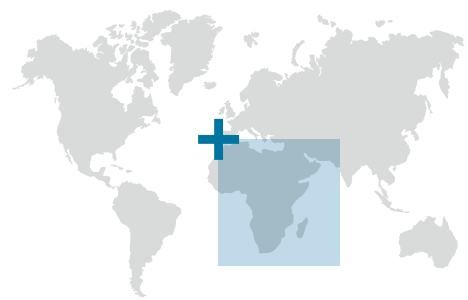


# INFOCUS: INNOVATION & TECHNOLOGY



## SUBJECT

The high transaction costs of serving low-income clients in developing and emerging market economies demand innovative approaches and technological advancements. Challenges that inflate operational costs include data collection, processing and management, premium payment mechanisms as well as claims verification and settlement. Index insurance products, mobile payment devices or more accurate weather, and agricultural-yield information based on satellite data are examples of innovative approaches that can help to overcome these challenges.

## CHALLENGES IN GHANA

Before 2011, agricultural insurance was not available to Ghanaian farmers. The cost of carrying out loss adjustments on small plots of land was too high for insurance companies to generate profits. The market lacked the impulse and knowhow to develop products that addressed the needs of farmers, for example through innovative weather index insurance solutions.

The development of weather index insurance relies on the availability of weather data, both for the development of products and verification of claims. The low density of weather stations in Ghana presented a major challenge when introducing a country-wide insurance scheme purely based on weather station data.

Supported by:



Federal Ministry  
for the Environment, Nature Conservation  
and Nuclear Safety

based on a decision of the German Bundestag

And while for the majority of farmers, rainfall deficit was the most severe risk, some farmers were more severely affected by other types of risk, for example, windstorms. Weather index insurance works best for droughts as rainfall can be easily measured through rain gauges and loss functions can be developed based on water requirement levels of crops. Other weather phenomena require more sophisticated weather stations and loss functions are not as easily established.

In addition, agriculture is exposed to a broad range of risks, weather and non-weather related. For some farmers in Ghana, single weather index and named peril insurance were not very attractive as they needed to consider their overall risk exposure.

## SOLUTIONS

### Developing a product range that caters to the needs of different farmers

In 2010, IIPAC conducted a feasibility study that identified the risk exposure of farmers in Ghana. The feasibility study segmented the market according to the main perils affecting various crops and proposed insurance solutions that were suitable for the risks and production conditions of each crop. Based on this analysis, IIPAC supported the Technical Management Unit (TMU) of the Ghana Agricultural Insurance Pool (GAIP) to develop a variety of products that address the main challenges faced by farmers.

**Weather station-based index insurance.** The first product developed in Ghana was a rainfall deficit index product based on weather station data. This product is particularly suited for important crops grown by smallholder farmers, such as maize, soya, and sorghum. Based on the expert opinion of agronomists, the water requirements for the three main growing phases, i.e. planting and germination, flowering, and maturation, were calculated for each crop. A rainfall deficit index was designed that was tied to the readings of the nearest weather station. To minimize basis risk only farms within a 20-km radius from the weather station were eligible to purchase insurance. As the weather station density in the country was low, IIPAC sponsored the acquisition of 36 automated weather stations (AWS).

**Satellite-based index insurance.** Despite the installation of additional AWS, many farmers in Ghana did not live close enough to a weather station. IIPAC, therefore, recommended using satellite data to ensure that farmers far from weather stations could be covered. The design of the index product was the same for weather station and satellite-based rainfall deficit insurance; the only difference was the reference data source for the triggers. The reference data source for the satellite-based rainfall deficit cover uses the Africa Rainfall Climatology version 2 (ARC2) from the National Oceanic and Atmospheric Administration (NOAA). With a data grid of  $-0.1^\circ$  spatial resolution ( $\sim 10$ km) this data is generally as reliable as interpolated data from ground stations.

**Named peril crop insurance.**<sup>1</sup> As some of the major commercial crops in Ghana, such as cocoa, rubber, and fruits, are less prone to droughts than to other perils, IIPAC also analyzed the feasibility of developing non-index insurance for these crops. Named peril insurance, however, requires physical loss verification. This approach is therefore only suitable for well-organized value chains where farm and production sizes justify the cost of carrying out individual loss adjustments. The project supported the TMU in the design of a windfall cover for rubber.

**Area Yield Index Insurance (AYII).** The feedback from farmers that were insured through the rainfall index revealed that they were interested in covering additional risks beyond droughts. IIPAC, therefore, supported the development of an Area Yield Index Insurance (AYII) which insures farms based on the average district yield as the basis for estimating the production loss of individual farmers. The index is tied to average district yields that are measured through Crop Cutting Experiments (CCE) by the Statistics, Research and Information Directorate (SRID) of the Ministry of Food and Agriculture (MOFA). IIPAC provided trainings to the MOFA staff on CCE.

<sup>1</sup>Named Perils Coverage is a property insurance term referring to policies that provide coverage only for loss caused by the perils specifically listed. Named Perils Coverage contrasts with all risks coverage, which applies to loss from all causes not specifically excluded.



## LESSONS LEARNED

The diversity of the agricultural sector indications market potential for a broad range of agricultural insurance products. Different types of indemnity and index insurance products are suited for different crops, depending on the risk profile, the production patterns, and the value chain structure. Developing product development capacity in a country ensures that the market potential can be exploited in an optimal fashion.

By having a range of insurance products at their disposal, insurers can react to farmers needs in a demand-oriented and flexible manner. Once the basic methodology and design of a product have been developed for one crop, expanding the product range to cover additional crops is feasible with limited additional investments required.

A key consideration for the development of products is the availability and reliability of data. The possibility of developing products is, in part, determined by the data infrastructure of the country. Given the large investment required, projects cannot be expected to upgrade the entire data collection infrastructure. In Ghana, the project supported the installation of 36 AWS. This selective support was useful in piloting the weather station based index product but did not lead to the scalability of the approach. Switching to remote-sensing technology is a more cost-efficient strategy.

The use of innovative design and modern technology should not only be limited to product development, but also to the distribution and marketing of products. In Ghana, while innovative products have been developed successfully, GAIP has so far failed in creating a cost-effective distribution model.

## OUTCOME

With support from IIPAC, the TMU of GAIP has developed two index insurance products for drought for farmers growing maize, soya and sorghum in seven out of ten regions in Ghana. During the project's lifespan, 6,116 farmers were insured for a total insured sum of EUR 35 million. The products were sold both to individual farmers and intermediaries such as financial institutions that act as aggregators.

In 2014, GAIP offered named peril crop insurance (NPCI) for the wind to two commercial rubber plantations. Through the contracting scheme operated by these plantations, many scale farmers are also insured.

The AYII product was developed by the TMU but is not offered in the market. The main reasons lay in the complexity of the products and cost associated with the distribution and administration of the product.



**Name of programme:**

Innovative Insurance Products for the Adaptation to Climate Change (IIPACC)

**Duration:**

December 2009 – June 2014

**Programme area:**

Ghana (countrywide)

**Cooperation partner:**

National Insurance Commission Ghana

**Local partner:**

National Insurance Commission Ghana, Ministry of Finance, Ministry of Food and Agriculture, Ghana Insurers Association, Ghana Meteorological Agency

**Target group:**

Actors in the agricultural value chain, such as smallholder farmers, commercial farmers, input suppliers, extension services, processors, financial institutions, lending to the agricultural sector

**Contact person:**

Advancing Climate Risk Insurance plus

E [acri@giz.de](mailto:acri@giz.de)

**Photo credit:**

single credits to be checked with [acri@giz.de](mailto:acri@giz.de)

*April 2019*

**DISCLAIMER**

This publication has been prepared by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Munich Climate Insurance Initiative (MCI) in the frame of the project "Promoting Integrated Mechanisms for Climate Risk Management and Transfer" funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The information in this publication is solely based on the project documentation provided by the project implementer(s).