

World Food Programme's Sahel Climate Catastrophe Layer

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Abstract

The World Food Programme (WFP) piloted a regional Sahel Climate Catastrophe Layer (SCCL) in Burkina Faso, Mali, and Niger, providing financial protection against severe droughts. The program, incepted during the 2024-2025 West Africa growing season, offered coverage for the most extreme regional drought events and complemented existing national-level risk financing tools.

Overview

Peril/s	Drought (agricultural)
Geography/Region	Sahel Region: Burkina Faso, Mali and Niger
Years of	May 2024 – November 2024
Exposure covered	Vulnerable populations
Trigger type/s	Pure parametric
Trigger mechanism/s	Standardized Precipitation Evapotranspiration Index (SPEI)
Key information	See Annex
Annual Limit	Approx. USD\$ 10 million per country (different for each country – see tables 1 & 2)
Issuer	ARC Ltd.
Cedant	WFP
Parties Involved	Gallagher Re (broker), ARC Ltd (insurer and calculation agent), WFP (cedant). All technical parties worked together to develop the product.

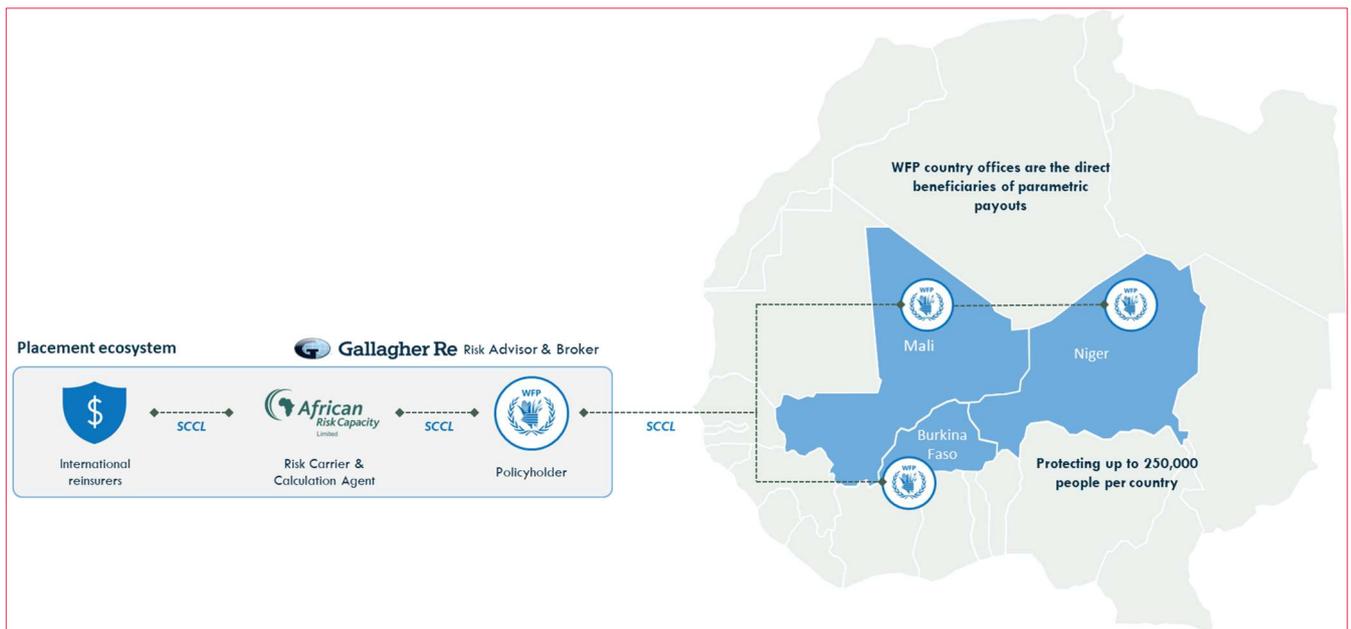


Figure 1: Schematic of SCSCCL instrument. The SCCL is 100% insured by ARC Ltd, backed by four international reinsurers. Figure taken from Gallagher Re slides.

DETAIL

Motivation

What is the motivation behind this product?

The motivation behind the WFP's SCCL stems from the urgent need to address the escalating food insecurity and vulnerability to climate-induced disasters, particularly droughts, in the Sahel region. Key drivers for this initiative include:

1. **Climate Resilience:** The Sahel is highly susceptible to severe droughts, which exacerbate food insecurity. The SCCL provides financial protection to communities, enhancing their resilience to climate shocks and preventing large-scale food crises.
2. **Humanitarian Crisis:** With an estimated 20 million people living in conflict-affected areas in the Sahel, 2.4 million of whom chronically food assistance, the region faces a confluence of challenges—conflict, poverty, and climate change—that make people vulnerable to hunger and loss of livelihoods.
3. **Unprecedented Hunger Crisis:** The worsening impacts of climate change, particularly drought, have led to an unprecedented hunger crisis. WFP's SCCL aims to provide a robust financial safety net that ensures timely responses to severe droughts, mitigating the risk of extreme food insecurity for around 750,000 people.
4. **Complementary Risk Management:** The SCCL complements existing insurance tools, such as the ARC Replica insurance, offering a layered approach to risk financing. While the ARC Replica policies address more frequent, less severe events, the SCCL is designed to provide significant payouts for more extreme and less frequent droughts (i.e. ≥ 1 -in-25 RP). This ensures a comprehensive strategy that aligns with national priorities and strengthens both regional and national resilience to climate-related disasters.

In summary, the SCCL is motivated by the need to enhance climate resilience, protect vulnerable populations from severe droughts, and address the broader humanitarian crisis in the Sahel.

What is the context for wanting to obtain a parametric insurance product?

WFP's interest in parametric insurance, like the SCCL, aligns with its broader climate and disaster risk financing (DRF) strategy to enhance disaster preparedness and response through pre-arranged funding. Key reasons for adopting parametric insurance include:

1. **Timely and Predictable Response** – Fast payouts based on predefined triggers (e.g., drought indices) enable quicker, more reliable responses compared to traditional aid, which often faces delays and hinges on reactive funding decisions. This is crucial in the Sahel, where rapid intervention can prevent humanitarian crises. In Mali, a study found that cash support provided

to drought-affected people through insurance payouts in February versus traditional donor assistance in June enabled them to access staple food items at prices as much as 20% lower.

2. **Efficiency and Impact** – Pre-arranged financing eliminates delays from post-disaster evaluation of needs, ensuring immediate resource availability and cost-effective disaster response.
3. **Enhanced Preparedness** – Securing financial protection in advance promotes the development of pre-defined response plans, strengthening WFP’s ability to implement early interventions, and mitigating the worst effects of climate extremes.
4. **Integration with Existing Risk Financing Tools** – This policy complements WFP’s ARC Replica insurance, which covers frequent but less severe events. Together, they provide a layered approach to managing climate risks.

Scaling Financial Protection – Expanding WFP’s macro insurance portfolio, which already covers 3 million people across 15 countries, helps extend coverage to vulnerable populations facing extreme drought in the Sahel.

Was a traditional indemnity solution considered and if so, why was one not chosen?

A traditional indemnity insurance solution was not chosen because **parametric insurance** offers significant advantages in terms of **speed and efficiency**, especially for slow-onset events like droughts. Unlike indemnity insurance, which requires time-consuming damage assessments and claims processes after a disaster, parametric insurance triggers **pre-arranged payouts** based on predefined thresholds, such as drought indices. This allows for a **faster response** when extreme weather events occur, ensuring that resources are available quickly to assist vulnerable communities.

The choice of parametric insurance also aligns with WFP’s goal of **investing in government and government partners in preparedness** and strengthening delivery systems, enabling countries to respond more predictably and effectively to climate extremes. Indemnity solutions, in contrast, would not provide the same level of **predictability or speed**, making them less ideal for WFP’s objectives in regions facing frequent climate shocks.

What coverage were you motivated to provide?

The primary motivation behind the SCCL is to provide **emergency response coverage to protect the food security of the most vulnerable**. The parametric insurance product is designed to ensure that financial resources are quickly available when severe droughts occur, enabling WFP and its partners to support early interventions and ensure timely assistance to populations facing acute food insecurity. By providing pre-arranged financing, the Catastrophe (Cat) Layer helps secure resources for **emergency humanitarian operations** to prevent or mitigate humanitarian crises.

What is the aim of the policy?

The aim of the SCCL policy is to maximize the number of people protected from the devastating impacts of severe droughts by ensuring a rapid and efficient response. For slow-onset events like droughts, the

key advantage of this macro-level insurance is the speed of payout, enabling WFP to quickly access funds as soon as a failed harvest is determined, and not once affected people start to employ negative coping strategies like reducing meals, withdrawing children from school, or selling productive assets. Receiving a payout from this policy would enable WFP to deliver timely assistance to affected communities and safeguard their resilience against drought. These interventions funded by the SCCL policy are carried out alongside broader humanitarian and government-led emergency responses.

The SCCL interventions are tailored to each country’s specific needs and context, and are outlined in Operations Plans (OP):

- In Mali, payouts fund three key interventions, similar to the ARC Replica disbursements, aimed at reaching more people in the same districts:
 - Support for shock-responsive social safety nets (cash top-up to existing social registry beneficiaries)
 - Emergency and seasonal cash assistance for food-insecure populations
 - Malnutrition prevention efforts (e.g. for pregnant, lactating women & children under two years old)
- In Niger, funds are directed towards providing either cash or in-kind assistance to those in need¹.
- In Burkina Faso, funds can be used for both cash and in-kind support, as well as nutritional assistance.

The interventions in each of these OPs align with national systems and complement existing humanitarian efforts by WFP and governments. This collaborative approach helps prevent WFP from operating in isolation.

What was the role and perception of basis risk?

Parametric insurance inherently carries basis risk, meaning discrepancies can arise between the Standardized Precipitation-Evapotranspiration Index (SPEI) and actual drought conditions on the ground. In some cases, a region may experience drought, but SPEI fails to capture it.

Beyond this inherent basis risk, differences also exist between the ARC Replica layer and the Cat Layer due to their reliance on distinct models and indices. These variations can lead to different trigger outcomes for the same event. For example, during a severe drought, the Cat Layer—using the SPEI index and a higher attachment return period—may trigger a payout, while the ARC Replica policy—based on CHIRPS (precipitation index) and WRSI—may not. Following as-if payout analyses, attaching at a high return period (i.e., >15RP) minimizes basis risk payouts between the Cat Layer and the ARC Replica country

¹ Niger: the Government of Niger is working on developing its Social Registry (Registre Sociale unique). Once the registry will be finalised/developed, we will be using the RSU for the targeting of the vulnerable households. For the pilot 2024 we will go with the approach discussed above, e.g., using the WRSI for geographic prioritization and the HEA for Household prioritization. However, moving forward and once the RSU is operational, the registry would be used for the targeting.

policies. Although, if it were to occur, it could pose reputational risks for WFP and ARC Ltd. This is because WFP would receive a payout and be able to assist affected communities, while the respective government, lacking an insurance payout, would not have the same resources to respond.

To address these technical challenges, WFP is participating in the **Drought Risk Information for the African Finance Sector (DRIAFS)** fellowship under the **Tropical Applications of Meteorology using SATellite data and ground-based observations (TAMSAT)** program, funded by the **National Environmental Research Council (NERC)**. In collaboration with ARC Ltd., this initiative will analyse the SCCL indices and compare them with the newly available **TAMSAT soil moisture dataset (1983–present) across Africa**. The findings will provide a deep understanding of the uncertainties, limitations, and differences between various indices, helping to enhance technical knowledge and capacity, strengthen partnerships, and improve risk modelling and decision making.

Additionally, the fellowship will produce practical outputs—such as tailored risk profiles and dashboards—which could support fairer insurance pricing. These insights will benefit both micro- and macro-level initiatives, with a strong emphasis on **diversity, equity, and inclusion (DE&I)**.

Description of the Coverage

How was the risk profile determined and evaluated?

The risk profile was determined using stochastic data methods, which offer a more conservative view of risk by triggering at a higher index value for the 1-in-25 attachment point, thereby providing broader coverage. Stochastic modelling was chosen because it generates a comprehensive view of potential risk by considering “all” plausible severity scenarios and probabilities based on a catalogue of thousands of simulated events (covering 10,000 years). Given its ability to capture a wide range of extreme events, this dataset was selected as the basis for determining the SCCL Risk Transfer Parameters (RTPs).

The technical partners evaluated the risk profiles by analysing the SPEI and SPI indices for the three target countries, using either ERA-5 or CHIRPS satellite rainfall datasets across a 6- or 9-month timescale. This analysis assessed whether the insurance product would have successfully detected severe drought events in historical data.

To ensure reliability, these modelled drought years were validated against:

1. The ARC Technical Working Group (TWG) ranking of the five driest years (2001–2023), as detailed in the most recent Africa RiskView (ARV) customization report.
2. The ARV Modelled Drought Response Cost (MDRC) dataset for each selected country.

For comparison, ARC Ltd also assessed data from 1992 onward, but formal correlation calculations followed ARC and ARC Replica policy guidelines, focusing on data from 2001 onward.

This validation process ensured that the modelled losses aligned with observed drought events, providing a rigorous foundation for risk pricing, including attachment probability and expected loss estimates.

Describe the trigger mechanism and how it was evaluated?

The evaluation process involved testing various indices, including **SPI**, **SPEI**, **sc-PDSI**, and **Soil Moisture**. The **SPEI 6-month index**, derived from the weighted average of all Sub-Component indices, with weights assigned based on their respective Aggregation Area percentages, demonstrated the strongest correlation with historical crop yields for key staple crops (millet, sorghum, and maize) and estimated financial losses, particularly for recent drought years. It also matched well with ARC's **MDRC profile**. Additionally, ARC's reinsurance broker recommended using a uniform index across all countries to ensure more favourable pricing. As a result, the SPEI 6-month index² was chosen as the single **primary trigger** for all three countries in the 2024/25 Cat Layer.

Table 1: Key information for each country's triggering system and policy

Parameter	Burkina Faso	Mali	Niger
Index	SPEI	SPEI	SPEI
Premium (USD \$)	\$ 500,000	\$ 500,000	\$ 500,000
Attachment Point	-1.8952	-1.9700	-1.8847
Exhaustion Point	-2.5122	-2.5355	-2.5009
Aggregate Limit (USD \$)	\$ 10,223,389	\$ 10,178,010	\$ 10,229,529
Period Start Date	01 May 2024	01 May 2024	01 May 2024
Period End Date	31 Oct 2024	31 Oct 2024	31 Oct 2024
Timescale	6 Months	6 Months	6 Months
Precipitation Data	ERA-5 Land	ERA-5 Land	ERA-5 Land

² The Standardized Precipitation Evapotranspiration Index (SPEI) is an extension of the widely used Standardized Precipitation Index (SPI). The SPEI is designed to take into account both precipitation and potential evapotranspiration (PET) in determining drought.

PET Data if applicable	ERA-5 Land PET	ERA-5 Land PET	ERA-5 Land PET
Sub-Component 1	Sorghum	Sorghum	Millet
Sub-Component 2	Maize	Maize	N/A
Sub-Component 3	Millet	N/A	N/A
Data Collection Time	6 weeks after Period End Date	6 weeks after Period End Date	6 weeks after Period End Date

Were there any back-up triggers or alternative mechanisms included to manage basis risk/ provide client with flexibility)?

In the event that the primary index experiences data errors or failure a backup secondary index was selected. The backup index selected will use SPI 6 months index with CHIRPS dataset (see country profiles below)

Table 2: Key information for each country’s triggering system and policy

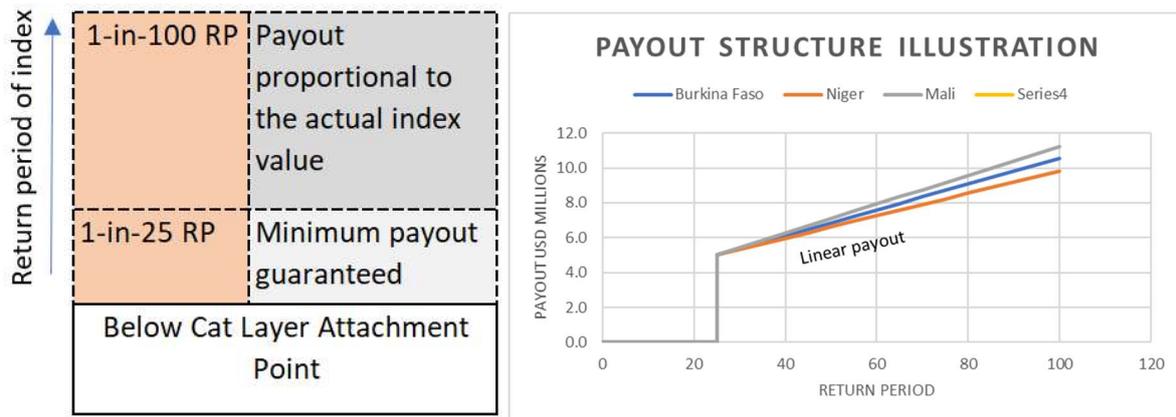
Parameter	Burkina Faso	Mali	Niger
Index	SPI	SPI	SPI
Premium	\$ 500,000	\$ 500,000	\$ 500,000
Attachment Point	-1.5896	-1.4288	-1.9152
Exhaustion Point	-2.1453	-2.0459	-2.4990
Aggregate Limit (USD \$)	\$ 10,205,085	\$ 10,216,891	\$ 10,168,881

Period Start Date	01 May 2024	01 May 2024	01 May 2024
Period End Date	31 Oct 2024	31 Oct 2024	31 Oct 2024
Timescale	6 Months	6 Months	6 Months
Precipitation Data	CHIRPS	CHIRPS	CHIRPS
PET Data if applicable	N/A	N/A	N/A
Sub-Component 1	Sorghum	Maize	Millet
Sub-Component 2	Maize	Sorghum	N/A
Sub-Component 3	Millet	N/A	N/A
Data Collection Time	6 weeks after Period End Date	6 weeks after Period End Date	6 weeks after Period End Date

Payout

What is the payout structure for the policy?

The policy features a **step-to-linear payout structure**. Once triggered, the WFP country office will receive a **minimum payout of 50% of the total coverage** (approximately USD\$ 5 million) if the drought reaches the 1-in-25 year severity threshold at country level. For more severe events, payouts increase proportionally based on the index’s intensity/severity. In the pilot year, all countries have the same **sum insured** to ensure **simplicity and equity** across the region.



Figures 1 & 2: Payout profiles of parametric structure

What is the disbursement mechanism for funds to be made available to the client?

The disbursement mechanism for funds involves **ARC Ltd** transferring resources to **WFP** upon submission of a **Response Plan** and **certification of losses** by **WFP** to **ARC Ltd**, along with the necessary banking instructions. This process ensures that funds are made available promptly to support effective disaster response efforts.

How quickly is the policy expected to pay out?

The policy is expected to pay out within a timeframe determined by the **SPEI ERA-5 precipitation final dataset**, which has a latency of **2-3 months**. Payout amounts cannot be confirmed until late January or early February, following the end-of-season data on **October 31, 2024**. Once the final data is available, **ARC** can take up to **10 days** to calculate the payouts, followed by an additional **2 days** to transfer the funds to **WFP**.

It should be noted that to mitigate the 2-3 month latency for the final dataset to be available, **WFP** use the interim payout calculation, released 5 days after the end of season data, to prepare their final Response Plan and then adjust accordingly once final data is released.

Has/did the policy pay out over its duration and if so, what was the client’s experience?

The **2024/2025 Cat Layer Policy** is the first year it has been inceptioned with the policy set to conclude in **November 2024**. As such, there have been no previous payouts.

Will the SCCL policy continue next year?

Yes, **WFP** is moving forward with Year 2 in collaboration with its technical partners. However, the scope of Year 2 will expand beyond the Sahel. The **Catastrophe Layer** will now cover up to **six countries, including regions in eastern and southern Africa**. This broader geographic coverage will enhance climate resilience, protect vulnerable populations from severe droughts, and bring **WFP** closer to its financial protection target of **USD 1bn** in pre-arranged finance for disaster risks. Additionally, it will create opportunities to diversify the Cat Layer portfolio and complement existing insurance tools in these newly included countries.

Annex

Table 3: Key information and risk transfer parameters for each country

Parameter	Burkina Faso	Mali	Niger
Season Start Date	1st May 2024	1st May 2024	1st May 2024
Season End Date	31st Oct 2024	31st Oct 2024	31st Oct 2024
Primary Index	SPEI	SPEI	SPEI
Primary Index Time Scale	6 months	6 months	6 months
Backup Index	SPI	SPI	SPI
Backup Index Time Scale	6 months	6 months	6 months
Primary Dataset	ERA-5 Land	ERA-5 Land	ERA-5 Land
Precipitation Data	ERA-5 Land	ERA-5 Land	ERA-5 Land
PET Data (if applicable)	ERA-5 Land PET	ERA-5 Land PET	ERA-5 Land PET
Maximum Latency of Primary Dataset	3 months	3 months	3 months
Backup Dataset	CHIRPS	CHIRPS	CHIRPS
Maximum Latency of Backup Dataset	6 weeks	6 weeks	6 weeks
Attachment Return Period	1-in-25	1-in-25	1-in-25
Exhaustion Return Period	1-in-100	1-in-100	1-in-100
Attachment Point SPEI	-1.8952	-1.9700	-1.8847
Exhaustion Point SPEI	-2.5122	-2.5355	-2.5009
Premium (USD \$)	\$ 500,000	\$ 500,000	\$ 500,000
Rate-on-Line % (Primary Dataset)	4.89%	4.91%	4.89%

Maximum Sum Insured (USD \$) - Primary Dataset	\$ 10,223,389	\$ 10,178,010	\$ 10,229,529
Maximum Sum Insured (USD \$) - Backup Dataset	\$ 10,205,085	\$ 10,216,891	\$ 10,168,881
Sub-Component 1	Sorghum	Maize	Millet
Sub-Component 2	Maize	Sorghum	N/A
Sub-Component 3	Millet	N/A	N/A
Data Collection Time	3 months after the Period End Date	3 months after the Period End Date	3 months after the Period End Date

Table 4: SPEI and SPI classification

Value	Classification
2.0 or more	Extremely Wet
1.5 to 1.99	Very Wet
1.0 to 1.49	Moderate Wet
-0.99 to 0.99	Normal
-1.0 to -1.49	Moderate Dry
-1.5 to -1.99	Very Dry
-2.0 or less	Extremely Dry