AGRICULTURAL INSURANCE OPTIONS

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Introduction

Agriculture is widely considered more risky than industry or trade. Thus, it is not surprising that agricultural lending projects have had poor repayment performance. Weather, pests, diseases, and other calamities affect the yield of crops—substantially in extreme cases. For example, in 2003 the United Nations Food and Agriculture Organization (FAO) reported that the third successive year of widespread crop failures in Malawi (due to excessive rains, floods, hailstorms, and in some areas, dry spells) had afflicted 176,000 families in four provinces with food deficits and chronic hunger severe enough to warrant humanitarian assistance to prevent starvation. (FAO, 2003.)

Droughts, floods and other natural disasters lead to severe income losses for rural people, especially farmers and poor people. Given their limited ability to offset these losses, many rural people suffer extreme hardship, lose assets and default on their debts in disaster years (Hazell, 2001). In most sub-Saharan countries drought is a major risk facing agriculture farmers. In developed countries such as the United States of America, Australia and Europe, agricultural insurance products are available to help farmers in cases of drought or other agriculture perils. Risk premium for such products are very high and hence in all these cases premiums are heavily subsidised by the respective governments (Mapfumo, 2006). The converse is true for Africa, crop insurance is a new subject all together and most farmers can not afford to purchase the premiums let alone they don't understand why they have to.

1. Crop Insurance

Crop insurance is financial protection or cover purchased by agricultural producers, and others in the agriculture value chain to protect themselves against either the loss of their crops due to natural disasters such as hail, drought, and floods, or the loss of revenue due to declines in the prices of agricultural commodities.

There are different types of agriculture insurance options that farmers can take around the world. For the purpose of this discussion the following categories have been identified: Traditional Crop Insurance, Area based yield coverage and Parametric or Index Insurance Covers. It should be noted that the crop insurance industry is growing and more and more products are emerging in the insurance industry however most of the emerging products cover specified peril and in one way or another all these can be fitted in the aforementioned categories. Hence this justifies why the three categories fits this discussion. All these agriculture insurances aim transferring minimising the effects of the risks. Below are examples of some of the major agriculture risks.

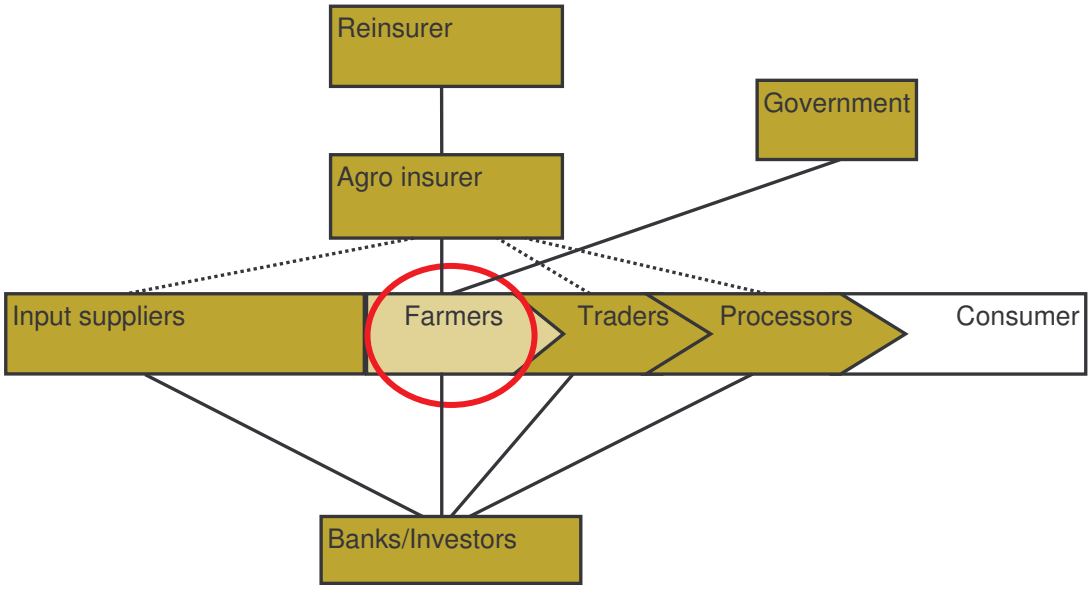
Major Agricultural Risks

Risk	Factors	Effect
Weather	Adverse weather, pests, diseases	Lower yields and loss of income
Price	Market forces inside and outside the country; local and international supply and demand	Lower prices and loss of income
Livestock	Disease, weather, theft	Loss of assets and income
Labor	Illness, death, injury	Loss of income
Financial	Higher than anticipated input costs, length of production cycle linked to inflation risk, lack of access to and high cost of credit, cash flow problems	Uncertain cash flow
Regulatory	Regulatory changes, both inside and outside the country, affecting the costs of inputs, production, and exporting.	Changes in costs, higher taxes

Weather Risk and Price Risk have the most significant negative impact on the incomes of agricultural producers in lower income countries

The ideal crop insurance should be able to cover farmers at all levels in the agriculture value chain. That's from production to processors however in real life situation there are different covers at all these levels and hence crop insurance focuses on farming production. The principle behind crop insurance is transferring risks from one level to another and insurance companies have a risk of losing their funds if heavy payouts are to be made in consecutive years. To circumvent from this risk insurance companies reinsure to regional companies.

Conceptual Diagram for agricultural value chain sector wide insurance approach



Source: Reinhard Kuschke, Swiss Re

2.1 Tradition Insurance

Traditional Insurance indemnifies farmers of certain growing crops, having an interest in such crop for loss or damage due to hail and any other causes of loss or perils provided for in the policy. This insurance provides protection for growers of certain kinds of crops. Coverage is written on a special cause-of-loss (single peril) or all-risk basis (Multiple Peril). Single Peril Crop Insurance cover only one specified risk while Multiple Peril Crop Insurance (MPCI) protects against crop yield losses by allowing participating producers to insure a certain percentage of historical crop production. A single policy protects crops against all natural perils including adverse weather, fire, insects, disease, wildlife, earthquake, volcanic eruption and failure of irrigation water due to unavoidable causes. This looks like an all risk insurance cover but in the agriculture there is nothing like a comprehensive cover even the MPCI cover will spell out the type of coverage that is provided within that policy.

Tradition type of insurance is considered to be expensive for most farmers. There are two main factors that make traditional agriculture insurance very expensive. One is the need for an assessor at claim time to do on farm visits, which adds considerable transactions costs. In most cases the figure deduced by the assessor is less than what the

farmer thinks should be his compensation. It is very subjective in nature and the deduced value would vary from one assessor to the other.

The second factor that contributes to the cost of traditional agriculture insurance is adverse selection and moral hazard. Often times only the worst farmers opt to buy the insurance since it is very difficult to disentangle losses caused by a peril i.e drought from those caused by the farmer's farm management practices. There is also a high moral hazard factor in traditional insurance since farmers can cause damage to their production and attribute this to weather. These are some of the reasons, which make traditional agriculture insurance not suitable for most farmers in Africa.

In précis Traditional crop insurance is not viable for smallholder economies because often times than not assessment is based on individual loss.

2.2 Area Yield Index Insurance (Revenue Index)

Area-yield index insurance is a type of cover where compensation is based on the expected yield loss or revenue loss per specified area. Area yield index insurance is sometimes referred to as revenue index. This insurance can be applied to both production and price risks (hence revenue index). This insurance is defined at a regional level and is provided against specific events that are independent of the behavior of the insured farmers. Examples include weather-related insurance policies linked to rainfalls or temperatures in a defined area, offering indemnity payments if the relevant index falls below (or rises above) a certain level and price-related policies with payouts based on crop prices. Such policies enable providers to insure against a specific risk, rather than all agriculture-related risks, and being defined at a regional level makes them more viable and attractive to private insurers because they reduce administrative costs and risks of fraud and moral hazard (Christen and Pearce, 2005)

The essential principle of area yield index insurance is that contracts are written against specific perils or events (e.g. area yield loss, drought, or flood) defined and recorded at a regional level (e.g. at a county or district level in the case of yields, or at the local weather station in the case of insured weather events). Insurance is sold in standard units (e.g. $10 or $100), with a standard contract (certificate) for each unit purchased called a Standard Unit Contract (SUC). The premium rate for a Standard Unit Contract is the same for all buyers who buy the same contract in a given region, and all buyers receive the same indemnity per SUC if the insured event occurs. Buyers are free to purchase as many units of the insurance as they wish. In this case the insurance is written against the average yield for a region (e.g. a county or district), and a payment is made whenever the measured yield for the region falls below some pre-defined limit (say 80 percent of normal). Such schemes already exist in the US, India, Sweden, and the Canadian province of Quebec (Miranda; Mishra; Skees, Black, and Barnett).

Area-based yield insurance requires long and reliable series of area-yield data, and this kind of data is not available in most developing countries. Hence alternative weather indices may be more attractive, such as area rainfall or temperature, for which there are available time series data that is collected on a regular basis.

With higher correlation there will be less basis risk. Understanding income-rainfall correlation requires crop yield modelling. Further, it is possible that a set of rainfall indexes may fit best for different farming systems. Farm income risks for certain crops may be most sensitive to rainfall shortfalls at different times during the season (e.g. planting and blooming). Income may also be at risk during harvest if there is excess rain. The specific design of the index contract will also have a bearing.

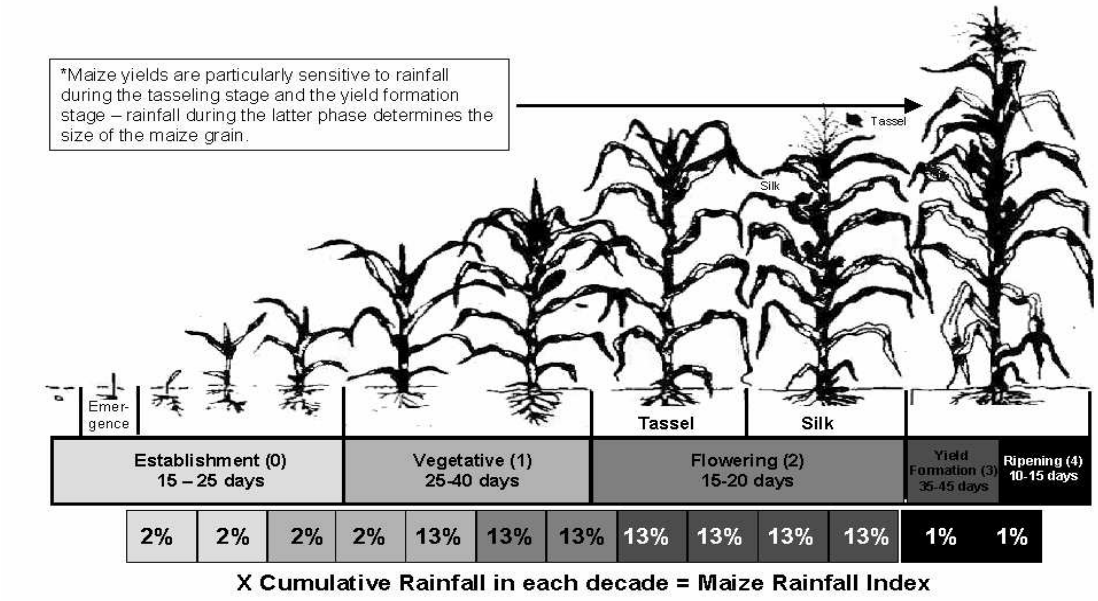
2.2.1 Constraints to Area Index Insurance

In principle, the area based index insurance looks simple and straight forward and one might expect the private sector to take the initiative in developing area-based index insurance, but there are several setup problems that might require a public intervention to jump start activity in many developing countries. There is need for high capital injection for research to identify key catastrophic weather events that correlate strongly with agricultural production and income in different types of rain fed agricultural regions.

2.3 Weather Index Insurance

Weather index insurance is a financial protection based on the performance of a specified index in relation to a specified trigger. It is one such product that attempts to insure farmers against the risk of drought or excess rainfall. Drought or excessive rainfall is not measured by what happens in a farmer's field; it is measured according to the amount of rain recorded at a specified weather station. Because policies are sold to farmers who live close to a weather station it is assumed that the rainfall received at the station is similar to the rainfall received by the farmer. Though this is not always the case, cases of severe drought will usually affect all farmers within a 20-30 kilometre radius to the same degree (Mapfumo, 2006). The 20-30 radius is a safe radius for Malawi climate and it can not be assumed that the radius would be the same in the sub-Saharan region. It is always advisable to study the local climate before determining this radius.

The beauty of weather index insurance is that it does not measure changes in yields or revenue but instead it measures changes in rainfall. The assumption is if rainfall is bad farmer's yields will be poor as well. There is a strong relationship between yield and rainfall for every single crop. It is important therefore to establish upfront the relationship between yield and rainfall. In establishing this relationship it is critical to consider the different amounts of rainfall needed for optimal growth at different points in the crop's life. The water requirement in a crop varies in variance physiological stages of the crop, for instance maize will require more rainfall during tassel formation than it would at germination stage. Any shortfall of rainfall at this stage will heavily affect the yield.



Once a strong correlation is identified in order to compensate farmers, instead of determining how bad a drought is, is by looking at the condition of the plants in a farmer's field, drought is determined by measuring the amount of rain that was received. Because making this measurement is impossible to do on each individual farmer's plot weather index insurance measures the amount of rain recorded at the local meteorological station (Mapfumo, 2007)

Weather index insurance again has its own challenges. One of these challenges is that an individual can suffer a loss and not be paid because the major event triggering a payment has not occurred. For example, a farmer with rainfall insurance could lose his/her crop to drought at a micro-location, but not receive an indemnity if the rainfall at the region's weather station remains above the trigger point. With index contracts it is also possible for an individual to be paid when they suffer no losses. This type of risk is referred to as basis risk. Index contracts essentially trade-off basis risks for transaction costs, and the insurance will not be attractive if the basis risk becomes too high.

2.3.1 Application Levels of Weather Index Insurance

Weather index insurance can be applied at different levels and these are: micro, meso and macro.

2.3.1.1 Weather Index at Micro level

Weather index insurance for drought and excess rainfall is sold to farmers through microfinance institutions. In most cases the insurance is bundled with credit. A study conducted in Malawi in 2006 revealed that farmers at this level were interested to purchase the insurance because of the credit component. However this could be due to the fact that at that time insurance education was just trickling down and not many had seen its benefits. Nevertheless microfinance institutions are also not only interested selling out insurance only but with credit.

2.3.1.2 Weather Index at Meso level

Weather index insurance product is sold to rural microfinance institutions to help offset loan defaults that are likely caused by the specified index. The microfinance institution in this case becomes the insured but the benefits trickle down to the farmers indirectly. Any write offs which could occur as a result of weather peril is covered by the insurance payouts and in this way the microfinance institution's program becomes sustainable.

2.3.1.3 Weather Index at Macro level

The macro cover is the highest cover and often times it is the government which becomes the insured. The government would insure its people (i.e subsistence farmers) against a specified peril. For example in Ethiopia, agriculture is predominantly rain-fed and more than 95 percent of agricultural production comes from subsistence and smallholder farmers. Adverse weather patterns, primarily lack of rain, are the predominant cause of natural disaster and food insecurity. With 10 percent of the population of 72 million requiring food aid assistance each year, food insecurity is a chronic crisis. It is estimated that at least 25–35 percent of the population are at risk from hunger in the event of an

extreme drought. This is a typical scenario that would lead the Ethiopian government to insure its farmers and this would be the macro cover.

3 A Cost Benefit Comparison of Traditional Crop Insurance versus Weather Index Insurance

Both traditional crop insurance and weather index insurance have strengths and weaknesses. As a result, they tend to be useful for different types of risks. A comparison of traditional crop insurance with weather index insurance is helpful for understanding how weather index insurance can lower the costs of risk transfer and why index-based insurance may be a promising alternative for addressing the constraints that have prevented market-based agricultural insurance in lower income countries.

1. Traditional insurance provides compensation for actual farm-level losses and underwriting, monitoring, and verifying losses becomes a very costly procedure. In contrast, weather index insurance reduces these costs because the weather event serves as a proxy for loss and there is no need to assess losses at the farm level. Primarily this eliminates the cost of sending trained loss adjusters to determine farmer's actual losses. The process of loss adjustment can be expensive and time-consuming. In case of weather index insurance there is no need for loss adjustment, the indemnity payouts are automatic once the weather index crosses a certain threshold.

2. Weather index insurance eliminates the costs of monitoring for moral hazard and adverse selection. With traditional agricultural insurance, the farmer knows more about the risks of a particular field than does the insurer who is underwriting the risk so the insurer must prevent adverse selection by being very careful to accurately price the risk. With weather insurance, farmers and insurers have access to the same data on past weather events so, unlike traditional agricultural insurance, the farmer does not have more information than the insurer. Also, because neither party can change the weather in the future, the insurer does not have to monitor the farmer for moral hazard. In contrast to traditional insurance, the insured cannot manipulate losses to his or her benefit in indexed insurance case. The insured receives a payment only if the index value meets or exceeds the trigger value. Therefore, weather index insurance preserves farmer incentives to plant a successful crop.

3. Traditional insurance is more suitable for independent risks because risk pooling works well when risks are unrelated. Weather index insurance is more suitable for correlated risks that cannot be pooled using traditional methods. When traditional crop insurance is used to underwrite correlated risks, it relies heavily on government subsidies to finance its high costs. Weather index insurance is more sustainable because market financing can reduce direct government support and the inefficiencies associated with subsidies.

4 Conclusion

Agriculture insurance is a new concept in the developing countries and however it is gaining popularity in the microfinance industry. Microfinance institutions should not only aim at having farmers access to finance, but also access to crop insurance if they are to bring meaningful transformation to farmers. There are a number of options that farmers can be offered in the agriculture ranging from livestock insurance and crop production insurances. In crop insurance there are a number of options again which one has to consider and these are traditional insurances (single peril insurance and multiple peril crop insurance), area yield index insurance and weather index insurance.

In agriculture insurance government and private sectors have to make decision on whether the insurance should be run at micro, meso or macro level. Every level has got its own pros and cons however the micro has a direct impact on smallholder farmers. However the greatest challenge in designing and implementing agriculture insurance is how efficient and cost effective the insurance cover is. Weather index insurance is gaining popular in developing countries as opposed to traditional insurance and area yield index insurance. It is the preferred insurance by many because of its reduction in transaction costs. The reduction in basis risk, a feature that is unique in agriculture insurance is also an incentive to the insurance company

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6 Author’s Biography

Gift Livata is a seasoned **Agricultural Microfinance Specialist** recognized both locally and internationally and currently working as **Agriculture Manager** for Opportunity International Bank of Malawi. Together with the World Bank CRMG and Micro Ensure Vice President for Crop Insurance facilitated the implementation of the weather index insurance project in Malawi. Gift has spend most of his time designing and implementing rural based agricultural lending techniques. He is recognized for playing a vital role in the designing and implementation of Opportunity Bank’s Agricultural rural lending model. The model has been successfully rolled out in Malawi and is being piloted in other Opportunity International African partners. Before joining the bank, Gift worked on a number of consultancies in rural development with both local and international stakeholders.