

Q&A

Webinar #6: Deep Dive on Risk Finance Instruments - Agricultural Insurance Knowledge Series on Strengthening Financial Resilience in Agriculture



The following questions were submitted during the Webinar #6 (either in webinar chat or earlier during the registration for the event), which could not be addressed during the Webinar Q&A. The questions are answered by our speakers:

- **John Plevin:** Financial Sector Specialist, Crisis and Disaster Risk Finance, WBG
- **Charles Stutley:** Senior Agriculture Insurance Consultant, Crisis and Disaster Risk Finance, WBG
- **Niza Banda:** Index Insurance Analyst, Mayfair Insurance Company, Zambia
- **Sharon Onyango:** Financial Sector Specialist, Financial Institutions Group/Global Index Insurance Facility, IFC

Q&A

Q1: With climate change, the need and demand for agriculture insurance is clearly growing. However, the distribution of weather variables has also diverged from historical patterns. Are index-based insurance schemes still pricing risk correctly?

- **Niza's response:** Affordability is key with these products. Scaling up helps diversify our risk and remain profitable. The pursuing of digitization is to help lower the cost of distribution and subsequently keep the product affordable.
- **Sharon's response:** In addition to this, actuaries and other insurance professionals working in this field also analyze the trend in the underlying data during the pricing process. This can allow the final pricing to be adjusted depending on whether the risk is becoming more or less likely. For instance, the pricing can be weighted so that more weight is placed on more recent years and lower weights can be placed on past years.

- **John's response:** We should also remember that aside from climate change there is huge uncertainty associated with infrequent events such as droughts. Working with short histories of data (as is often the case) is always difficult and may leave insurers exposed to trends or spikes in experience. Insurers have generally not focused on climate change too much in the past, given that they typically write insurance for one-year periods and so, haven't been to exposed to long-term shifts in climate. However, we are currently seeing a growing trend for risk modelers and actuaries to allow for more science and data around climate change when assessing insurance risk and pricing.
- **Charles' response:** Climate change is typically leading to more variable and intense weather events. A good risk modeler / actuary will consider the increased volatility of the time-series data set for the more recent years and price their catastrophe loading accordingly.

Q2: What type of risk modelling tools are available in agricultural risks especially for natural catastrophes and epidemics?

- **Sharon's response:** AgroClimate - a product of the Southeast Climate Consortium - provides some web-based tools ([link here](#)).
- **John's response:** There are a wide range of tools available to assess risks from catastrophes, and these vary depending on the use to which they are put. Please see the material from earlier sessions (including Session 2) for some examples. You might be interested in looking at a World Bank initiative on drought modelling: [Next Generation Drought Indices](#) which, among other things, provides a framework to understand, model, and monitor droughts.

Q3: Private Commercial banks in most emerging markets do not see the need for this type of insurance e.g. parametric, they do not recognize the level of risk to their portfolio and/or impact not that negative, how do you make banks recognize the risk? What can be done at systemic level by Governments to incentivize/ push banks to use these insurance products?

- **Sharon's response:** One possible option is for insurers or insurance intermediaries to work closely with banks to analyze the impact of climate and other risks on their non-performing loans. They could also design sample portfolio insurance products and use these to show how insurance could be used to reduce the NPLs. Governments could play a role in bundling insurance with some of their agriculture sector programs, where improved resilience against climate risks could be useful. For instance, Nigeria's Central Bank provides incentives such as credit guarantees to banks to promote lending to smallholder farmers. It also makes index insurance compulsory for all loans facilitated by these guarantees. In Zambia, the Ministry of Agriculture bundles insurance with its input subsidies to smallholder farmers.
- **John's response:** I agree with all of Sharon's points. In addition, the Regulator, I think, has a clear role to play to ensure that banks are required to understand and account for their risks explicitly. This can lead to incentives to reduce and manage risk by reducing the capital costs of the banks.

Q4: What's the total premium volume for GIIF in addition to the total number of contracts and total sums insured?

- **Sharon's response:** Cumulative premium is about US \$50 million.

Q5: What – if any – is the difference between meso level insurance and group insurance (where an aggregator like an employer or lender is the policyholder for insurance covering the employees or borrowers)?

- **Charles' response:** I believe that there is a lot of overlap between meso level insurance and group insurance - a financial institution (FI) or organization can hold a single master policy on behalf of large numbers of individual insured farmers and collect premiums from them and share out claims. Under a classical meso cover, of which there are relatively few examples, the risk aggregator or FI buys the policy to protect its loan portfolio and in the event of major loss it receives the payout to use to reschedule emergency loans and loan repayments. Individual farmers do not pay premiums and receive payouts per se.

Q6: If soil moisture indices are being used, is the crop available moisture measured, calculated with soil moisture balance modeling, or a combination of both?

- **Sharon's response:** Insurers and other stakeholders have access to data on the water content of the soil, at different soil depths, provided by some satellites. They need to combine this data with knowledge on moisture requirements per crop. Some also design indices that pay out if the soil moisture drops below the long-term average, for example.

Q7: Could you shed light on available techniques in addressing the unique challenge in designing index-based insurance for perennial/tree crops?

- **Charles' response.** The insurance industry, by and large, has steered away from index-based insurance for perennial/tree crops because of the major problems of basis risk. For example, it would appear to be relatively easy to design a hurricane/typhoon/windstorm index cover based on windspeed and distance from the track of the storm, however, each tree crop has a distinct windspeed/damage function which would need very careful analysis: banana plants will snap and topple and sustain major damage at sub-tropical storm windspeeds of much <35 mph; rubber trees may sustain moderate to severe damage at hurricane 1 windspeeds (74 mph), while a coconut tree/plantation may incur little damage at hurricane 1 windspeeds. Topography can also highly influence localized windspeeds/vectors and one tree plantation may have suffered major damage while another plot several hundred meters away may have very little damage. Some perennial crops such as arabica coffee which typically have a biannual production pattern with both flowering buds for next year's crop and ripening fruits for this year's harvest on the same stems is very difficult to insure against under an index cover say for drought and frost. See for example, Globalagrisk.com early work on coffee index drought insurance in Vietnam. India (e.g. the Agricultural Insurance Company, AIC) has developed WBCI products for perennial crops (e.g. rubber, sugar cane) and tree fruit (e.g. mangos): in this latterly case index cover included wind, excess rain/humidity and temperature and it would be worthwhile contacting the company for further guidance.

Q8: Question for Niza - what's the reason for the number of farmers insured decreasing during the last 2 years?

- **Niza's response:** Our biggest client is the government of the republic of Zambia who we proposed the product to in the beginning and were the only insurer in the market actively operating in that space. However, over the years other insurers became active particularly in the area yield index. The government sought to try a different type of insurance and also diversify their risk by sharing the portfolio with three other insurers in the market.

Q9: Do weather data (including from satellites) still need to be sourced through Zambia's National Meteorological Authority?

- **Niza's response:** We use ARC2 and CHIRPS which are international weather stations from which we also get data for free. We do keep the local Metrological Department involved in the process and validations.

Q10: Has there been settlement of claims? What were the responses from the farmers like? Were they really satisfied? What informs your calculation of risk factor? (Specific to Zambia)

- **Niza's response:** Yes, we have had settlement of claims every year from inception. There is general appreciation from the farmers as the payouts assist them to replant where there's loss or assist their livelihoods. However, complaints about the amounts were raised and we revised the minimum payouts without increasing the premiums. The type of peril (drought or excessive rainfall), severity and frequency inform our calculation of risk factor.

Q11: What's the best way to minimize basis risk? It is present with weather data (station network), automatic weather stations do not help due to data quality and maintenance costs (if to do properly). Satellite weather data sets have algorithm issues resulting in basis risk, finer granularity only increases data noise and actually adds bias risk. How best to manage basis risk from your perspective?

- **Niza's response:** From our experience we do limited field verification. We ensure that our reinsurance agreements we have loss verification clauses that take care of basis risk issues.
- **John's response:** There are different technical approaches to trying to manage basis risk which focus on data quality and index design, but also can include secondary indices or options to carry out field-level loss assessment under certain circumstances. In my opinion one of the most important things to do is to make sure all stakeholders including the insured farmer understand the product, when it pays out, when it doesn't, and how to manage basis risk from their own perspective (including other sources of finance). This is very difficult to do and often the importance is underestimated.
- **Charles' response.** There are several types of basis risk including 1) spatial (geographical) basis risk; 2) temporal basis risk; and 3) product design basis risk. To reduce spatial basis risk, typical measures include: increase the density of ground weather measurement stations and reduce the size of the Unit Area of Insurance (UAIG e.g. from a radius of 10 km of the trigger station to 5 Km; for Area Yield Index Insurance (AYII) India under the PMFBY has attempted to reduce basis risk by reducing the size of the AYII from a block/Thaluka to the Gram Panchayet or individual village. Temporal basis risk can be severe if farmers stagger their planting dates over several months, but the WII product incepts on a fixed date and the germination, tillering, flowering, maturity windows of the WII product do not match many farmers actual crop cycle. Product design basis risk is typically where the designers get their product wrong, and payouts are not triggered in spite of severe crop losses - there are many cases of failed WII pilots from Africa and India due to poor design. See the work of Michael Carter and Tara Chiu on setting of Minimum Quality Standards for index insurance ([link here](#)) and USAID-Davis University Quality Index Insurance Certification (QUIIC) initiative in East Africa ([link here](#)).

Q12: How are the interests of farmers protected? Are the farmers smart enough to understand the language of the index insurance companies? Have any lessons emerged

from farmers themselves in their experience in using index insurance? (Specific to Zambia)

- **Niza's response:** We carry out sensitization meetings as much as possible and water down the product to make it easy to understand. We deliver information translated into local languages, have radio programs, USSD code aided short courses also in local languages. For the most part, appreciation for input replacement has been given to us.

Q13. Could you provide some examples of insurance schemes that include combining parametric and indemnity methods?

- **Sharon's response:** The area yield index in Nigeria is one example. This is a parametric product since the aggregate yield for a particular area is used to determine compensation for all insured farmers within that area. However, crop cuts are conducted on sample farms within the area to estimate the yield per area – crop cutting is typically used in indemnity insurance (e.g., multi-peril insurance).
- **Charles' response.** The World Food Program, WFP, under their R4 initiative offer a hybrid satellite WII (rainfall deficit) cover combined with an Area Yield Index Insurance (AYII) cover. MamdaRe (Morocco) with support from PartnerRe have designed a hybrid 5-vegetative stages Evapotranspiration rainfall deficit cover combined with AYII trigger are harvest for rainfed maize in Rwanda. Both of these hybrid programs have added an AYII trigger at harvest to minimize basis risk on the WII cover.

Q14. How can the public sector support private sector oriented agricultural insurance?

- **John's response:** I hope this was answered during the webinar and through the factsheets.
- **Charles' response.** Though a bit dated, I suggest you look at Mahul and Stutley 2010 ([link here](#)), which provides a detailed review of how governments can support market-based PPP insurance programs around the World, and which presents case-studies for 65 countries in Vol II.

Q15. What types of new PPPs are available to help scale this product for private insurers?

- **John's response:** I hope this was answered during the webinar and through the factsheets.
- **Charles' Response.** New PPP approaches to scaling-up index insurance for small farmers center on providing farmers with an adding value proposition by bundling crop WII with modern inputs and credit, technical/extension advise and sometime assistance with marketing of crop output. In addition to the innovative work in Zambia presented by Mayfair in Module 6, suggest you look at the WFP R4 Rural Resilience ([link here](#)) in 8 African countries and also the One Acre Fund approach IAF which is currently providing bundled crop AYII plus credit/inputs to more than 0.5 million farmers in Kenya alone under a PPP with a consortium of local Kenyan private insurers and backed by 50% premium subsidies from Government of Kenya.

Q16: What barriers exist for relevant insurance products to be accessed and used by low-income and vulnerable populations?

- **Sharon's response:** Product affordability and insurance awareness are key barriers for low-income populations.
- **Charles' response:** Fully agree with Sharon's points. Other factors include lack of trust in insurance and particularly index insurance; lack of perceived value in expensive insurance

products; through cultural and religious factors which can act as a barrier to the purchase of agricultural insurance.

Q17: I would like to know the cost of these insurance products, availability and affordability in Sub Saharan African countries.

- **Sharon's response:** In Nigeria, the average premium for area yield index insurance is about 3% and covers about 643,000 farmers. The average rate of index-based products in most countries varies between 3% and 7% (this is based on GIIF experience only).
- **Charles' response:** many of the first generation of crop WII products and programs in Africa and Asia (India) were very expensive with average premium rates typically between 7.5% and 15%. The more insured perils you add to a WII product the more expensive it becomes. AYII in Africa tends to be more reasonably priced with an average of say 5% to 7.5% for 75%/80% coverage. However, in India the PMFBY which is the World's largest AYII program insuring about 40-50 million farmers over two seasons each year and which is highly concentrated in drought-prone states currently have an average premium rate of about 12.5% for kharif crops, which is very expensive. The Kenya and Ethiopia index-based livestock insurance programs providing satellite NDVI pasture-drought index insurance which are designed to trigger payouts every 2.5 to 5 years and are correspondingly expensive with premium rates between 10.0 % to 17.5% or higher.

Q18. What is the best technology enabled solutions for DRF?

- **John's response:** This is a huge question which I'm not sure I can answer comprehensively here! There are a few areas where technology promises to improve the quality of insurance and DRF in agriculture, such as: mobile and digital payment systems to increase transparency and speed; mobile and digital registration systems; remote sensing and photo-based loss assessment to reduce costs and increase accuracy of payouts.

Q19: Will agricultural insurance for small scale farmers in emerging markets only work on embedded basis?

- **Sharon's response:** Embedding insurance with other services allows farmers to see value even in years where no claims are paid.
- **John's response:** I'd avoid saying that it would only work on an embedded basis but I would certainly agree that the full value of insurance can be best brought out when used with inputs and services as part of a comprehensive approach to risk management and financing.
- **Charles' response:** I fully endorse Sharon and John's responses. See also my comments to Q3 above. You may also wish to look at how Thailand has scaled-up crop insurance for very small rice farmers. The Thai national rice top-up insurance scheme between 2011-15 was a purely voluntary program and suffered from very low voluntary demand and anti-selection in spite of 60% government premium subsidies: in 2016 a decision was made by BAAC (Bank for Agriculture and Agricultural Cooperatives) to link crop insurance cover with credit provision on a compulsory basis (BAAC added additional 40% premium subsidies for Tier 1 crop insurance) and 5 years later more than 75% of the national rice cultivated area is insured.