

Climate risk  
management  
in Africa:  
Learning from practice

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This report was funded by the UK Department for International Development (DFID) and the US National Oceanic and Atmospheric Administration (NOAA), which provided its support under cooperative agreement NA050AR4311004.

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**Editing, design and layout:** Green Ink, UK ([www.greenink.co.uk](http://www.greenink.co.uk))

**Printing:** Pragati Offset Pvt. Ltd, India ([www.pragati.com](http://www.pragati.com))

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First published 2007

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ISBN 978-0-9729252-3-5

**Correct citation**

Hellmuth, M.E., Moorhead, A., Thomson, M.C., and Williams, J. (eds) 2007. *Climate Risk Management in Africa: Learning from Practice*. International Research Institute for Climate and Society (IRI), Columbia University, New York, USA.

## Drought insurance in Malawi

### Background

Malawi is one of Africa's poorest countries, with 65% of its population of 12 million living below the poverty line and a per capita GDP of only US\$ 200. It is also a very rural country, with over 80% of its people engaged



Farmers won't invest if there is a high risk of crop failure;  
C. Hughes/Panos Pictures

in farming. The vast majority of farmers are smallholders, cultivating areas of 1 ha or less. The main food crop is maize, while tobacco and groundnut are the two principal cash crops.

Over 90% of crop production is rainfed, taking place during a single rainy season lasting from December to April. Rainfall during this period tends to be highly erratic and drought is a recurrent problem, often causing widespread crop failure. In addition, the risk of drought is a major factor keeping productivity low, since even in good years farmers are wary of using inputs such as improved seeds and fertilizers for fear of losing their investment.

This case study describes a pilot project that is testing a new way of dealing with drought risk: the provision of index-based weather insurance directly to smallholders (see 'Insuring against adverse weather'). The project, which is primarily driven by the private sector, goes to the heart of food insecurity in Malawi by tackling the major cause of low levels of farmer investment in new technology.

### A coalition for innovation

The novelty of drought insurance has led to the development of a coalition of stakeholder groups, some of whom have not previously worked together.

## Insuring against adverse weather

Insurance has long been an important tool in risk management, but the concept of weather-related insurance is new. It is currently being tested in a number of African countries.

Traditional insurance contracts insure against crop failure, but these lead to perverse incentives for farmers to allow crops to fail. There is also an incentive for less productive farmers to buy insurance and for more productive farmers not to do so. These problems imply more and higher payouts, which would in turn lead to higher premiums, ultimately making this type of insurance too expensive to be workable.

The new contracts are written against an index that describes an established relationship between, for example, lack of rainfall and crop failure, ideally verified by long historical records of both rainfall and yields. If rainfall turns out to be low, falling below an agreed trigger point, the farmers receive payouts. But whether the insurance pays out or not, farmers still have the incentive to make productive management decisions.

The main advantage over crop insurance is that, when rainfall is low enough to cause crops to fail, insurers will pay out to farmers quickly, so that farmers do not need to sell off their assets to survive. The money will see them through the drought period, and they will then be able to continue farming when



C. Palm/IRI

the rains resume. Without insurance, farmers or pastoralists are often forced to sell equipment or animals to survive a drought, and this means they become dependent on aid for a much longer period after the drought has ended. Drought insurance should thus reduce the repeated need for donors to find large sums of money quickly in emergencies. Another major advantage is that, with this insurance in place, farmers feel more able to take risks in order to increase their returns, for example by investing in fertilizers or improved seeds. Drought insurance is thus at its most powerful when it is combined with loans for the purchase of such inputs. Any payouts due are simply added to the final settlement at the end of the season, when farmers receive cash for their harvest and repay their loans. Index-based insurance is also cheaper to implement than conventional crop insurance because the insurance company does not need to send employees to the field to verify crop losses.

There are some disadvantages. The farmer is insured only against drought. If crops fail for some other reason, such as pests and diseases, he or she receives no compensation. But index-based insurance is still worthwhile if the risk it insures against is the most important one in a given production system. It is best applied as a part of a larger risk layering strategy in which other tools, such as traditional risk management and government social safety nets, complete the package.

Lastly, while index-based insurance is the key to raising productivity and incomes in the smallholder farming community, it does not protect the poorest of the poor, most of whom do not have access to land and/or are too marginalized or vulnerable to be economically active. It does not, therefore, obviate the need for governments and donor agencies to invest in the emergency relief and safety nets needed to assist this group.



Organized markets for inputs and outputs facilitate administration of the loan plus insurance bundle;  
J. Banning/Panos Pictures

The Malawi project has its origins in work by the World Bank's Commodity Risk Management Group, which was instrumental in developing the concept of drought insurance, raising awareness of it, and stimulating the interest of potential partners in trying it out. IRI was asked to provide technical support to the group in its work with private-sector partners to design and evaluate the insurance product.

The Malawi government has welcomed the project and facilitated its pilot phase. It is actively involved through the participation of the national meteorological service, which is the source of the climate- and weather-related data and expertise essential for the design and implementation of the insurance scheme. The data needed for design include historical

rainfall and evapotranspiration, together with soil characteristics and agronomic information. Needed for implementation are reliable monitoring and timely reporting of rainfall, since these are the basis for determining payouts.

Another important partner is the National Smallholder Farmers Association of Malawi (NASFAM), an umbrella association embracing 40 or more local farmers' associations. NASFAM's roles are to provide access to seed inputs and to buy members' harvests. When paying for the harvest it also performs the important role of ensuring loan recovery, by deducting the loan, adjusted for any insurance payout, from the cash payment. NASFAM was keen to participate because it saw the project as a means of lifting the burden of



indebtedness amongst farmers, who were previously obliged to repay loans in full when crops failed (see ‘Strengthening Malawi’s micro-credit system’).

Two micro-finance institutions are participating as loan providers: the Malawi Rural Finance Company (MRFC), which was already lending to the smallholder sector, and Opportunity International Banking Malawi (OIBM), a newcomer to the sector. Both expressed interest in drought insurance as a way of safeguarding repayment of their loans. In fact, for OIBM the insurance was the key component that secured its willingness to lend to smallholders.

To aid learning during the project’s pilot phase, Malawi’s leading insurance



NASFAM is a key partner in the project; D.Osgood/IRI

## Strengthening Malawi’s micro-credit system

Malawi’s drought insurance scheme has not been developed in a vacuum. Rather, it is able to build on an existing tradition in the provision of micro-credit to smallholders.

In the past, micro-credit schemes have been targeted to specific crops, mainly tobacco, that are considered profitable enough to enable farmers to repay credit without difficulty, and that are traded in an organized marketing system that allows systematic recovery of the loans. The collateral is based on the social capital of the club system, whereby farmers who know and trust one another form groups of 10 to 25 who are mutually and collectively responsible for repayment. If anyone defaults, all the group’s members are liable. This system has worked well, delivering loan recovery rates of at least 95%.

Problems with this system arise when, for drought or other reasons, all the members of a club lose their harvests. When this happens, the entire club is unable to repay the loan, which is then deferred for repayment the following year. However, most small-scale farmers need a new loan to start cropping the following season, leading to rising levels of indebtedness and deepening poverty.

The provision of drought insurance can offset the risk of systemic failure of this kind. The objective must be to design schemes that are robust enough to pay out to large numbers of farmers when drought is widespread and severe.



Two finance companies are providing micro-credit;  
D.Osgood/IRI

companies are participating as a consortium, the Insurance Association of Malawi. Once the insurance scheme and the mechanisms for administering it have been developed and tested, the companies will operate individually, in competition with one another. For the companies, the project offered an entry point into the smallholder sector, where they have had virtually no presence in the past.

### Designing the pilot project

Malawi's drought insurance project began with a stakeholders' meeting organized by the World Bank in July 2005. Stakeholders realized the potential of the new concept and expressed their interest in participating in a



Malawi's insurance companies are collaborating as a consortium; D.Osgood/IRI

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Drought index insurance is a real breakthrough, as it provides the opportunity not only to re-access the commercial farming community but also to access rural smallholder folk, who need it most. The fact that claims are settled based on weather station data removes both moral hazard and assessors' fees, making administration of the product easy.

Ben Kautsire, liaison officer,  
Insurance Association of Malawi.

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pilot phase to test it. On the strength of their enthusiasm, the project was launched without further delay.

The first task was to select the commodity on which to test the concept. The initial list was made on the basis of the portfolio of crops handled by NASFAM. The choice was then narrowed, using the selection criteria shown in Table 7. Obviously, the main criterion had to be drought sensitivity, but other criteria were also important. These included the level and cost of inputs needed, which justified the provision of financing; the existence of an organized marketing system, which would ensure efficient loan recovery; the value of the crop, which needed to be profitable enough to allow farmers to pay off

the loan while retaining a decent income; and the crop's suitability for smallholder farmers – in other words, not involving intensive management, complicated processing, or rapid perishability.

Groundnut, which scored well against most of these criteria, was chosen for the pilot phase. The only doubt surrounded the crop's marketing system, since farmers could in theory decide to sell their harvests to outside traders instead of through NASFAM, thereby jeopardizing loan repayment. To get round this problem, NASFAM undertook to offer higher prices than other traders. The variety chosen was Chalimbana 2000, a new hybrid that combines high yields with drought resistance and other desirable traits.

**Table 7.** Selection criteria for crops covered by Malawi's weather risk insurance project.

Crop	Selection criteria (1=not suitable 5=highly suitable)				
	Sensitivity to drought	Input usage	Marketing system	High value	Suitability for smallholders
Chillies	1	1	4	5	5
Cotton	2	5	3	2	5
Groundnut	5	3	4	4	5
Maize (grain)	5	4	1	1	5
Maize (seed)	5	4	5	5	1
Paprika	3	5	4	4	3
Rainfed rice	Not applicable	3	3	3	4
Irrigated rice	Not applicable	4	4	3	4
Soya	4	2	1	2	4
Tobacco	4	5	5	5	4



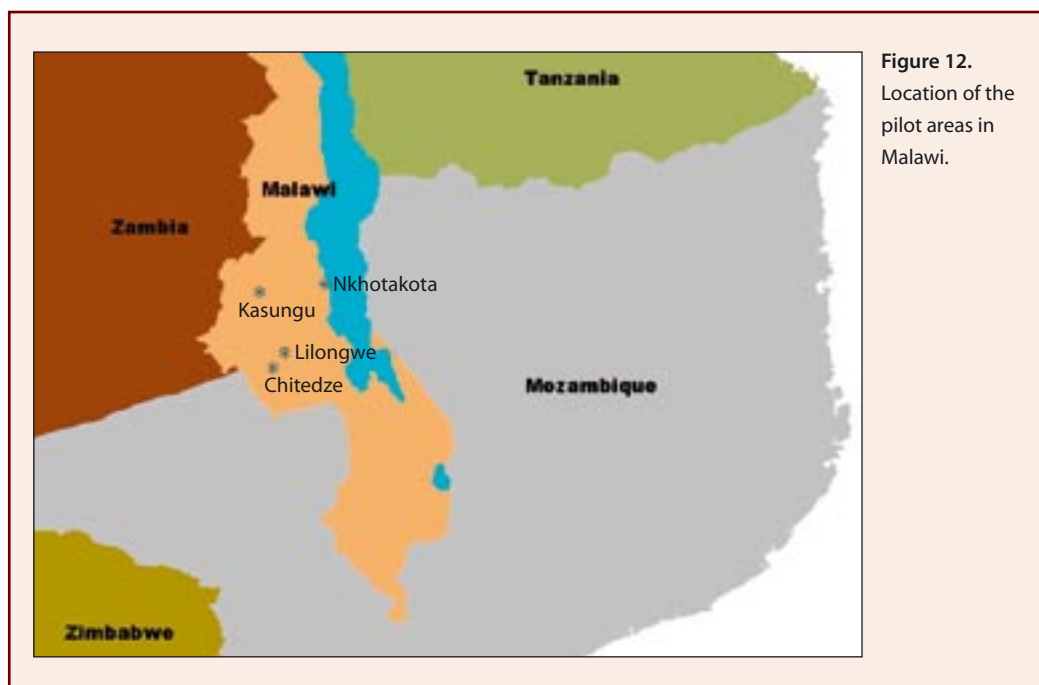
Groundnut was chosen as a test crop for the pilot phase; D. Osgood/IRI

The next step was to identify the sites for the pilot phase. Four sites were selected, based on NASFAM presence, groundnut production, and proximity to a meteorological station (see Figure 12). Consultations with the meteorological service, the extension service, and farmers suggested that farmers within 20 km of a station would experience roughly the same rainfall patterns as the station itself. Thus, during the pilot phase, only farmers who were within this radius were insured.

Meetings to select participating farmers were held in August 2005. Farmers had to be members of NASFAM, to be growing groundnuts, to have adequate land to sow 0.5 ha to the new variety while maintaining some

land in other crops, and to have not previously defaulted on a loan. A total of 882 farmers in the four project sites were selected, grouped in clubs of 10 to 20 members each.

The insurance contracts were designed to pay out if the rainfall data from the nearest meteorological station showed a deficit at one or more critical stages of the growing season. Each contract had a 'no-sow' clause that would pay out if insufficient rain fell during the early part of the season, from mid-November to early January. This was followed by clauses specifying the different levels of rainfall that would trigger payments during the three major phenological stages of establishment, flowering, and maturation.



The overall loan package was designed so that it would fit into the standard smallholder farm. The technology inputs should not place too great a strain on labor resources, while the total amount lent should not pose too great a challenge in terms of repayment. Table 8 shows the components and overall package.

Before the beginning of the rainy season, each participating farmer club entered into a formal loan agreement that incorporated the weather insurance premium. It is important to stress that individual farmers did not receive any money in advance; instead, each club transferred the loan, partly to NASFAM, for the

**Table 8.** Components of the loan package for the pilot phase in Malawi.

Components	US\$
Loan processing fee (applicable to MRFC clients only)	0.32
32 kg seed at US\$ 0.90/kg	29.20
Interest at 33% per annum, for 9 months	7.23
Insurance premium at 7.5% of loan package	2.79
Surtax on insurance premium at 7.5 %	0.21
<b>Total</b>	<b>39.75</b>

purchase of seeds, and partly to the Insurance Association of Malawi, for the weather insurance premium. The farmers agreed to sell their harvest to NASFAM at a guaranteed price. After the season, NASFAM would use the proceeds of the harvest to repay the bank loan and pay the surplus income to the farmers. The fact that the farmer receives no cash in advance reduces the risk of non-repayment to the bank. (Linnerooth-Bayer *et al.*, 2006).

### Initial experiences: the 2005–2006 season

The season unfolded with rainfall recorded at the meteorological stations close to normal levels for the various production areas. In three of the four pilot locations adequate rainfall was received to avoid payouts, but farmers in the Kasungu area received a small payout of US\$ 0.68 each.

One concern expressed by the farmers was that the rainfall data used to determine payouts were from a single rainfall station that could be up to 20 km away. As a result some farmers were winners and others losers, as rainfall on their farms differed from that at the station. This is one of the major challenges facing the design and implementation of index insurance in heterogeneous rainfed environments.

Another complication that arose during the season was poor seed quality. A middle-man working for a commercial seed company sold expired seeds that did not germinate. This provided an interesting test of the project's acceptability to the farming community, since this is exactly the kind of thing the insurance scheme does not cover. Farmers showed that they understood the scheme, since they did not demand payouts from it but instead put pressure on the seed company.



Participating farmers had to live within 20 km of a meteorological station; D. Osgood/IRI

A further issue was that of so-called ‘side-selling’ – farmers marketing to opportunistic traders who offered a higher price than NASFAM. Groundnut seed prices rose sharply as the season progressed, eroding the premium offered by NAFSAM at the start of the season and thus tempting farmers to break contract. Only a few did so – but the incident revealed that the combined insurance and loan package may be vulnerable to this kind of behavior, even within an organized market. NASFAM responded to this challenge by offering to reimburse anyone who had sold early to the association with the difference between the price paid and the higher price obtaining at the end of the season.

Experience in the formation of clubs showed that these performed best when they are self-selecting, evolving ‘naturally’ into a group that is socially cohesive. Under these conditions, the principle of collective liability works well. Because project planning had to be rushed, a small number of farmers were compelled to form clubs. These clubs tended

not to function well and look unlikely to last through the second season.

### **The way forward**

Pending completion of an assessment study that is still under way, it is impossible to quantify the impact of the project during its first season. However, there is anecdotal evidence to suggest the potential for substantial positive impact. In interviews, farmers indicated that they greatly appreciated the scheme and that they would like it to be expanded to cover a larger area per farmer and to include other crops, particularly maize. The main attraction was that the scheme facilitated access to production loans.

Practically all the farmers involved are keen to participate again in the second year, and demand from new farmers greatly outstrips the capacity of the project to enroll, educate, and manage them. Farmers said that signing up for the insurance scheme is their preferred way of adapting to climate variability and change.

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Are you going to expand this project to other crops such as maize, seed maize or tobacco?

With access to finance to buy certified seed, our chance to get a good yield is increased. Please expand this to other crops and do not limit the acreage as you have done in the pilot. It is good to note that, in case of severe drought, I do not have to worry about paying back loans in addition to looking for food to feed my family. In future I hope to send my children to school with income from this project.

Quent Mukhwimba, Ukwe Farmers’ Association.

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As this publication goes to press, scaling up is taking place during the 2006–07 season as planned. Initial estimates are that several thousand contracts have been signed so far. In response to demand, the number of farmers in existing pilot areas is being increased, new areas are being added, and the scheme is being extended to cover maize as well as groundnut.

The inclusion of maize poses new challenges. The lack of an organized market for this crop will complicate the task of loan recovery. It will be important to work with policy makers to clarify and stabilize the policy environment regarding subsidies and other factors that affect the design of the package and the costing of its components. It will also be important to protect the package from price fluctuations so as to ensure that

farmers can repay their loans. To overcome these challenges, the maize loan, for the first year at least, has been bundled with that for groundnut.

Training for field staff will be essential as the program expands. To facilitate this, program partners plan to develop a manual, together with standardized procedures. Eventually, a software tool for more generic use in designing projects will also be developed and disseminated. These tools should ease the scaling up challenge, by allowing a wider range of stakeholders to design their own projects.

In the longer term, it is planned to engage a broader range of participants. This may include commercial farmers, in addition to a more diverse array of input suppliers and



Including maize will pose new challenges; C. Palm/IRI



produce buyers. These moves will encourage competition and ease the administrative burden borne by NASFAM. The cost of the insurance premium, currently about 7.5% of the loan, is likely to remain a barrier for the poorest farmers, who often live in the areas at greatest risk of drought. Competition may create some scope for reducing this cost, but affordability for poor farmers will doubtless remain an issue as the program expands.

Another long-term aim is to broaden the range of financial products available. At the pilot stage, insurance is necessary in order to guarantee the loan. However, as farmers participate in the program, building up savings and a reliable credit history, they should start to enjoy a broader range of options, including stand-alone insurance, loans that are guaranteed without insurance, and various savings schemes.

The program's future evolution towards a broader range of commodities and financial products may allow farmers to make more effective use of climate information, particularly ENSO-based seasonal rainfall forecasts, which show some skill in Malawi. Farmers have expressed an interest in adapting their crop mix in response to such forecasts, shifting towards drought-tolerant crops when a dry season is forecast and towards high-risk but high-productivity crops when the forecast is for a wet season. Work is therefore being done to reflect the seasonal forecast in the design of the insurance and loan package,

so that this offers the best mix of seeds and financial tools for the seasonal rainfall expected.

The spatial variability of rainfall and the lack of rainfall stations with reliable long-term records are limitations that will need to be addressed if scaling up is to be successful. Models for estimating rainfall in areas where there is no station will need to be developed and calibrated, making use of satellite imagery, data interpolation, and data blending, as is being done in Ethiopia (see 'Making the most of data', p. 40). At the same time, the country will need to invest in a denser network of automatic weather recording stations.

## Conclusion

The pilot project in Malawi has demonstrated that weather risk insurance can be implemented in the small-scale farming sector. Although its impact has not yet been quantified, it seems likely that this innovation will prove the 'missing ingredient' needed to enable farmers to adopt new, yield-increasing technology, including improved seeds and fertilizers, and to adapt their enterprises and practices in response to seasonal forecasts. The outcome should be higher and more stable crop yields, sustained over the years as soil fertility also starts to recover.

This is the first time that weather insurance for smallholders has been implemented in Africa. In Malawi, the key players are in

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We are very excited to be part of the first successful weather index pilot launch in Africa.

As an industry, to ensure portfolio diversification, we would want to see this product expanded to include more crops and more areas around the country. We hope insurers in our neighboring countries will also adopt this high technology product.

Ben Kautsire.

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place and are willing to turn the project into a fully fledged program. The project here has been a valuable learning experience, providing useful guidance for the design and imple-

mentation of similar pilot projects in other countries, including Kenya and Tanzania, where activities are being launched for the 2006–07 cropping season.

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