



## Is there evidence of linking crop insurance and rural credit and its potential benefits ?

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The Farm Risk Management for Africa Project (FARMAF) aims to improve food security and livelihoods of the rural poor in Africa by enhancing smallholder farmers' access to sustainable tools and instruments to manage farm risks.

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### 1 Introduction linking crop insurance and credit

Farmers' access to credit provided by banks or special rural credit institutions for smallholders has hardly been established. One of the constraints on such lending is the limited amount of collateral to securitize the repayment of the loan. This means that the bank will have little recourse against defaulting borrowers. As a result, high-return economic cropping activities which typically require significant up-front investments (e.g., seeds and fertilizers) are hampered by these credit constraints.

Linking credit and insurance can transfer part of the risk of lending from the farmer to the insurer. African farmers are exposed to a high degree of weather-related risks. Especially drought can severely affect crop yields and destabilizes farm incomes. Smallholder farmers in Africa have, till now, limited options in managing these crop risks because of severely underdeveloped insurance markets. Insurance is an ex-ante measure to cope with crop losses by smoothing farm income. Neither credit nor insurance markets are likely to emerge independently in low-collateral environments and incomes are likely to stagnate. Even if lenders are willing to grant loans with a no or low level of security, they will need to charge higher interest rates in order to price in the default risk as a result of harvest failure.

In this policy paper more insight into the impact of linking crop insurance and credit and related policy issues is addressed. First, two insurance schemes analysed within the FARMAF project are elaborated on, namely a credit-based insurance in Zambia and a weather index-based insurance in Burkina Faso. Therefore the current state of affairs are overviewed, empirical evidence of linkages is addressed, and lessons that can be learned from that in FARMAF's efforts to scale up (access to) crop insurances are described. Second, general policy issues and experiences related to both insurance schemes analysed within the FARMAF project is discussed.

## 2 Indemnity-based crop insurance in Zambia

The insurance case in Zambia focuses on the Lima Credit Scheme (LCS). The objectives of LCS is to provide smallholder farmers without collateral with commercial agricultural credit services based on group savings and loans approach. The District Farmers Associations (DFA) has to co-guarantee the loan. Moreover, the Agrisure policy issued by the Zambia State Insurance Company (ZSIC) is a mandatory element within LCS. In 2014, two other insurance companies have come on board namely: African Grey Insurance and Mayfair Insurance.

Farmers participating in the scheme are member of the Zambia National Farmers' Union (ZNFU). LCS funds mainly smallholders and targeted smallholder farmers average loan sizes of US\$600 – US\$700. Farmers are able to produce for the market (beyond subsistence) and practice farming as a (potential) business. The program target farmers who organise themselves into groups of 10-20 farmers based on mutual trust, reputation and commodity focus.

At the start of the scheme only maize was amenable for insurance. Maize is the dominant food crop as well as cash crop in Zambia. Peril covered by the Agrisure policy include damage or destruction of crops caused by natural events such as drought, lightning, flood, hailstorm and fire. In case of calamities the insurance indemnifies the cost of inputs for which credit was obtained. The insurance company carries out pre-harvest assessments. The agricultural inspector will write down the recommendations he has given to farmers with regards to improve farming practices. In case of a claim, the inspector will check the recommendations were implemented. The claim is not eligible if the agricultural recommendations are not followed.

Launched in 2008/2009 season the granted credit and thus exposure by ZSIC increased to US\$ 3.98 million in the 2013/2014 season. Benefiting farmers have increased to 16,780 cultivating 36.700 hectare over the same period (Table 1).

In 2008/2009 the insurance started with a premium set at 5% of the insured amount. Currently, the premium has been reduced to 4%. Premium differentiation to discriminate between exposure units more or less at risk is absent. The participating DFAs have paid premiums amounting US\$ 423,600 under the current Lima farming season. In 2014/15 season, it's projected that farmers will pay premiums approximately US\$ 625,000.

**Table 1:** Key characteristics of Lima credit and indemnity-based insurance scheme in Zambia.

Year	Number of farmers	Hectares	Premium (%)
2008/2009	600	600	5%
2009/2010	1,334	2,229	5%
2010/2011	1,511	3,320	5%
2011/2012	4,723	10,300	4%
2012/2013		21,000	4%
2013/2014	16,780	36,700	4%

A smallholder farmer deposits 50% of the full supply of his input requirements in a fixed term collateral account. Interest payments on his deposit amounts 4%, which is lower than inflation. Input suppliers deliver on order from ZNFU to respective destinations where the DFAs management is responsible for distribution to farmers. The financing bank pays the invoice of the input supplier on confirmation of successful completion of the contract by ZNFU.

ZNFU envisages to reach ultimately 35.000 farmers in the coming years. In the Lima expansion plans ZNFU foresees that other field crops (e.g. soybean and other beans), livestock, vegetables and asset finance are incorporated into Lima. Moreover it strives to create more competitive financial service packages for small-scale farmers that not only provide access to seasonal credit but also provide access to medium & long term inputs & asset finance.

### 3 Index-based insurance in Burkina Faso

The insurance case in Burkina Faso focuses on an index-based insurance scheme issued by PlaNet Guarantee. The scheme covers drought risks in maize. Maize is selected since it requires relative high amounts of inputs and output is more volatile than for example millet and sorghum which are more resistant to drought. The system works by a combination of crop insurance and a rural credit facility. The credit agency insures their portfolio of loans whereby the lenders sign in addition to the loan contract an accompany insurance contract. The pay-outs are made via the credit agency but is withhold if the credit is not returned.

In Burkina Faso, several micro finance institutions market the PlaNet Guarantee cover in 2013/2014. Confédération Paysanne du Faso (CPF) and CIRAD collaborate with PlaNet Guarantee to foster weather insurance take up in a limited number of villages and to assess the impact of insurance of farmers' income. Although the insurance contract is optional the credit agencies are becoming more stringent in requesting this cover. Insured farmers without credit are rare in Burkina Faso.

The pay-outs for index insurance relate to specific weather events which is in Burkina Faso the decadal relative evapotranspiration. The index value is indirectly assessed by remote sensing with a grid size of 3 km by 3 km. Triggers below which payments are made correspond to percentile 5% of historical long-running decadal relative evapotranspiration data. Threshold for full payment is adjusted depending of areas and crop development period. Yet pay-outs are dependent on three specific periods mimicking the different stages of maize production (since 2012). The first stage covers 30 days after seeding (1st of July), the second stage comprises 20 days and the last stage 40 days. Pay-outs are proportionally to the total covered amount for the three subsequent stages are 30%, 100% and 100% respectively.

In Burkina Faso the scheme was launched by a pilot with 194 maize producers during the 2011 season by PlaNet Guarantee while in 2013/2014 2,072 producers were insured.

Producers pay a premium of 9.5% of the loan amount requested since 2012. The premium is not differentiated between covered zones and regions, but each zone and region has its specific threshold level (and thus actuary fair). This implies that protection levels are higher in the South which is less drought risk prone. The micro finance institution also requests a deposit amount of 25%.

**Table 2:** Key characteristics of maize index-based insurance scheme in Burkina Faso.

Year <sup>1</sup>	Number of farmers	Hectares	Premium	Premium (%)
2011	194	227	35,000	10.0
2012	1,340	1,507	155,000	10.8
2013	1,885	1,813	145,000	10.8
2014	2,072	2,212	210,000	9.5

<sup>1</sup> Subscription around July, harvest around October, pay-offs if any before the end of the year.

PlaNet Guarantee seeks to extend the experiment conducted among 10,000 producers for subsequent seasons, expanding to other crops. In 2013 the PlaNet Guarantee insurance scheme was extended to cotton production, and 446 producers took up the product.

Note that the Burkina Faso project is part of a larger project whose objective is to develop parametric agricultural insurance systems in WAEMU countries, including Senegal, Mali and Burkina Faso. This facility should cover at least 60,000 people by the end of 2015 in West Africa and raise awareness to more than 165,000 farmers on agricultural insurance.

## 4 Evidence on role of insurance and linkages

Insurance is an ex-ante measure to cope with crop losses by smoothening farm income. In Zambia, eligible claims in 2012/2013 amounted US\$ 263,650 and in 2013/2014 amounted US\$ 84,153 to indemnify for floods, drought and fire (Figure 1). At the end of the 2011 growing season, the average pay-out was 2.5% in Burkina Faso (Rosema et al., 2014).



**Figure 1:** Insured Zambian farmer affected by flash floods in the Central Province in the 2012/13 season.

Evidence on the role of insurance in farm income enhancement includes linkages to complementary actions such as access to production finance. Both schemes enable smallholder farmers without collateral agricultural credit services to finance inputs. For example, access to credit for fertilizer use in maize production is limited in Burkina Faso in contrary to credit offered by the cotton marketing board. Approximately 50% of the farmers who produce maize but did not produce cotton applied fertilizers.

On the other hand, micro finance institutions benefit from linking credit supply with insurance uptake. Smallholders are less exposed to weather risks by taking up insurance which also reduces their default risk. The Lima scheme has recorded almost a 100% recovery rate, a feature not common with agricultural loans especially among small-scale farmers (Swedish International Development Cooperation Agency, 2012).

Moreover, because of the reduced (systemic weather related) credit risk banks should be able to increase their funding capacity and to be enticed to have a larger proportion of agricultural loans in their portfolio.

Better conditions with micro-finance institutions and banks are a logical consequence. A more competitive loan provision by the private sector financing institutions might manifest itself in better access to credit and lower interest rates of the principle loan. Empirical evidence on the impact of linkages, including also complementary actions such as inputs supply and extension delivery arrangements, are observed.

When the Lima credit scheme first started in Zambia, the interest rate was 26%, soon reduced to 21% and now stands at 14%. Rather than the nominal interest rate a more indicative of the competitiveness of the rate is that the bank adds 2% to the base rate determined by the Central Bank. According to the evaluators of the Swedish International Development Cooperation Agency (2012) the mutual financing structure and the 50% cash collateral offered by farmers makes it much more attractive to banks to lend to smallholder farmers.

The reduced credit risk might also manifest itself in lower cash deposits or more competitive interest rates of the cash collateral. For example, some micro finance institutions in Burkina Faso have decreased the requested deposit amount from 25% to 15%, which is equal to gross insurance premium.

While first successes in current cases are observed, the question can be raised if all the ingredients are needed and what a change (in package or grouping) would imply for the price and conditions of the loan. The way forward is in creating more competitive financial service packages for small-scale farmers such that insurance premiums that lower the credit risk are (partially) set off by more competitive credit provision.

## 5 Comparative analysis of experience on indemnity-based and index-based insurance

In comparison to North America and the European Union the insurance supply chain is underdeveloped in Africa, especially in the business line of agricultural insurances. The market failure is addressed by several actors that want to facilitate market development in Africa (e.g. World Bank, IFC, EU, WFP, IFAD and NGO's). These actors do not restrict themselves to specific insurance designs being either indemnity-based or index-based, yet in the past years they intensively explored the potential of index-based insurance.

Although recent developments in index-based insurance products offer a tentative potential for coping with yield losses, indemnity-based insurance has a longer history with a broader outreach worldwide. The Lima case in Zambia proves that inherent problems with indemnity-based insurance can be adequately handled. For example, moral hazard is addressed via a group savings and loans approach which are formed based on mutual trust. Moreover, agricultural inspectors monitor and provide mandatory farming recommendations. Yet transaction costs are kept under control. Note that the premium in Zambia is substantial lower than in Burkina Faso (4% versus 9.5%) because the latter insured areas are probably more drought prone. However, sustainability of delivering indemnity-based insurance is hinging on good organised local farming communities and a strong institution representing smallholders.

Index-linked insurance products eliminate the need to individually verify claims, reduce transaction costs and make it easier to offer products and services in rural communities and in frontier regions. Clients expect that yield losses are eligible for compensation as is the case for traditional indemnity-based insurance. However, household might experience losses while not receiving pay-outs. Therefore, the concept of an index is more difficult to be marketed since smallholders should be aware of characteristics of the financial product he or she is purchasing. The experience of FARMAF project in Burkina Faso is that awareness campaigns addresses this knowledge gap.

## 6 Scaling up most promising insurance options

The ultimately objective is that the market develops itself into a sustainable and mature crop insurance market with a diversified geographically portfolio. To go beyond the pilot phase into the scale-up phase raises the questions what kind of insurance approach (indemnity-based versus index-based) and corresponding information is to be used for more wide-scale products. As the Zambian case has shown, piloting and upscaling indemnity-based schemes will only become viable if the sector are well organised with outreach in rural regions. Not only a strong representative farming organisation such as ZNFU is crucial, also existence of sizeable commercial farms. This is not given in many other countries in Africa. Therefore, upscaling is more likely for index-based insurance, being either ground-based or satellite-based.

Competitive advantage of using remote sensing technology in Africa mainly originates from supply opportunities. Limited availability of historic local data together with its limited resolution impedes implementing ground-based index insurance in Africa. Both are temporarily limiting supply factors from a technical point of view. Insurers can install a dense network of local weather stations but bottlenecks are foreseen at time of the scaling-up phase. Scaling-up is crucial for keeping costs under control, and remote sensing technologies can improve efficiency with limited investment. Satellite-based indices represents a major breakthrough towards affordable crop insurance.

Despite distinct advantages of satellites, there is a need to consider each context carefully. Main bottlenecks of using remote sensing techniques originate from demand issues. For some of the insurers the issue of the complexity of satellite-based indices is a major and permanent limiting factor. It is felt that a remote sensing index cannot be explained adequately to the client, while with respect to rainfall indices one can easily refer to the locally installed weather station.

Some of the current schemes use satellite data, to complement data from weather stations and

weather data. But after a few years with experience, they can start doing calculations with the local weather station data and switch to ground-based indices in those areas. However, offering the product in other areas would imply to start this procedure over again. Other insurers might switch from ground-data indices to satellite-based indices at the time of up-scaling. At present it is too early to determine which specific technology will prevail. A one size fits all approach is moreover not expected since specific remote sensing technologies and indices might work under some conditions, while ground-based indices are preferred under other conditions.

## 7 Policy environment

The influence of the policy environment and regulation on the success of farm risk management systems is given the current insurance cases less of a prominent relevance compared to marketing cases within the FARMAF project. For instance insurance regulators supervising the insurance industry for the benefit and protection of policyholders did not hamper development of insurance schemes in Zambia and Burkina Faso.

Public policy measures can facilitate the operation of insurance markets. Specific measures can include education of farmers and extension personnel in risk management issues, particularly in the functioning and the use insurance. Support of the development of private insurance may include (i) the development of informational infrastructure such as (weather) monitoring equipment and databases; (ii) take preventive actions such as public investments in protective infrastructure or the support of private actions that reduce the extent of damages caused by disastrous events (iii) direct participation in the market during the starting phase.

Another complementary option for government intervention is subsidizing premiums. Although subsidized crop insurance is quite common in North America and the European Union premium support in Africa is not widespread because of public budget limitations. Premium subsidies can help to develop markets for insurers (by assisting them to build a sizeable agricultural insurance portfolio within which they could more efficiently diversify the risk and spread

the transactions costs) and banks (less credit risk and less funding problems). But above all farmers benefit since premium subsidies will reduce their cost of insurance. Yet in Burkina Faso an insurance tax of 8% is imposed, thereby increasing the cost of insurance.

Also public interventions in input and output markets affect demand for farm credit and therefore agricultural insurance. Public policy should take into consideration the wider impact their interventions have.

## 8 Conclusion

Linking rural credit with crop insurance potentially offers important advantages to smoothen and enhance smallholders income. The Zambia and Burkina Faso cases provide an opportunity to analyse the impact of the credit-insurance-input-extension model and to see how the (successful) scheme can be adapted and replicated in other countries. The policy environment should endorse these market innovations.

### FARMAF related back-ground reports

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