

When rain only tells half the story: Cotton Index Insurance in Mali

So far, the most common application of index-based insurance in developing countries is linked to rainfall. However, a recent feasibility study indicates that area yield index insurance makes more sense for Malian cotton farmers.

In Mali, agriculture makes up 80 percent of the labour force and provides 45 percent of the GDP. Weather hazards like droughts and excess rainfall can create disastrous consequences for the farmers who depend on crop yields for their livelihoods. Additionally, most Malian farmers – and most West African farmers in general – do not have access to tools to protect their hard-earned income, their assets, and their families. To address this issue, in 2008, the ILO’s Microinsurance Innovation Facility provided grant funding to the non-profit organisation PlaNet Finance (in partnership with two reinsurance companies, AGF Afrique and Swiss Re) for a feasibility study of index-based insurance for cotton producers in Mali. Cotton was selected because of its economic weight and its position as the country’s top export.

■ What index works for Malian cotton?

The feasibility study in Mali evaluated three types of indices. The **weather-based index** is based on rainfall alone, though it can incorporate multiple aspects of rainfall, such as periods without rain, late start of the rainy season, and excessive rain. The **satellite-based index** (SBI) measures

“greenness”, or the level of photosynthesis in vegetation, and estimated rainfall data to approximate farmers’ loss. Finally, the **district-level area-based yield** (DARBY) **index** measures representative data of the yields of all farmers in a geographic area.

The Table shows the strengths and weaknesses of the three approaches.

■ Weather-based index insurance

The feasibility study showed that the weather-based index was not correlated

with farmers’ losses. Using data from Koutiala in south-eastern Mali (Sikasso region), the team conducted a quantitative comparison between simulated index-based insurance payouts and historical yield losses. Years in which a lack of annual rainfall would have triggered a payout are not aligned with years in which farmers experienced loss, resulting in a high basis risk (80 %).

A pre-feasibility study conducted by USAID for maize index insurance in the Sikasso region found the same lack of correlation between weather and crop yields. This study cited soil quality as a potentially important confounding

Comparison of three index-based insurances

Criteria	Explanation	Weather-based	Satellite-based	Yield-based
Basis risk (the probability that the index-based payout will not accurately reflect a farmer’s loss)	The index must target the correct risks, maximising the correlation of payout to income loss.	Basis risk of 80 %. There is no significant correlation between lack of rainfall and low yield.	Basis risk of 36 %. Only captures fluctuations in vegetative cover and rainfall; more appropriate for large-scale than localised drought.	Basis risk of 30 %. Captures any variation in yield at the district level, due to weather or any other cause.
Availability of data	Data must be adequately robust, both historically and on an ongoing basis.	Historical weather data available for 30 years. On an ongoing basis, rain gauges are in 200+ villages, but are read by farmers, making data less reliable.	Satellite vegetation and rainfall data is available for free and is very precise.	Data provided by the Malian government covering 32 districts over 6 years. Village-level data will be provided if the project moves forward.
Simplicity of product and administration	Farmers need to understand the value of the product and it must be simple to administer.	Farmers understand the concept and it is fairly easy to administer once the product is designed.	Interpreting SBI data requires ongoing technical expertise, which is not readily available on a long-term basis.	Farmers understand the concept and it is fairly easy to administer once the product is designed.

■ = Feasible ■ = Feasible, with issues ■ = Infeasible

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The ILO's Microinsurance Innovation Facility was established in 2008 to further the extension of insurance to millions of low-income people in the developing world, with the overall aim of reducing their vulnerability to risk. With support from the Bill and Melinda Gates Foundation, the Facility makes grants to projects throughout the developing world that are using microinsurance in innovative ways.

More information:
www.ilo.org/microinsurance

factor in Mali (Hartell, Skees 2009). Other factors, like pests, fertiliser, and seed quality, also affect farmers' productivity, throwing off the correlation between rain and yield.

■ Satellite-based index insurance (SBI)

The SBI offers very precise data compared to the other indices. Though an SBI is typically more suitable for identifying large-scale drought than localised drought, the feasibility study found that it was able to explain 64 percent of the yearly variation in yield, resulting in a basis risk of 36 percent.

However, the interpretation of the data needed for the SBI is also very complex and requires advanced tech-

Cotton is an important export commodity. But small-scale cotton farmers have only very limited access to insurance services.

nical expertise, which is not available on a sustainable basis; hence a SBI could not be a feasible long-term solution for Malian cotton farmers.

■ Area yield index insurance

The district-level area-based yield (DARBY) index captures any variation in yield at the district level (typically containing 15,000 hectares of cotton production), whether it is due to weather or any other cause. Available data cover the average annual yield of 32 districts in six circles in Southern Mali over a six-year period. These data were able to explain 70 percent of the yearly variation in yield faced by the villages, for a basis risk of 30 percent.

This is the lowest basis risk of the three types of indices. Based on the

limited basis risk and the DARBY index's ability to incorporate non-weather variables, the project team selected it as the most promising index for the Malian context.

■ The way forward

Though drought index insurance has been successfully piloted in Ethiopia (World Food Programme 2006) and Malawi (World Bank 2009), the study shows that cotton in Mali requires a different kind of intervention. The feasibility study is a valuable indication of the limitations and possibilities for index insurance in West Africa, and particularly for the context of Malian cotton. A pilot may be introduced in September 2010 in association with cotton farmers' co-operatives and the Malian government.



Photo: ILO

Zusammenfassung

2008 gewährte die Microinsurance Innovation Facility der ILO dem Mikrofinanz-Tochterunternehmen der Nichtregierungsorganisation PlaNet Finance Group zusammen mit AGF Afrique und Swiss Re eine Finanzhilfe für eine Machbarkeitsstudie über indexbasierte Versicherungen für Baumwollerzeuger in Mali. Dabei wurden drei Indizes bewertet. Da der Wetterindex ein hohes Grundrisiko birgt und für den satellitenbasierten Index umfangreiche technische Mittel erforderlich

sind, wurde der Flächenertragsindex als vielversprechendster Ansatz gewählt. Da er jede Schwankung auf Distriktebene erfasst, berücksichtigt er fast alle Größen und bietet eine sehr hohe Korrelation mit den Ernteverlusten der Bauern.

Resumen

En 2008, el Fondo para la Innovación en Microseguros proporcionó fondos de subvención a PlaNet Guarantee (en asociación con AGF Afrique y Swiss Re) para realizar

un estudio de factibilidad sobre seguros basados en índices para los productores de algodón en Mali. Se evaluaron tres tipos de índices. En vista del alto riesgo de base del índice climático y de los recursos técnicos requeridos para un índice satelital, se eligió el índice basado en el rendimiento por área como el enfoque más prometedor. Gracias a que capta cualquier variación a nivel distrital, logra incorporar casi todas las variables y mantiene una muy alta correlación con las pérdidas de los agricultores.