



**Planned Improvements in Quality Assurance and Control
to *Africa RiskView* and Customization Processes**

October 2017

Introduction

Africa RiskView is the technical engine behind African Risk Capacity operations, and it is built on principles of objectivity, replicability, and stability. By providing a standardized modelling framework for each country to quantify drought risk to rain-fed staple crops – and the ensuing risk to vulnerable populations who rely on those crops for their health and livelihoods – *Africa RiskView* gives country an objective and transparent view on their climate risk, both in terms of dollars and people affected, and lays the foundation for a scalable parametric insurance model across Africa.

By nature, any model supporting parametric insurance comes with challenges. Data quality and availability, human behaviour, and the predicative limitations are some of difficulties that affect every model's performance, and throughout the development and implementation of ARC's parametric insurance model, there have been new and unanticipated challenges. However, in the face of difficulties and challenges, ARC finds solutions. With each season and risk pool, ARC continuously learns from its experience to improve its process and model, create better products, and offer more effective solutions to manage disaster risk for its Member States.

During and after the 2015/16 agricultural season, ARC re-examined their processes and model after the estimates of *Africa RiskView* did not initially trigger a payout with the given input data. Through collaboration with Member States and international partners, and following recommendations from the ARC Governing Board, ARC planned and implemented added quality assurance measures to ensure that country data is as accurate and robust as possible and that in-country technical teams have a thorough understanding of the sensitivities of *Africa RiskView*'s model to input values.

Background

In order to purchase an insurance policy from ARC Insurance Company Limited (ARC Ltd), countries must customize *Africa RiskView* each year they seek to purchase a policy in order to best reflect the impacts of drought to the country's food security. Countries spend weeks examining historical drought impacts, collecting and mapping vulnerability data, creating a model based on each country's agronomic variables, and validating the data with external datasets to most accurately reflect reality on the ground. The country customization of *Africa RiskView* serves as the index that underpins the ARC Ltd insurance policy that countries can purchase.

Seven countries participated in the ARC Insurance Company Limited (ARC Ltd) 2015-16 risk pool: Senegal, the Gambia, Mauritania, Mali, Niger, Kenya, and Malawi. As the 2015-16 agricultural season progressed, ARC observed discrepancies between the *Africa RiskView* estimates for Malawi and the numbers reported by Malawi Vulnerability Assessment Committee. Beginning in April, ARC initiated a series of reviews in order to understand the differences between *Africa RiskView* estimates and on-the-ground projections. Following in-country reviews and a study conducted by the Centre for Agricultural and Rural Development of Lilongwe University of Agriculture and Natural Resources, a shift in maize varieties planted was discovered. In recent years, a majority of farmers had switched from planting "long cycle" maize (with a 120- and 140-day growing period) to "short cycle" maize with a shorter growing period of 90-days and greater sensitivity to dry spells.

ARC immediately re-customized *Africa RiskView* with the new reference crop, and from that change, ARV predicted that 2 million people were affected by the drought. With this updated information, a payout of US \$8.1 million was triggered with the policy that Malawi purchased for the season.

As the payout process was rolling out, ARC began examining its operations and processes to find better ways to reduce the basis risk – the difference between an index's estimation and actual losses

– to ensure that the *Africa RiskView* drought model was performing at the best of its ability and that countries receive an effective and valuable product to safeguard against the financial impacts of climate risk.

ARC Actions for Quality Assurance

The predictions of every model relies on the quality and accuracy of the input data, and the sensitivity of the model to variations in input data also impacts the accuracy and robustness of the model's estimations. In order to reduce basis risk, ARC has designed quality assurance measures into the customization process in order to collect thorough data about factors that affect a country's drought risk. With dedicated support to each country throughout the customization and validation of *Africa RiskView*, ARC extensively discusses key and pertinent elements with in-country technical working groups in every country participating in the ARC capacity building programme. Before an insurance policy can be issued, the *Africa RiskView* customization and validation of any country must be approved by the [ARC Governing Board](#), which is comprised of continental experts of development economics, risk finance, climate change, and food security.

Following the experience from the 2015-16 agricultural season, ARC took dedicated steps to bolster its quality assurance processes by identifying methods to better ensure accuracy of input data and examining the sensitivities of *Africa RiskView*.

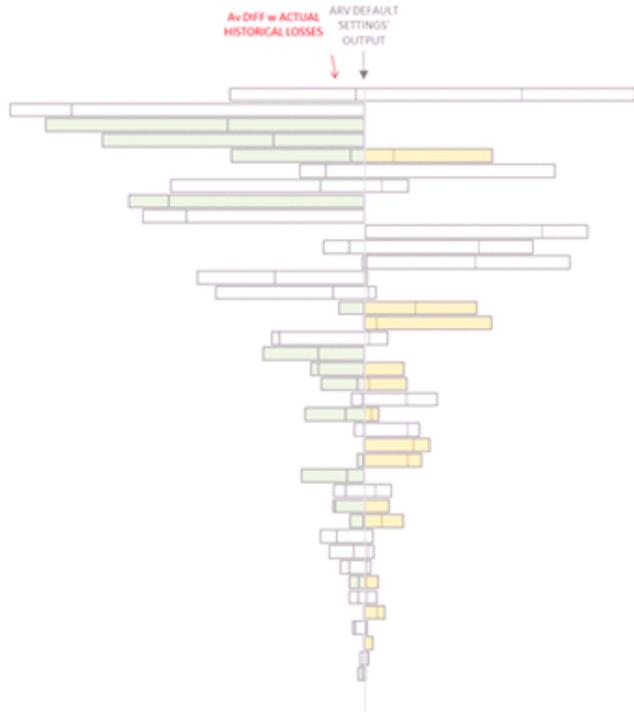
Sensitivity and Robustness Analysis

To improve quality assurance of ARV, ARC invited the World Bank Disaster Risk Financing and Insurance Programme to conduct a Sensitivity and Robustness Analysis on *Africa RiskView* to better evaluate the variability of the drought model results with changes in key input parameters. The three-month study concluded that accurate country customizations are critical, variability must be clearly communicated to countries, and variability can be reduced in *Africa RiskView*.

Following the recommendations of the report, ARC has been implementing the following quality assurance measures:

- *Sensitivity and Robustness Analysis in ARV*: ARC will implement new functionalities in *Africa RiskView* to apply the sensitivity and robustness analysis to all drought parameters systematically. This will make *Africa RiskView* the first model in the risk transfer space to use such quality assurance measures to test parameters as an inherent and embedded part of the model.
- *ARV improvements*: New datasets (such as rainfall and potential evapotranspiration) are being added in *Africa RiskView* when possible, the structure of the model is continuously being reviewed to address identified limitations, alternative drought indices are being considered for *Africa RiskView*. To supplement these *Africa RiskView* improvements, additional capacity building for in-country technical working groups is being planned to assure that country customizations are more validated, fine-tuned, and scrutinized.

- Visual presentations:** To communicate the variability of results and thus importance of the accuracy of input data to countries, ARC will use new tools in order to demonstrate the impact of variability and collect accurate data from countries. By visualizing information in a graphic format instead of text, the variability of output based on differences in input data can be and demonstrated more clearly and effectively.
- Quality Assurance Checklist:** To prompt closer examination of input data, ARC will work with in-country technical working groups, consistent of local multidisciplinary experts, to scrutinize customizations against a Quality Assurance Checklist. The checklist acts as a standardized and itemized rubric that facilitates in-depth discussions on model parameters, highlighting each input for extra examination with ARC flagging the most critical parameters. The completed checklist will be included with the customization validation report as an additional requirement for ARC Ltd insurance eligibility.
- Additional sensibility and robustness analyses:** ARC is exploring different indices to test the accuracy of input data. In the same vein, ARC is also searching for additional sensitivity and robustness analyses to measure the impact of variability for its risk models.
- Improving drought model external input data:** ARC will improve drought model external input data sources and clearly flag the most critical parameters based on the results of the sensitivity analysis.



Second Inception Date for Late-Starting Seasons

Including a second inception date would allow more time between prior season's end-date and the start date to qualify for coverage. This will provide more time to finalize the new customization, which must be completed on an annual basis, with adequate due diligence.

First Inception Date: 1st April
(mainly for West Africa policies)

Second Inception Date: 1st October
(mainly for Southern and Eastern Africa policies).

Establishment of External Customization Review Committee process for ARV Customization

To add an extra level of quality assurance for countries to understand and cover their risks, ARC is establishing Customization Review Committees for each country with experts who have various in-depth insights into different layers of information needed for an accurate customization of *Africa RiskView*.

The committee will consist of specialists with continental, national, and regional expertise. Continental specialists possess a thorough understanding of the *Africa RiskView* model, and they will be appointed to the Customization Review Committees of every country. National specialists have in-depth knowledge about the agricultural practices, agro-ecological and vulnerability profiles of their country. Regional specialists will ensure consistency between countries of the same region, and they will be selected based on their knowledge of region specific characteristics.

Augmented and More Inclusive In-Country Technical Working Groups

In-country technical working groups are typically comprised of technical experts from government ministries. To better capitalize on community, academic, and NGO expertise, ARC is diversifying the constitution of the technical working groups to integrate more sources of knowledge that will bring added knowledge and perspective in the *Africa RiskView* customization process. ARC is seeking to include local agricultural research institutes, farmer groups, universities, seed associations, NGOs, civil society, and producers associations into the in-country technical working groups.

ARC is already conducting in-depth *Africa RiskView* trainings with universities and regional centres, such as CERSGIS (Accra, Ghana), ACMAD (Niamey, Niger), ISET (Mauritania), CNRA and CURAT UFR Science de l'Environnement (University of Abidjan, Cote d'Ivoire). These *Africa RiskView* trainings provide African researchers with an early warning and disaster risk management tool, and their inclusion into the in-country technical working groups will foster more robust quality assurance in the *Africa RiskView* customization process.

ARV Research and Development

Throughout improvements in ARC's processes of collecting quality input data, ARC's Research and Development plan will continue to improve the *Africa RiskView* platform to improve its observations and forecasts by incorporating additional drought indicators through collaborations with leading climate modelling institutions.

ARC established a collaboration and outlined a joint work-plan with WFP farmer insurance programme R4 and their technical service provider International Research Institute for Climate and Society (IRI) at Columbia University's Earth Institute. The first results of this work on alternative rainfall datasets and drought indicators for *Africa RiskView* should be completed in October 2017.

ARC is discussing a joint work plan with AGRHYMET and African Centre of Meteorological Applications for Development (ACMAD) on these priority areas. Moreover, ARC is collaborating with the National Drought Management Authority of Kenya to incorporate Kenya's drought index, which is based out of VCI, into *Africa RiskView*.

The SAFARI project will fund the drought model R&D work outlined by the consortium with the aim of enhancing ARV to become the standard information source on weather risk exposure and an early warning tool on the desktop of every African Minister of Finance, Agriculture and Disaster Management and their disaster response partners. As part of the SAFARI research proposal ARC, NDMA and ILRI plan to do a thorough review of WRSI (as used in *Africa RiskView*), VCI and other drought indicators used in Kenya to understand their relative advantages and disadvantages and applications for risk transfer.