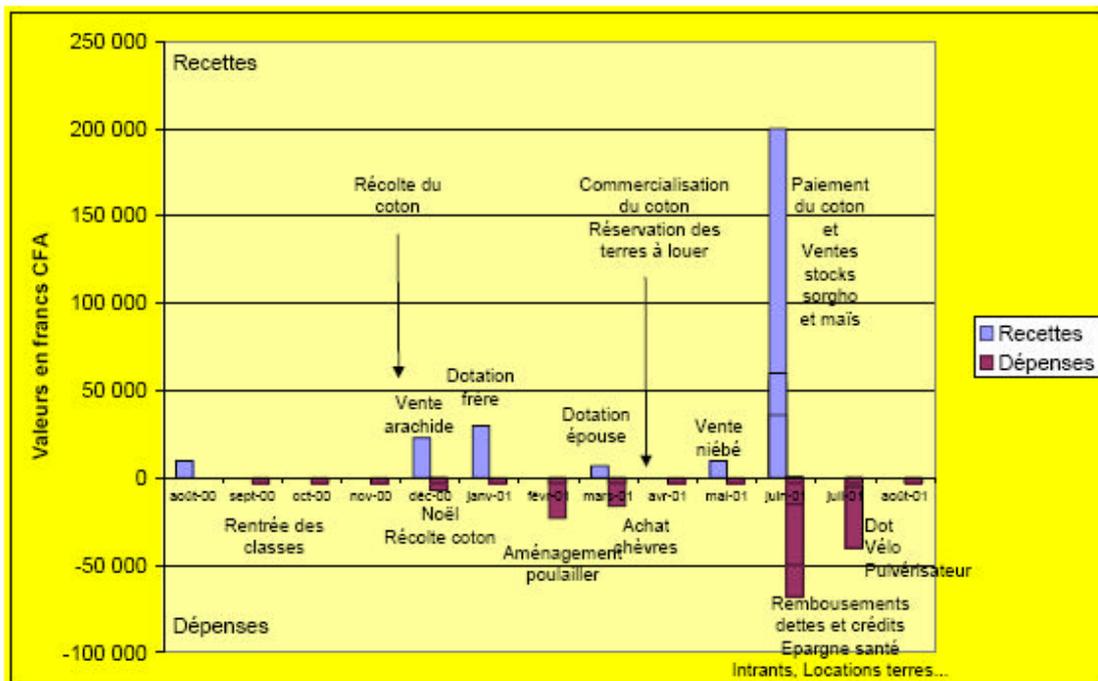
\* Transport des marchandises : représente un coût supplémentaire pour le producteur. Dans les zones rurales où les camions et le carburant sont chers et difficiles à obtenir, le transport des marchandises jusqu'au village voisin ou à la ville la plus proche peut poser un réel problème.

**Annex # III: Exemple de recettes et dépenses annuelles et planning de gestion**

Source:

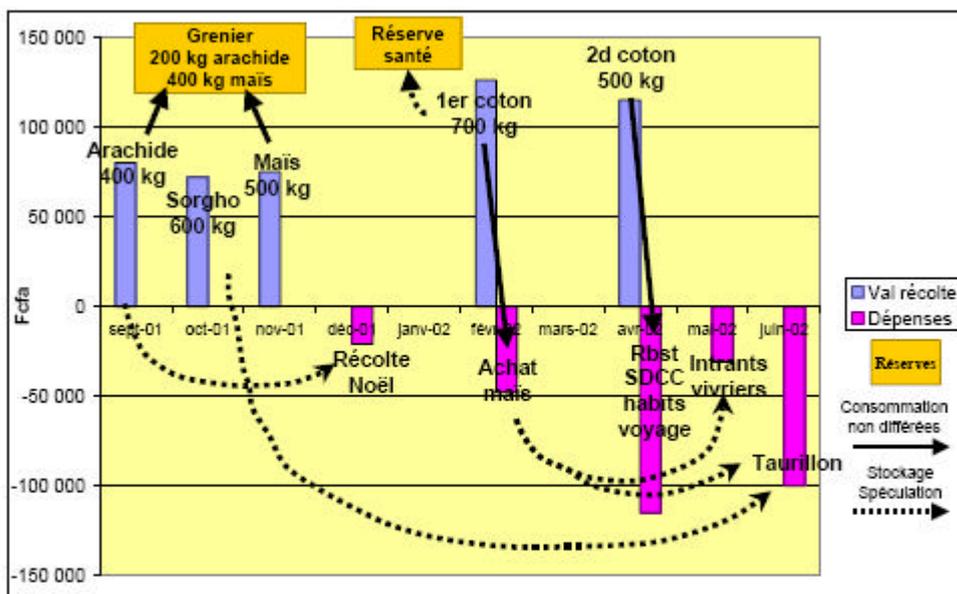
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**A. Recettes dépenses**



**Figure 1 : Recettes et dépenses d'André I. pour la campagne 2000/2001**

**B. Planning de gestion**



**Figure 6 : Planning prévisionnel de gestion simplifié d'André I. pour la campagne 2001/2002**

#### **Annex # IV: Comparison weather VS Crop insurance**

Source:

Raza Hasan Shehla "Bad Weather friends at the World Bank". September 12, 2003. Asia Time OnLine

<b>Weather insurance</b>	<b>Crop insurance</b>
Coverage for deviation in rainfall index. Compensation for economic losses due to less or more than normal rainfall.	Coverage for droughts and floods - extreme situations, coverage for pest attacks.
Low administration costs.	High administration costs, high loss ratios.
Calculation of rainfall index is fully objective and transparent.	Claim settlement basis is non-transparent.
Immediate claim settlements.	Lengthy claim settlement process.
Reinsurance available.	Reinsurance is limited.

#### **Annex # V: Prerequisites for credit linked index insurance project success**

Source:

"Weather index insurance, Malawi". November 2005. Opportunity International – Planning & Operations Support.

##### ***Prerequisites for credit linked index insurance project success.***

- Accredited weather stations with data for 30-40 years and that are able and willing to provide data to stakeholders during contract period.
- Farmers to be within 10-20 kilometre radius of station.
- Willing lenders, such as OIBM, with experienced staff.
- Willing farmers.
- A farmers association or body to help mobilise the farmers.
- Insurers that are willing to write non-conventional covers; in this case one of the roles performed by Opportunity International was to underwrite and price the insurance products for local insurers.
- Project co-ordinator with relevant insurance background; this was provided by Opportunity International's Shadreck Mapfumo on the ground in Malawi.
- World Bank to help with expertise and to work with project co-ordinator.

## Annex # VI: Summary of relative advantages and disadvantages of Index Insurance

### Source:

Skees J: Innovation with Rural Finance". Paving the way forward for rural finance – an international conference on best practices. Lead Theme Paper

### *Summary of Relative Advantages and Disadvantages of Index Insurance*

Index contracts offer numerous advantages over more traditional forms of farm-level multiple-peril crop insurance. These advantages include

1. *No moral hazard:* Moral hazard arises with traditional insurance when insured parties can alter their behavior so as to increase the potential likelihood or magnitude of a loss. This is not possible with index insurance because the indemnity does not depend on the individual producer's realized yield.
2. *No adverse selection:* Adverse selection is a misclassification problem caused by asymmetric information. If the potential insured has better information than the insurer about the potential likelihood or magnitude of a loss, the potential insured can use that information to self-select whether or not to purchase insurance. Index insurance on the other hand is based on widely available information, so there are no informational asymmetries to be exploited.
3. *Low administrative costs:* Unlike farm-level multiple-peril crop insurance policies, index insurance products do not require underwriting and inspections of individual farms. Indemnities are paid solely on the realized value of the underlying index as measured by government agencies or other third parties.
4. *Standardized and transparent structure:* Index insurance policies can be sold in various denominations as simple certificates with a structure that is uniform across underlying indexes. The terms of the contracts would therefore be relatively easy for purchasers to understand.
5. *Availability and negotiability:* Since they are standardized and transparent, index insurance policies can easily be traded in secondary markets. Such markets would create liquidity and allow policies to flow where they are most highly valued.

Individuals could buy or sell policies as the realization of the underlying index begins to unfold. Moreover, the contracts could be made available to a wide variety of parties, including farmers, agricultural lenders, traders, processors, input suppliers, shopkeepers, consumers, and agricultural workers.

6. *Reinsurance function:* Index insurance can be used to transfer the risk of widespread correlated agricultural production losses. Thus, it can be used as a mechanism to reinsure insurance company portfolios of farm-level insurance policies. Index insurance instruments allow farm-level insurers to transfer their exposure to undiversifiable correlated loss risk while retaining the residual risk that is idiosyncratic and diversifiable (Black, Barnett, and Hu, 1999).

## **Annex # VII: Agricultural insurance Programs – Costs VS premiums**

Source:

Wenner Mark "Agricultural Insurance in Latin America: Where are we?" Paving the way forward for rural finance – an international conference on best practices. Case study

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

Source: Skees (2003)

## Annex # VIII: Draft contract – Mongolian Livestock Index Insurance

### Source:

Skees J: Innovation with Rural Finance". Paving the way forward for rural finance – an international conference on best practices. Lead Theme Paper

### DRAFT LANGUAGE FOR ILLUSTRATION ONLY MONGOLIAN LIVESTOCK INSURANCE

*This insurance is solely based on the official sum statistics on adult livestock losses for cattle and yak in sum Saintsagaan in aimag Dundgobi.<sup>7</sup> The insurance will pay you when the mortality rate (the ratio of adult losses during the year 2002 divided by the total herd population at the beginning of the year) exceeds a value of 6.5%. To be eligible, you must register for this insurance by May 1. Registration involves a statement of intent to purchase, and a reporting of your animal numbers by species at that time.*

#### *Value of Insurance*

*While we believe the average value of cattle and yak to be about Tg 100,000, you may purchase any value of insurance between Tg 20,000 and Tg 200,000 per animal reported.*

#### *Paying Premium*

*You will pay a premium rate of 4% times the value of insurance you chose. The premium payment is due on January 1. Should no payment be received by that time, we will cancel this insurance policy.*

#### *Paying for losses:*

*If the mortality rate for the sum of Saintsagaan in aimag Dundgobi exceeds 6.5%, we will pay you the product of the mortality rate times the value of insurance you have chosen. For example, if you purchased Tg 10,000,000 and the mortality rate was 10%, you would receive a payment of Tg 1,000,000. While this insurance should provide compensation under most circumstances when you have large losses of animals, please understand that you may have livestock losses when the sum mortality rate does not trigger a payment.*