**Highlights:**

- **Rainfall:**
  - Normal to above normal cumulative rains throughout most agricultural areas of the country
  - Poor spatial and temporal distribution of rainfall in localised areas, particularly in central and eastern Niger

- **Drought:**
  - Below normal WRSI in most agricultural areas compared to the 2001-2013 average
  - Central and eastern Niger are the most affected areas

- **Populations Affected:**
  - ARV estimates that around 2.9 million people are directly affected by drought conditions in the country after the end of the 2014 agricultural season
  - The areas most affected include parts of central and eastern Niger, particularly southern Maradi and south-western Zinder regions

- **Insurance:**
  - Given the high modelled drought response costs, Niger is eligible for a payout of over USD 3 million by the ARC Insurance Company Limited
  - These funds will be used to activate a Final Implementation Plan (FIP), which the country is currently finalising

**INTRODUCTION**

This *Africa RiskView* Special Report will analyse the situation in Niger at the end of the 2014 agricultural season, as detected by the software *Africa RiskView* (ARV). Niger is amongst the five countries that form the first risk pool of the *African Risk Capacity* (ARC), together with Mauritania, Mozambique, Kenya and Senegal. These five countries insured their respective agricultural or rangeland seasons against the cost of a drought-related intervention, within the context and mandate of ARC. Before participating in the first risk pool, Niger customised ARV to model the impact of drought as accurately as possible. The agricultural season in Niger extends from May to October, and the country chose *millet* as the *reference crop* for its participation in the insurance pool. During the customisation process of ARV, all the parameters of the drought index were adjusted to the conditions and agricultural practices on the ground, in order to allow for accurate modelling.

This *end-of-season report* will review the agricultural season in Niger, and present ARV's modelled results. It is part of a *validation exercise* of ARV, which is conducted in each country after the end of each insured season. This exercise is aimed at verifying the model's performance in order to identify potential improvements for drought monitoring and insurance coverage. The ARV Special Report covers the following topics: *rainfall, drought, affected population and response cost estimates*, and discuss these in the context of *external sources*.

**RAINFALL**

Overall, on a cumulative basis, the 2014 rainy season performed normally throughout most of Niger. The bulk of the rains were received between late July and September. The cumulative rainfall map (see Map 1), which is in line with seasonal patterns, indicates that the southernmost regions of Niger, such as Gaya, Say, Dosso and Boboye, were the wettest areas in the country, with cumulative rains of up to nearly 670 mm throughout the season. By contrast, the country’s northern and eastern parts, including Nguigmi, Gouré and Tchin Tabaraden, only recorded cumulative rains of 90 to 300 mm.

Compared to the 30-year average since 1983, the cumulative rains were average to above average across most agricultural production areas, with the exception of some parts of south-central and south-eastern Niger. Ouallam, Filingué and Illéla, all three situated in the country’s south-west, are the regions that recorded the highest rainfall surpluses, ranging between 50 and 80 mm above the long-term average. On the other hand, Madarounfa, Aigué (both located in south-central Niger) and Loga (south-west) recorded rainfall deficits between 30 and 100 mm during the season. Overall, it has to be noted that the ARC2 dataset, which the country selected during the customisation of ARV, indicates slightly wetter conditions during the 2014 season in West Africa compared to the RFE2 dataset, which is used by the majority of countries participating in the first insurance pool.
While the analysis of cumulative rains does not necessarily highlight major problems in Niger, the *temporal and spatial distribution of rainfall* in 2014 indicates that some areas experienced *localised dry-spells* which might have impacted agricultural production. In May 2014, most areas of the country (with the exception of south-central Niger) recorded rainfall surpluses, which indicates an early start of the season (see Map 3). This early start of the season however was followed by a dry month of June (see Map 4), while in July the rainfall performance was mixed (see Map 5), with a prolonged dry spell at the start of the month in the central and eastern parts of the country. Nonetheless, most agricultural areas with the exception of the country’s south-eastern parts received above average rains in July. Overall, the rains in the May to July period performed relatively well in the western parts of Niger, while the south-central and eastern parts received below average rains. The rainfall threshold for the start of sowing activities, which the country set at 15 mm, was however eventually reached throughout Niger during this period, which corresponds to the sowing window. In the south-eastern parts of the country however this threshold was only reached at the very end of July.

In the second half of the season, from August to October 2014, all regions of Niger recorded above average rains, with the exception of some areas in south-central Niger (particularly Madarounfa and Aguíé). In terms of temporal distribution, most of the country experienced above normal rains in August (see Map 6), while in September, above normal rains were limited to the south-west, while the rest of the country remained drier than normal (see Map 7). Finally, the rains performed slightly below normal in October, indicating an early cessation of rains, with the exception of central Niger (see Map 8).

The following two rainfall charts show how in south-western Niger (Tillabery region) the rains were normal to above normal for during most of the season, while in the south-eastern parts of the country (Diffa region), drier than normal conditions were recorded, with a spike in precipitations in July (dekads 21-23).
Drought

ARV uses the Water Requirements Satisfaction Index (WRSI) as an indicator for drought. The WRSI is an index developed by the Food and Agriculture Organisation of the United Nations (FAO), which, based on satellite rainfall estimates, calculates whether a particular crop is getting the amount of water it needs at different stages of its development. To maximise the accuracy of ARV, countries intending to take out insurance customise the software’s parameters to reflect the realities on the ground, as discussed above.

The WRSI at the end of the season varies across the country. In the south-west, which is the main agricultural producing area of Niger, the WRSI is higher than in the eastern and northern agricultural areas, which are usually drier and where agriculture is less developed (see Map 10). Compared to the average, it appears that the 2014 season is better than the 30-year average (see Map 11). However, this is skewed by the extreme droughts that occurred in the Sahel region in the 1980s and 1990s. Moreover, in the context of Niger’s participation in the ARC insurance pool, the country defined a 10-year average WRSI as drought benchmark, which means that a drought is only flagged if the current WRSI is below the 10-year average. The comparison with the 13-year average (since 2001) shows how this year’s season actually performed poorly in most of Niger (see Map 12). Particularly areas that experienced erratic rainfall show a below normal drought index, while parts of south-western and western Niger have a normal to above normal WRSI. The districts most affected by a below average WRSI are Aguié, Madarounfa and Loga, which are also the areas that recorded below normal rains (see previous section of this report). Conversely, those districts that received good rains, such as Ouallam, Illéla and Filingué, have a WRSI that is closer to the average.

During the customisation of ARV, the country defined a sowing threshold of 15 mm that needs to be reached within the sowing period (May to July). Based on this, the best possible planting dekad within the sowing window is then calculated and used for the final WRSI. According to ARV, the best conditions for sowing were reached between dekad 17 (11-20 June) and dekad 21 (21-31 July). In the south-western parts of the country, planting conditions were reached earlier than in the east (see Map 13), which is in line with rainfall patterns which see a progression of seasonal rains from the south-west to the east. Compared to a normal year, planting started 10 to 30 days later than normal in the eastern and northern agricultural areas of the country (see Map 14). However, in south-western and central Niger, planting occurred normally, or up to 20 days earlier than normal in some locations.
**Population Affected**

Based on the WRSI calculations discussed in the previous section of this report, ARV estimates the number of people potentially affected by drought. As part of the in-country customisation process, vulnerability profiles are developed at sub-national levels for each country, which define the potential impact of a drought on the population living in a specific area. It is important to note that not all those affected by a drought might be in need of humanitarian assistance. Moreover, humanitarian needs are often driven by a variety of factors including, but not limited to, the weather.

The outcome of the vulnerability profiling exercise in Niger indicates that around 5 million people are exposed to the risk of a mild drought, around 6.35 million to the risk of a medium drought and nearly 7.9 million are exposed to the risk of a severe drought in the country. Of these, ARV estimates that after the end of the 2014 agricultural season, about 2.9 million people are directly affected by drought conditions in Niger. The distribution of affected population shows that the majority of affected populations live in the central and eastern agricultural areas of Niger (see Map 15). The highest number of affected people is estimated to be in Magaria district, with around 485,000 people affected, followed by Mayahi and Madarounfa, with around 309,000 and 267,000 drought affected people, respectively. All three districts are located in southern Maradi and south-western Zinder regions of Niger. Southern Diffa region also accounts for a high number of affected people, according to ARV’s estimates.

This relatively high number of drought affected people makes 2014 appear as one of the more serious droughts in the last 15 years. The impact of the 2014 drought is comparable to the droughts in 2004 and 2009 (see Graph 3). Nonetheless, the modelled drought remains far behind the droughts of the 1980s and 1990s, when up to 7 million people would have been affected, if the current population and vulnerability information is applied. The changes in population and their vulnerability, since those year but also since 2004, should also be taken into account when comparing this year to what actually happened in terms of populations affected in previous years. It should also be noted, however, that these modelled population estimates only estimate the number of people directly affected by a drought in the country. They are not necessarily representative of the wider food security situation, which depends on various other factors such as non-rainfall related issues that affect agricultural production (locust invasions, floods, fertiliser use etc.), as well as broader food security indicators such as market prices, nutrition, food access etc. For instance, the 2011 food crisis in the Sahel might not be apparent from the modelled drought impact, however locust invasions and other factors exacerbated the impact of lower than normal seasonal rains and resulted in a major crisis in Niger and the wider region.

**Response Cost Estimation**

The response cost estimation, which ARV does in a fourth and final step, consists in the conversion of the numbers of affected people into response costs, based on a pre-defined response cost per person. The modelled response costs are the underlying basis of the insurance policies for countries that participate in the ARC insurance pool. Pay-outs will be triggered from the ARC Insurance Company Limited to countries where the estimated response cost at the end of the season exceeds a pre-defined threshold specified in the insurance contracts. Given the drought conditions modelled by ARV, and the associated high response costs in Niger, the country will be eligible for a pay-out of nearly USD 3.5 million by the ARC Insurance Company Limited. This pay-out is comparable to the pay-out the country would have received in 2004, had it participated in the ARC insurance pool. Historically, the drought in 1984 would have triggered the maximum pay-out of USD 30 million, followed by the droughts in 1997, 1996, 1985 and 1983. Since 2001, Niger would have received pay-outs in 2004 as mentioned above, as well as in 2009. The pay-out will be used to activate a Final Implementation Plan (FIP), which is currently being finalised based on the pre-defined Operations Plan that the country prepared as a pre-requisite for its participation in the insurance pool. The funds can be used exclusively to fund the drought response as outlined in the FIP, a subset of activities that were included in Niger’s Operations Plan. The ARC Agency will monitor the implementation of the FIP closely.
Validation of ARV with External Sources

The Normalised Difference Vegetation Index (NDVI) allows verification of ARV’s estimates using satellite imagery that visualises the progression of the vegetation in West Africa. The latest NDVI images suggest that the current vegetation conditions are normal to slightly below normal in all agricultural areas of Niger, confirming the assumption of a slightly lower than normal performance of this year’s agricultural season. However, no major anomaly is recorded, as Map 16 indicates.

The Famine Early Warning Systems Network (FEWS NET) produces an independent WRSI model at the regional level. The latest WRSI data available for West Africa shows a slightly different and worse picture than ARV (see Map 17), however the overall trend of an average to below average WRSI in Niger is reflected (see Map 18). According to FEWS NET’s model, the most affected areas include central and western Niger, particularly Tahoua region as well as the eastern parts of Niamey and Dosso regions. ARV also estimates that these areas are affected, however the magnitude of modelled drought conditions seems less important than in FEWS NET’s model. On the other hand, FEWS NET’s WRSI only indicates a slight anomaly in southern Maradi region, which according to ARV is more severely affected.

Conversely to the picture drawn by the WRSI, FEWS NET’s latest Food Security Outlook for Niger suggests that the 2014 agricultural campaign might result in a normal to above normal harvest, based on qualitative information collected in the field. The positive outlook is based on the good performance of the rains between the end of July and the end of September 2014, and the absence of major crop pests. As a result, the report indicates that a Minimal Food Security Phase Classification (IPC Phase 1) is likely throughout Niger, with the exception of some areas in the south-east (Diffa region), which are classified in IPC Phase 2 (Stressed) due to a likely production shortfall. This analysis is similar to the preliminary results of the annual Cadre Harmonisé food security classification exercise. According to the nationwide assessment, around 3.1 million people are expected to be food insecure (classified in Stressed or Crisis food security conditions) in Niger after the end of the 2014 agricultural season. This includes agro-pastoral communities that might be affected by localised droughts, as well as pastoralists and populations that have been displaced by the conflicts in neighbouring Nigeria and Mali.

Finally, as part of the FIP preparation, an in-country validation exercise was conducted with technical experts in Niger in November 2014. ARV’s outputs in terms of rainfall, WRSI and population affected were reviewed in depth, and the modelled drought estimates were generally confirmed. The in-country Technical Working Group (TWG) agreed that the areas highlighted by ARV as being the most affected were experiencing problems due to localised erratic rains throughout the season. The distribution and number of drought affected populations seems to be in line with the situation on the ground, although it was also highlighted that at the national level, no major drought-related food security crisis is expected.
About ARC:

- The African Risk Capacity (ARC) is a specialised agency of the African Union designed to improve the capacity of AU Member States to manage natural disaster risk, adapt to climate change and protect food insecure populations.
- The Africa RiskView (ARV) software is the technical engine of ARC. It uses satellite-based rainfall information to estimate the cost of responding to a drought, which triggers a corresponding insurance payout.
- The ARC Insurance Company Limited is the commercial affiliate of the ARC Agency, which pools risk across the continent through issuing insurance policies to participating countries.

Implementation of the Response

As a pre-requisite for its participation in the ARC insurance pool, Niger was required to prepare a detailed Operations Plan which outlines the response options available to the country in case the trigger, or attachment level, defined in Niger’s ARV-indexed insurance contract is exceeded at the end of the season. This Operations Plan was reviewed and approved by the ARC Agency Governing Board, enabling Niger to enter into an insurance contact with ARC Insurance Company Limited. Given the below normal progression of the 2014 agricultural season in the central and eastern part of the country in particular, the ARC Secretariat started discussions with the Government of Niger before the end of the season. In view of the pay-out, the in-country Technical Working Group is in the process of finalising the FIP, which will determine which of the response options defined in the Operations Plan will be activated, taking into account ARV’s modelled estimates and the situation on the ground. Once the FIP is submitted to and approved by the ARC Agency Governing Board Peer Review Mechanism, the pay-out will be released to the country. The implementation of the response will be closely monitored by the ARC Agency as well as through an external M&E process audit.