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## **Index-based Insurance for Cocoa Production in Ghana: Just a Mirage?**

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### **Abstract**

Index-based rainfall insurance is a financial adaptation option that pays out benefits based on a predetermined index e.g. rainfall level. It is a measure that has the potential to improve cocoa farmers' resilience and enhance their adaptability to climate change induced risks. However, the complex nature of the cocoa sector and the organisational structure of Ghanaian farmers create uncertainty about the adoption and successful implementation of index insurance. This paper presents results of a study on factors explaining farmers' willingness to pay for index insurance, and the organisational and institutional factors that influence its demand and adoption. Primary data were collected through structured surveys with 313 households in 20 communities in Bia East and Dormaa West districts. In addition, five insurance companies were interviewed to determine their interest in and potential challenges for the establishment of a market for index insurance products for farmers. Key informant interviews were conducted with representatives of the Ghana Cocoa Board to determine the factors that can affect adoption of index insurance. Econometric analysis of the data reveals that majority of cocoa farmers are willing to pay the equivalent of 10% of the value of a 62 kg bag of cocoa as insurance premium. Insurance companies will be willing to provide index insurance packages to cocoa farmers provided there is time series yield and meteorological data to help structure the premium. Insurance companies, however, are concerned about farmers' level of education and organisation and how index insurance can be sold to them. The main policy recommendation based on these findings is to advance the concept of index-based insurance by training the cocoa extension service division with support of the Ghana Cocoa Board to educate farmers on index insurance. However, with no clear structures and resources allocated for adoption and implementation of index insurance, its future remains unclear.

**Keywords:** Cocoa farmers, Ghana, index-insurance, willingness-to-pay

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## **Introduction**

Cocoa serves as the main source of employment and income for about 70% of the Ghanaian work force (Nimoh et al. 2011). Cocoa is an understory tree-crop which is sensitive to extreme sunlight and drought (Laderach et al. 2013; Parulekar 2014). This makes cocoa production susceptible to extreme sunshine and temperatures. In addition, cocoa production in Ghana is still rain-fed as farmers produce cocoa mostly on a small-scale basis and therefore lack the necessary resources to provide irrigation (Aneani et al. 2011). However, optimum amounts of rainfall and temperature are crucial for a good yield. These climatic variables are high-risk factors during the fruiting and growing stages of cocoa (ICCO 2013). Currently, the risk of cocoa failure is getting higher due to rainfall variations and extreme temperatures (Balma Issaka et al. 2016). Crop failure due to climate variability can lead to loss of income and livelihood insecurities among cocoa farmers (Akhter 2013). Even though the changes of climatic factors are expected to be gradual, leaving time for adaptation, they can still threaten sustainable cocoa production if completely neglected (ICCO 2013; Laderach et al. 2013). Index-based weather insurance (index insurance) is a financial adaptation option that pays out benefits based on a given index, e.g. rainfall level. It can support farmers to better cope with crop failure due to extreme events. In previous studies, it has proven to enhance farmers' resilience and increase their adaptability to climate change (Clarke et al. 2012). During extreme events, farmers can receive payout to cushion them against the shock of crop failure. Nevertheless, farmers' willingness to pay (WTP) and factors that can influence institutional capacity to provide index insurance are unknown. The aim of this study is twofold: it provides empirical results on farmers' WTP for index insurance and based on information from various experts, discusses the institutional capacity to provide index insurance as an adaptation to climate-related risks.

## **Material and Methods**

Two cocoa growing districts, Dormaa West and Bia East, were selected for the study. Questionnaire survey data were collected using a random sample of 313 households from 20 communities within the two districts. A focus group discussion was conducted to determine farmers' willingness to pay and amount willing to pay. Responses were used as the baseline for the household survey.

To collect information on the institutional capacity, an analysis of key stakeholders of cocoa index insurance was conducted. Five insurance companies were interviewed to determine their willingness to provide index insurance to cocoa farmers. In addition, representatives from the Ghana Cocoa Board, Cocoa Research Institute of Ghana and the Bonsu Cocoa College were interviewed to determine the factors that can influence adoption and implementation of index insurance in Ghana.

## **Results and Discussion**

### ***Perception and experiences of climate-related risks***

Econometric analysis of the household survey data revealed that 91% of the respondents had observed or heard about changes in the weather pattern. Farmers perceive climate change through rainfall variation (72.2%), drought (23.3%), extreme temperatures (19.8%) and strong winds (0.96%). This is in accordance with several studies that have also reported similar perceptions of climate change among farmers (Kost et al. 2012; Atinkut and Mebrat 2016; Ndamani and Watanabe 2016). Out of these, more than 97% had been exposed to effects owing to extreme weather events. Notable among these effects were yield reduction (67.4%) and income reduction (51.1%). About 68% of the respondents expect the occurrence of climate-related risks in the future.

### ***Willingness to pay for index insurance***

In all, 93.3% of the respondents were willing to pay for index insurance. Out of this, 83% were willing to pay 10% or more of their annual cocoa yield as insurance premium with a mean WTP of 13.9%. The overall average amount respondents were willing to pay for index insurance was 12.2%

of their yield. The study revealed that farmers' experiences of climate-related risks had an influence on the amount they were willing to pay for index insurance (Figure 1). On average, farmers who have experienced very severe effects were willing to pay significantly higher amounts of their yield as index insurance premiums ( $X^2(5, N = 289) = 14.1, p = 0.015$ ). Farmers' origin and land ownership type were found to be strongly correlated. However, both have a significant influence on overall willingness to pay and the amount they were willing to pay for index insurance. In addition, respondents' perceptions of risks and their satisfaction with other types of insurance had a significant influence on WTP. Furthermore, access to extension service and subsidies were found to significantly influence farmers' WTP.

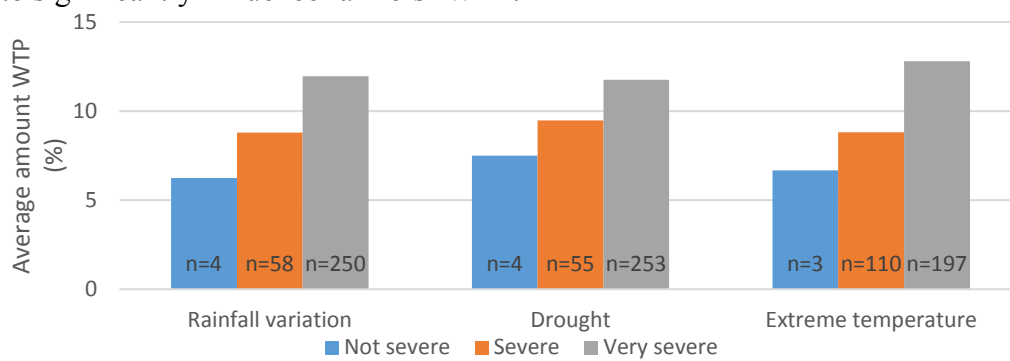


Figure 1: Amount willing to pay based on risk exposure (as assessed through the question of how severe did the weather changes affect farmers)

### ***Institutional factors influencing provision and implementation of index insurance***

A number of hindering and encouraging factors that could influence the provision and implementation of index insurance from different perspectives were identified.

#### **Hindering factors:**

Insurance companies perceive index insurance as risky and unattractive. They indicate that farmers have wrong perceptions of insurance and they see it as “free money”. They are also concerned about the level of education of farmers and their ability to understand index insurance contracts. According to insurance companies, farmers are not organized; therefore, selling index insurance to them would be difficult. They also expressed concern about the reliability of weather data. Meanwhile, reliable weather data is a key requirement for index insurance to operate (Leblois et al. 2014).

According to the Ghana Cocoa Board (COCOBOD), there is no complete biophysical dataset of farmers and individual yield data are also not available. Another issue they mentioned was the lack of financial resources to start and maintain an index insurance project. They also anticipate the lack of weather data to be a hindrance to the successful implementation of index insurance contracts. Research and academic institutions are, however, concerned about the actual costs and benefits involved in index insurance. They also anticipate that the saving habits of farmers and their low interest in saving with banks can be a stumbling block. Finally, they are concerned that farmers do not have the required know-how to engage in an insurance contract.

#### **Encouraging factors:**

A number of factors that could increase the success of index insurance implementation were also identified. According to insurance companies, providing index insurance to farmers could enhance their investment opportunities and maximise profits. In addition, they saw the large population of farmers as an opportunity for the insurance market. COCOBOD revealed that a portion of the surplus fund set aside to stabilize cocoa prices could be used to support an index insurance project. They also envisioned that there could be a Tri-pedal scheme where contributions could be generated from farmers, the government and other organisations to support index insurance projects. Research and academic institutions are optimistic that farmers would welcome the idea of index insurance.

They also mentioned that remote sensing technology could be used to enhance the reliability of weather data. Furthermore, they see a potential to bring microfinance institutions on board to increase farmers' access to credit and enhance their ability to pay for index insurance premium.

### **Conclusions and Outlook**

The results of the study show that farmers have been exposed to climate-related risks and yield loss. The majority are willing to pay for index insurance. Farmers' decisions are connected to their experiences of the changes in the weather patterns. They perceive insurance as an initiative that can motivate the youth, protect cocoa production and secure livelihoods. Institutional structures and the enabling environment can influence implementation of index insurance policy.

The study recommends formation of farmer associations and cooperatives to help increase access to information on index insurance. For easy access to yield data, COCOBOD is to collect and maintain countrywide census data on cocoa farmers. Research and academic institutions are also to analyse the costs and benefits of an index insurance market and assess the availability and reliability of weather data.

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