

## DeRISK SE Asia INFO NOTE SERIES

### DeRisking Coffee in the Central Highlands: Piloting a Coffee Climate Protection Insurance (CCPI) for farmers and agribusinesses

Angelica Barlis, Shahbaz Mushtaq, Laurent Bossolasco,  
Jarrod Kath, Julian Roberts, Claire Wilkinson,  
Cornelis Swaans

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#### KEY MESSAGES

- Co-designing insurance solutions establishes trust between farmers and private sector partners, allowing tailored product design to respond to the needs of coffee producers.
- A business model with incremental steps towards scaling supported by a strong private-sector partnership enables farmers' capacity to pay for insurance premiums
- Raising awareness on insurance and solutions through literacy and product design workshops is necessary to improve farmers' understanding of the potential benefits.

**T**he DeRISK Southeast Asia project, together with the Atlantic Commodities Vietnam Ltd (ECOM) Sustainable Management Services, is enabling smallholder coffee farmers in the Central Highlands of Vietnam to better manage climate risks. This includes the translation of seasonal forecasts into usable agro-advisories, coupled with an integrated risk management approach in the form of an index-based insurance for drought, excess rainfall, and temperature. Climate is a significant driver of coffee yield and quality of beans, thus, having a significant effect on farmers' income.

The collaboration between public and private sector partners, aims to enable farmers to manage risks through a co-contribution model for coffee index insurance premiums. If farmers generate good yield and are prepared to deal with climate risks, it creates inherent benefits among supply chain actors and acknowledges the value of shared responsibility across the chain. Insurance protects farmers against adverse weather conditions.

#### Background

The Central Highlands in Vietnam is a top coffee-producing region which has been facing severe

agricultural and economic losses brought on by droughts experienced throughout the years. Reductions of up to 25% of the total production of green coffee beans have been recorded during the 1997-1998 or 2010-2011 droughts. Moreover, high rainfall (>750 mm) and high mean minimum temperature (>22 °C) during harvest (October-December) increased the risk (>75% probability) of above-average coffee bean defects. These included insect damage and moldy beans, and variation in bean sizes as a result of a range of rainfall and temperature drivers across the flowering, growing, and harvest seasons (Kath et al., 2021). With adverse climatic events resulting in big financial losses to farmers, there is a need to develop financial risk management strategies to ensure farmers can earn a decent income.

One of the most severe climate impacts occurred in 2015-2016. The provinces of Dak Lak, Dak Nong, Gia Lai, Kon Tum, and Lam Dong were affected severely by drought. This resulted in 152,000 ha of agricultural land counting direct economic losses of about USD 269 million (Byrareddy et al., 2021). The communities in the region received support such as the provision of rice and food supply, water tanks, access to low-interest credit and cash support, and seed and agricultural inputs to



Vietnam has emerged to be one of the top coffee suppliers in the world, with Central Highlands as a top coffee-producing region. Photo: CIAT

restore crop production (FAO, 2016). However, no actions were taken to manage and reduce risks among farmers.

The Coffee Climate Protection Insurance (CCPI) aims to protect smallholder Robusta coffee farmers in Central Highlands by insuring them against the financial impact of adverse weather conditions. ECOM Sustainable Management Services led the piloting of drought and excess rainfall insurance products in Dak Lak and Lam Dong provinces in 2021. The project implemented a risk management measure by transferring climate risks from farmers to insurance markets. Given the potential benefits of adequately layered risk transfer solutions as part of a comprehensive climate risk management approach, it responds to a need for insurance to protect smallholder farmers against the potential economic shocks brought about by extreme weather conditions.

There are two main types of insurance for agriculture. The conventional or traditional crop insurance which relies on direct measurement of the loss or damage suffered by the farmers through actual field assessments; and the index-based insurance that responds to an objective parameter (e.g. rainfall or temperature measurements) at a defined location or weather station during an agreed time period (WFP, 2011). This relates the payouts to an index correlated to agricultural production losses rather than actual physical loss or damage.

## Project Description

Co-designing products to ensure ownership is a precondition for the successful implementation of an insurance scheme. This guarantees that index insurance products are tailored to the needs of beneficiaries. Working closely with ECOM and smallholder coffee producers, the project investigated the climate risks and their impact on coffee production and the supply

chain. Based on an analysis of the most impactful risks, the project co-developed and roadtested index insurance products among farmers to raise general awareness on insurance, complemented with evaluation workshops and farmer surveys to assess their willingness-to-pay (WTP).

The project introduced an inclusive process by engaging farmers in insurance product design while working directly with the coffee industry and research institutions and ensuring alignment with relevant policies for greater uptake of index insurance. The business model emphasizes the importance of incremental steps toward scaling. The CCPI scheme protecting coffee farmers against drought and extreme rainfall perils is being tested in three phases between 2021 and 2025:

- Phase 1 (2021) – Insurance premium is fully supported by ECOM for 100 coffee farmers. The project is processing the experience from 2021, supplemented with WTP surveys and information on farmers' change in behavior after availing of the insurance.
- Phase 2 (2022-2023) – This follow up phase covers about 500 to 600 coffee farmers and will explore a co-contribution model for insurance premiums supported by the findings from the WTP study. Planned meetings with industry players like coffee roasters are taking place in 2022.
- Phase 3 (2024-2025) – The final phase will cover about 1,000 coffee farmers and will involve farmers, roasters, and coffee traders who co-finance the insurance premiums. This scheme incrementally builds farmers' capacity to pay for insurance premiums with continuous training support (Figure 1).

Year 1 focused on "insurance literacy seminars" to introduce the concept of insurance (first time), present the insurance prototypes to coffee producers, and allow them to participate in the co-design process by selecting the premium based



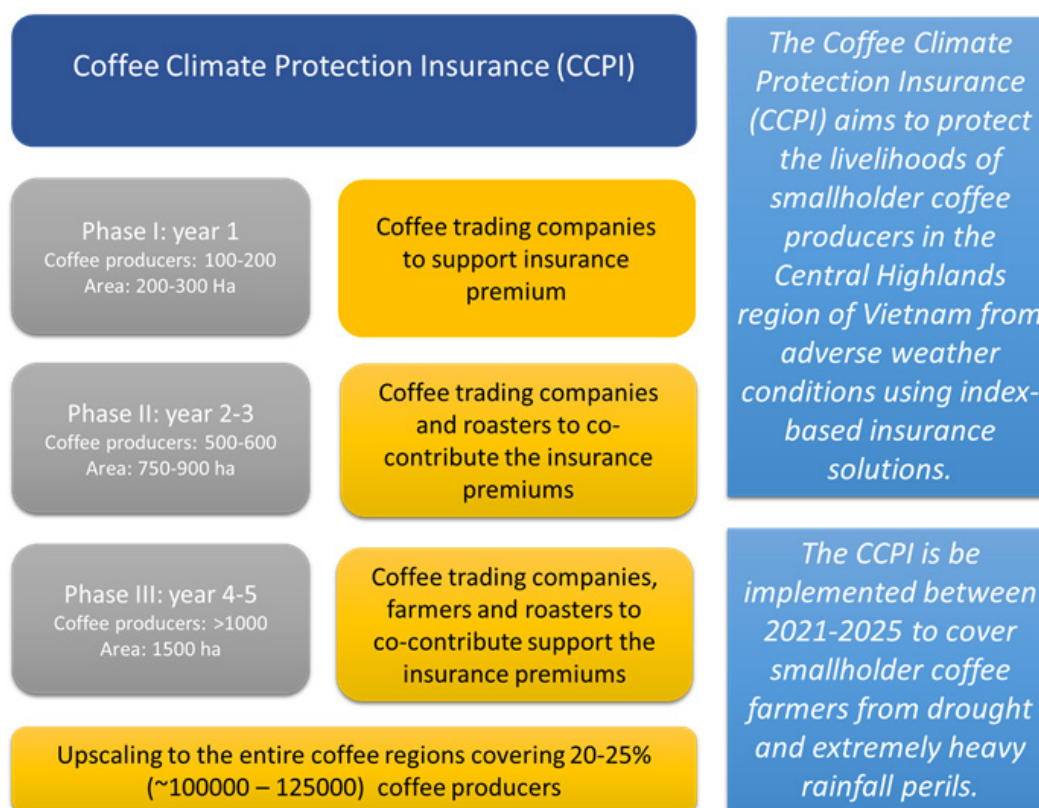


Figure 1. CCPI scheme developed by DeRISK SE Asia

on their capacity to pay, as well as defining the period for policy coverage when they most need the insurance. Years 2 and 3 will enhance the farmers' capacity in making farming decisions and risk management practices, integrating the decision of whether to purchase insurance for the season. Year 4 and 5 anticipate that coffee trading companies, farmers and roasters will co-contribute to the insurance premiums.

### Piloted index insurance product design

Two products were developed: a low cumulative rainfall index (drought) and high cumulative rainfall index.

Figure 2a refers to 'low cumulative rainfall index' between 1st April and 31st May in Dak Lak. The insurance claim is based on the following formula: [Attachment – Rainfall] x Payout. Hence, in case of cumulative rainfall of:

- A. 180mm, a grower will receive no payout as the attachment has not been breached.
- B. 110mm, a grower will receive USD 222 [(147mm – 110mm) x USD 6]
- C. 75mm, a grower will receive the maximum payout possible, USD 432 [(147mm – 75mm) x USD 6]
- D. 60mm, a policyholder will still receive USD 432 as this is the maximum possible payout.

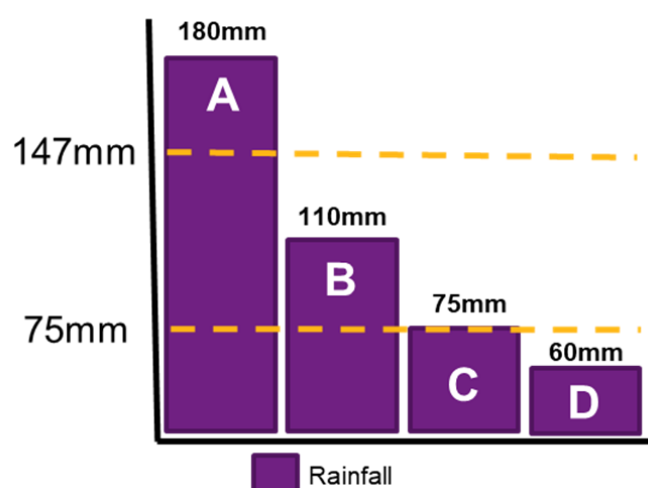


Figure 2a. Low cumulative rainfall index  
(Source: WTW)

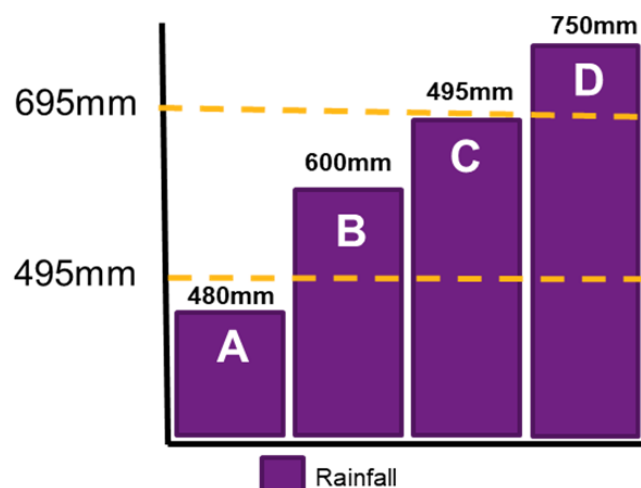


Figure 2b. High cumulative rainfall index  
(Source: WTW)

Meanwhile, Figure 2b refers to a high cumulative rainfall index, between 1st July and 31st August in Lam Dong. A claim equals: (Attachment – Rainfal) x Payout. Hence, in case of a cumulative rainfall of:

- A. 480mm, a grower will receive no payout as the attachment has not been breached.
- B. 600mm, a grower will receive USD 630 [(600mm – 495mm) x USD 6]
- C. 695mm, a grower will receive the maximum payout possible, USD 1,200 [(695mm – 495mm) x USD 6]
- D. 750mm, a policyholder will still receive USD 1,200 as this is the maximum possible payout.

The index insurance policy is developed based on the ERA5 dataset. Data cover the Earth on a 30km grid and resolve the atmosphere using 137 levels from the surface up to a height of 80km. Quality-assured monthly updates of ERA5 (1959 to present) are published within 3 months in real-time. Preliminary daily updates of the dataset are available to users within 5 days in real-time (ECMWF, 2019).

## Challenges

Several challenges were experienced during the first phase of the insurance pilot:

- Most farmers were not aware of the concept of insurance for crops or agriculture and lack an understanding of how index-based

solutions work. This highlights an urgent need for knowledge transfer and awareness raising for enhanced adoption of insurance products. While a digital platform, designed and tailored for the coffee industry, including claims trigger information, interactive learning, discussion support, and mobile application for monitoring can greatly enhance the knowledge of coffee producers, literacy workshops on insurance will remain relevant.

- While smallholder farmers were generally satisfied and willing to pay a certain amount of premiums, there were concerns about the affordability of insurance, especially temperature-based products. This underpins the need to ensure premiums are affordable and a need for innovative and cost-effective ways to roll out insurance products.
- Difficulties in procuring suitable crop yield and climate data to investigate basis risk and to structure insurance products. As station data is largely lacking, and or not complete, in the Central Highlands, global scale gridded datasets (e.g. ERA5) had to be investigated and utilized to develop insurance options.
- The small size of the insurance pilot program (i.e. 100 coffee producers) meant that encouraging suitable reinsurance providers was a major challenge. However, the project experienced team was able to secure the interest of a reinsurance provider, which had interest in backing the program because of its considerable potential for scaling up and social benefits.





## Lessons from phase 1

The pilot demonstrates a promising reception from the coffee producers on index insurance solutions, which has the potential to provide options for smallholder farmers to manage the financial impacts of climate risks. The workshops and household surveys indicate that the coffee supply industry and smallholders see the value of insurance solutions and are keen to participate in CCPI.

Results from the WTP study (with 151 coffee producers) using the contingent valuation method revealed that besides several socio-demographic characteristics (i.e., education, and coffee farm size), farmers' insurance knowledge, and their perception of the impact of climate change (particularly drought) on coffee production positively influence their decision on participating in the insurance schemes. This suggests that additional training on insurance schemes and raising awareness on climate change impacts are needed to enhance the insurance uptake from farmers. The estimated mean WTP for insurance premiums derived was estimated at 2.17 million VND (approximately USD 95). Generally, farmers in Lam Dong were willing to pay more for index insurance products than in Dak Lak. Farmers' preference for distribution channels for insurance products was also investigated in the survey. The results indicated ECOM and/or government agencies as the most preferred distribution channels.

These results should be considered when developing phases 2 and 3 of the CCPI. Although this study provides several important results which can help improve the design of the current weather-index insurance products, the sample in our study was relatively small and may not represent the whole population in the area. The concept of weather-index insurance is relatively new in the study area, and hence it is important to continuously assess farmers' characteristics and their demands to design the most suitable insurance schemes.

In summary, the DeRISK insurance consortium and its partners have learned the following key lessons in implementing the first year of CCPI in the Central Highlands of Vietnam:

- Innovative insurance options may be more attractive to insurers if users also adopt risk management techniques (e.g., use of seasonal forecasting, improved water management).
- Insurance piloting as an industry-led initiative (eg ECOM) driven by innovations and interest to support coffee farmers and industry players is an attractive mechanism to upscale insurance solutions.
- Understanding of climate risks and their potential impact on livelihoods and supply chain emphasizes the relevance and focus of insurance product.
- Co-designing insurance solutions established trust and ownership among farmers and the private sector, allowing flexibility of product design to be tailored to coffee producers.
- Road testing of insurance product prototypes, insurance literacy workshops, and evaluation surveys created wider awareness and interest in crop insurance.
- User-centered and industry-driven insurance initiatives create a strong possibility of replication in other areas while building a model that is sustainable over a long period (shared responsibility across the supply chain since each actor has inherent benefits if farmers are productive and protected).
- Considerable effort is needed in creating awareness and capacity building at different levels from national government agencies to smallholder farming producers (plus national farmers unions etc.).



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## About the authors

**Angelica Barlis** (a.barlis@cgiar.org) is a Research Fellow of the Alliance of Bioversity International and CIAT and the Project Manager of DeRISK SE Asia.

**Shahbaz Mushtaq** (Shahbaz.Mushtaq@usq.edu.au) is the Deputy Director of the Center for Applied Climate Sciences of USQ and the lead of Work Package 4 of DeRISK SE Asia.

**Laurent Bossolasco** (lbossolasco@ecomtrading.com) is the Asia Coffee Regional Manager of ECOM Sustainability Management Services.

**Jarrold Kath** (Jarrod.Kath@usq.edu.au) is a Climate Scientist and Senior Lecturer in the School of Agriculture and Environmental Science at USQ. He led the development of indices for insurance products under DeRISK SE Asia.

**Julian Roberts** (Julian.Roberts@WillisTowersWatson.com) is the Managing Director (Risk and Analytics) at Willis Towers Watson, a key partner of DeRISK in developing the insurance products.

**Claire Wilkinson** (claire.wilkinson@WillisTowersWatson.com) is the Managing Director (Structured Risk Solutions) at Willis Towers Watson, a key partner of DeRISK in developing the insurance products.

**Cornelis Swaans** (c.swaans@cgiar.org) is the Asia Climate Action Lead at the Alliance of Bioversity International and CIAT and the Project Lead of DeRISK SE Asia.

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The Applying seasonal climate forecasting and innovative insurance solutions to climate risk management in the agriculture sector in Southeast Asia, also known as the DeRISK SE Asia Project, led by the World Meteorological Organization (WMO), co-implemented by the University of Southern Queensland (USQ) and the Alliance, with funding support from the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), aims to develop climate risk management systems, best practices, and insurance products that will shield smallholder farmers and businesses across the agricultural value chain in key Southeast Asia countries from physical and financial disaster associated with climate change. It will assist the governments in developing national and regional adaptation and risk management strategies. To know more about our project, please visit: <https://deriskseasia.org/>.