Africa RiskView

END OF SEASON REPORT | Malawi (2020/21 SEASON)

This ***Africa RiskView* End of Season Report** is a publication by the **African Risk Capacity (ARC)**. The report discusses *Africa RiskView's* estimates of rainfall, drought and population to be affected, comparing them to information from the ground and from external sources. It also provides the basis of a validation exercise of *Africa RiskView*, which is conducted in each country at the end of an insured season. This exercise aims at reviewing the performance of the model and ensuring that the country's drought risk is accurately reproduced by *Africa RiskView* for drought monitoring and insurance coverage. The reports are also being continuously refined with a view to providing early warning to ARC member countries.

Highlights:

Rainfall

- The cumulative rainfall received during the growing period in Malawi, i.e. from dekad 32 (November 11) to dekad 13 (May 10), was significantly above normal.
- Except for below-normal rainfall observed in dekads at the start and toward the end of the growing period, the temporal rainfall distribution was largely favourable.
- Some districts in Southern Region such as Chikwawa, Nsanje, and Mwanza saw below-normal rainfall in dekad 36, dekad 1, and dekad 7.

Drought:

- As per the predefined sowing criteria in *Africa RiskView* WRSI model, sowing for the 2020/21 season was successful throughout Malawi.
- The first sowing chance in most of the Southern and Central Region was realized between dekad 32 and dekad 34. Parts of the Central and the entire Northern Region had the first sowing chance in dekad 36.
- The end-of-season WRSI for the selected reference crop (maize) was normal to above normal for most parts of the country.

Affected Populations:

- According to *Africa RiskView*, the total population affected by drought in the 2020/21 agricultural season is estimated to be about 80,000 or one percent of the vulnerable population. The number of people affected this year is the fourth lowest since 2001/02.

Rainfall

The growing season for the reference crop chosen to model the agricultural season in Malawi (maize) broadly runs from dekad 32 to dekad 13, i.e. November 11 to May 10. Based on RFE2[1] satellite rainfall estimates, the cumulative rainfall received within this period was generally above normal ; with the national average standing at 168 % of the normal as defined in *Africa RiskView* – average cumulative rainfall for the period from 2001 to 2019. As shown in Figure 1, most of Malawi received cumulative rainfall amounts ranging from 140% to 170% of the normal. Parts of the Southern and Central Region received cumulative rainfall amounts close to double the normal rainfall for the growing period.

At the onset of the season (dekad 32 to 33 - November 10 to 30), most of Malawi received below normal cumulative rainfall, except for parts of the Southern Regions and pockets in the Central and Northern Region which received well above normal rainfall—Figure 2. This is the period when seasonal rainfall and planting begin in the Southern Region and parts of the Central Region. In the subsequent month of December, substantial rainfall exceeding the normal was received across Malawi—Figure 3. Above-normal rainfall persisted in January, February, and March (Figures 4–6). The period from April to the first dekad of May was dry in parts of the country. During the same period, the western parts of the Central Region and parts of the Northern and Southern region registered close to normal rainfall —Figure 7

Regarding temporal distribution, most of the dekads within the growing period received above normal rainfall. However, districts in the Central and Southern Region, like Nsanja, Chikwawa, Mwanza, Lilongwe, Kasungu and Dowa, had below -normal rainfall in dekad 32. Similarly, districts in the South-

[1] The satellite dataset selected for the 2019/20 customisation of *Africa RiskView* to Malawi

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ern Region, like Rumphi, Karonga, Mzimba and Nkhata Bay, had below-normal rainfall in dekad 33. In addition, a few districts in the Southern Region, including Chikwawa, Nsanje and Mwanza, received below normal rainfall in dekad 36, dekad 1 and dekad 7—Figure 8.

Sowing in *Africa RiskView* triggers with the fulfilment of dekadal rainfall criteria. This criteria for Malawi require 20mm of rain in any one dekad within the sowing window, followed by at least 5mm of rain in each of the two subsequent dekads following it. If this condition is not met, it is assumed that sowing was unsuccessful. Additionally, the "First" sowing opportunity aggregation method was assumed to model farmers' response to sowing chances. According to this assumption, farmers are expected to take advantage of the first sowing opportunity when and if realized.

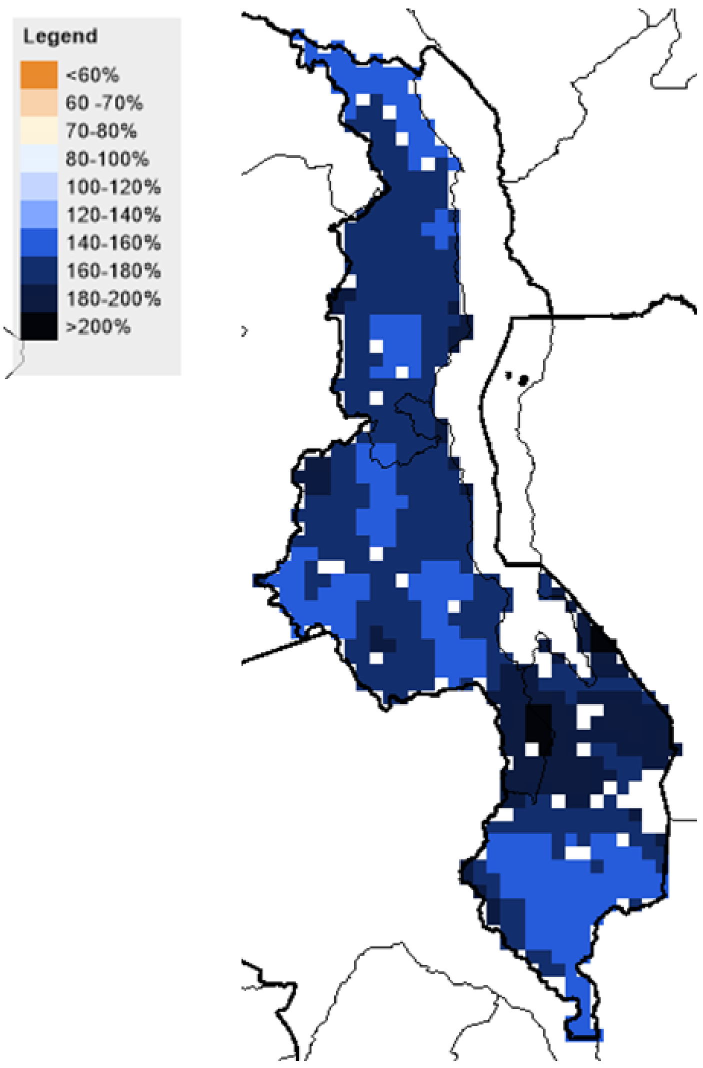

Figure 1: Cumulative Rains as % of normal (November 11, 2020 –May 10, 2021), RFE2

As per the sowing criteria described above, the whole of Malawi had successful sowing for the 2020/21 agricultural season. Most of the Southern and Central Region realized the first sowing chance in the period from dekad 32 to dekad 34. Parts of the Central region and the entire Norther Region had the first sowing chance in dekad 36 —Figure 9. The first sowing chance in most of the Malawi was realised at the normal or one dekad earlier than the normal sowing dekad. Pockets in the Central Region realised the first sowing chance two dekads earlier than the normal —Figure 10.

Although farmers are assumed to take advantage of the "First" sowing opportunity when optimal conditions for successful sowing are realised in the *African RiskView* WRSI model for Malawi, three to four dekads fulfilling the criteria set for sowing were obtained during the sowing window. Most of Malawi had four sowing chances, while parts of the Southern and the Central regions had three sowing chances. Isolated areas in the Southern and Central Regions had five sowing chances—Figure 11.

Drought Index

Africa RiskView uses the Water Requirements Satisfaction Index (WRSI) as a proxy indicator for drought. The WRSI is an index originally 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. In Malawi, maize (120-day and 100-day varieties) was used as a reference crop to model the performance of the agricultural season and the WRSI within *Africa RiskView* is customised in response to the water need of maize crop at different stages of growth.

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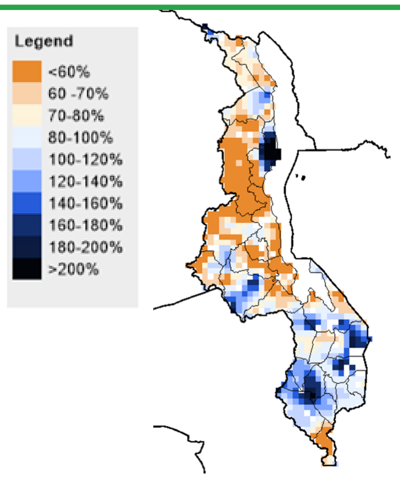

Figure 2: Rainfall as % of normal (November 11, 2020 – November 30, 2020), RFE2

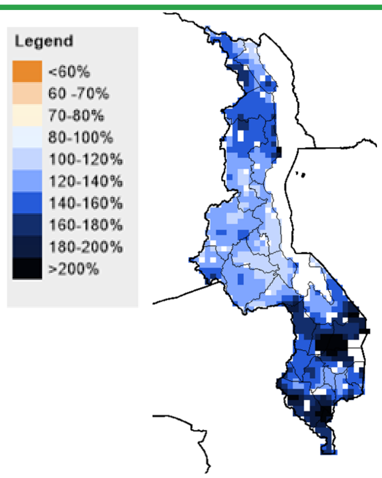

Figure 3: Rainfall as % of normal (December 1, 2020 – December 31, 2020), RFE2

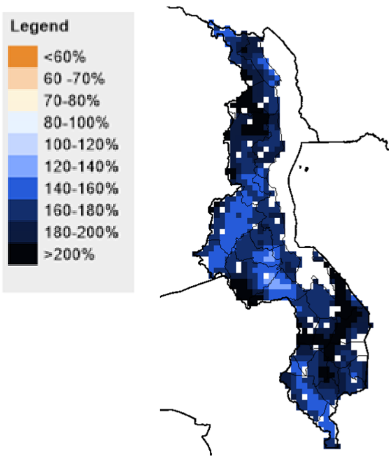

Figure 4: Rainfall as % of normal (January 1, – January 31, 2021), RFE2

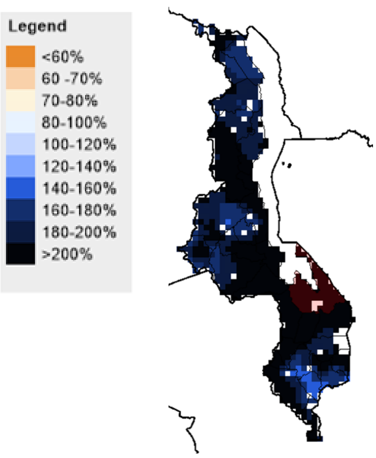

Figure 5: Rainfall as % of normal (February 1, – February 28, 2021), RFE2

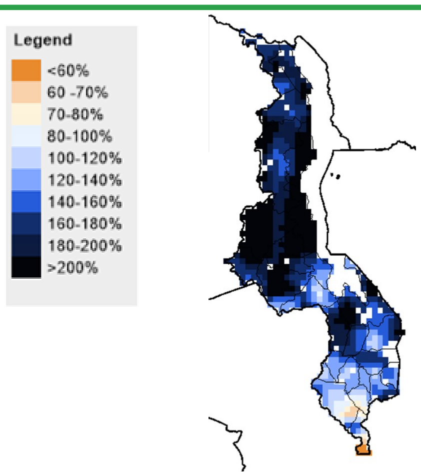

Figure 6: Rainfall as % of normal (March 1, – March 31, 2021), RFE2

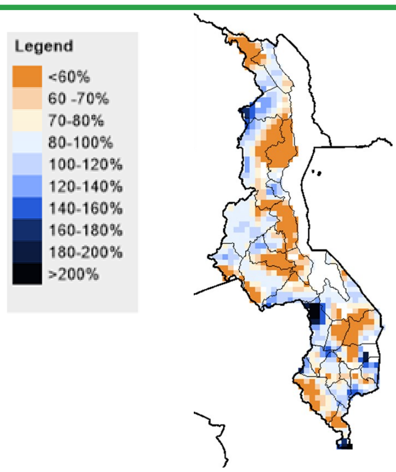

Figure 7: Rainfall as % of normal (April 1, – May 10, 2021), RFE2

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Figure 8: Dekadal Distribution of Rainfall (dekad 32 (November 11,2020) to dekad 13 (May 10, 2021))

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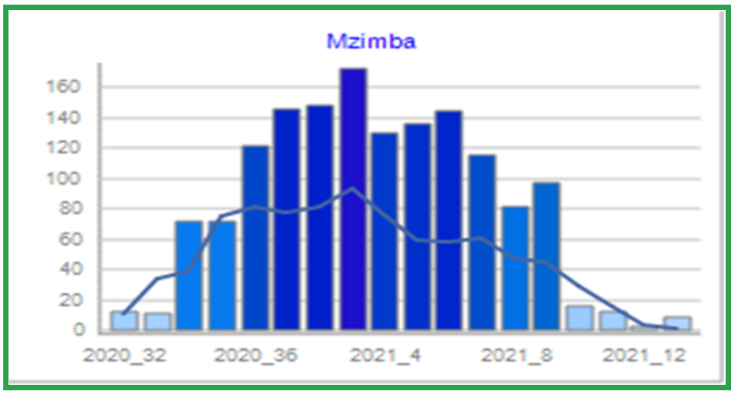

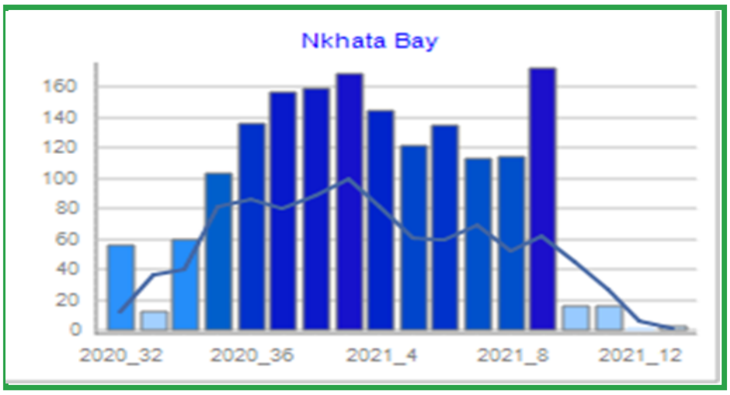

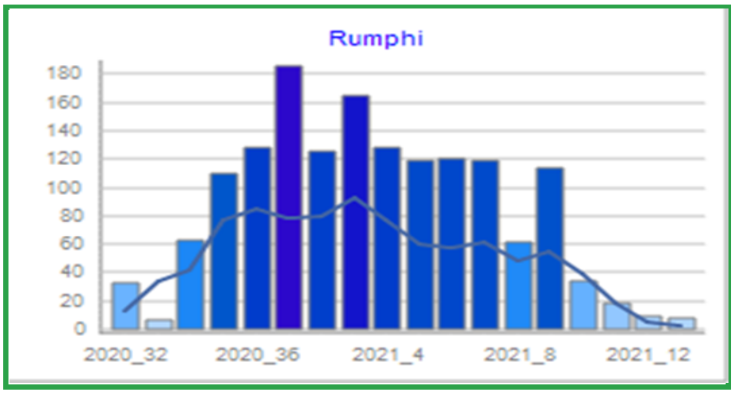

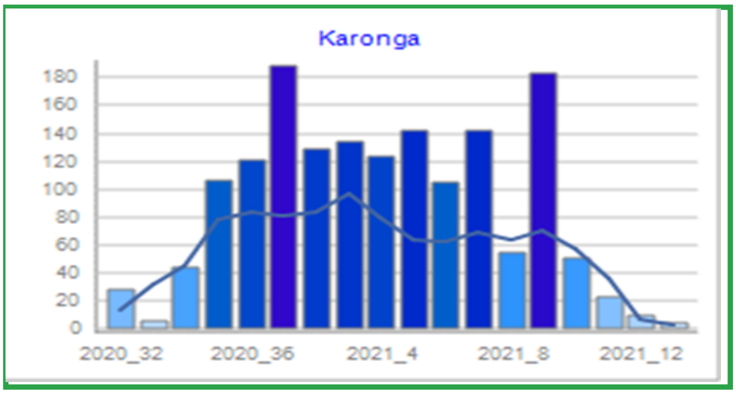

As shown in Figure 12 and Figure 13 below, excellent (95% to 100%) end-of-season WRSI conditions were realised for both the 100-day and 120 days maize varieties. This implies that 95% to 100% of the water requirement for maize crop has been met. Furthermore, comparison of the *Africa RiskView* end-of-season WRSI with the reference benchmark selected for the 2020/21 customisation (median WRSI value of the past 10 years) showed that the end-of-season WRSI value for most parts of Malawi was near the benchmark to above the benchmark —Figure 14 and Figure 15.

In line with the finding of *Africa RiskView*, the FEWS NET April Food Security Outlook[2] stated that due to favorable rainfall condition and increased access to inputs, Malawi is expected to realize above-average production of most food crops in 2021. The production is estimated to be 42 percent above the five-year average. The report also indicated that minimal (IPC Phase 1) food security outcomes are widespread across the country. However, by August/September, area-level Stressed (IPC Phase 2) outcomes are likely in Nsanje and Chikwawa districts due to the impacts of localized dry spells on crop production. In addition, some poorer households in other areas impacted by dry spells (including in parts of Balaka, Neno, Thyolo, and Kasungu district) are also likely to face Stressed (IPC Phase 2) outcomes by this time. Similarly, the April GEOGLAM Crop Monitor[3] indicated that most of Malawi had favorable to exceptional growing conditions.

Population Affected

Drought conditions are triggered when the actual WRSI value at the end of the season is found to be below the benchmark. In order to determine the number of people affected, both the drought exposure (the extent of the WRSI deviation from the benchmark) and the vulnerability of the population in the affected area are taken into consideration.

For the 2020/21 agricultural season, the *Africa RiskView* esti-

[2] https://fews.net/southern-africa/malawi

[3] https://cropmonitor.org/

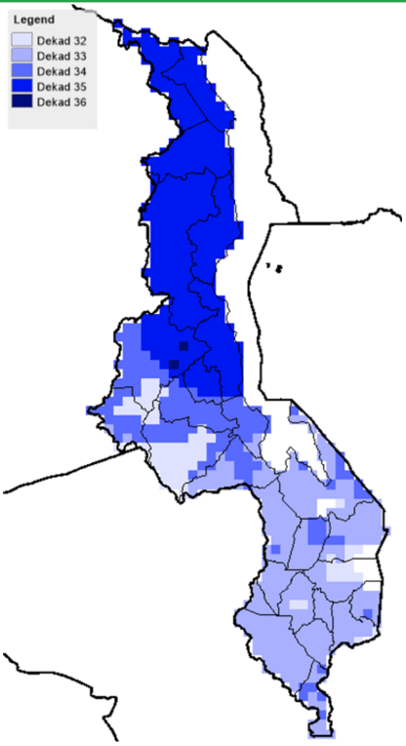

Figure 9: First sowing opportunity, (November 11, 2020 – January 20, 2021), RFE2

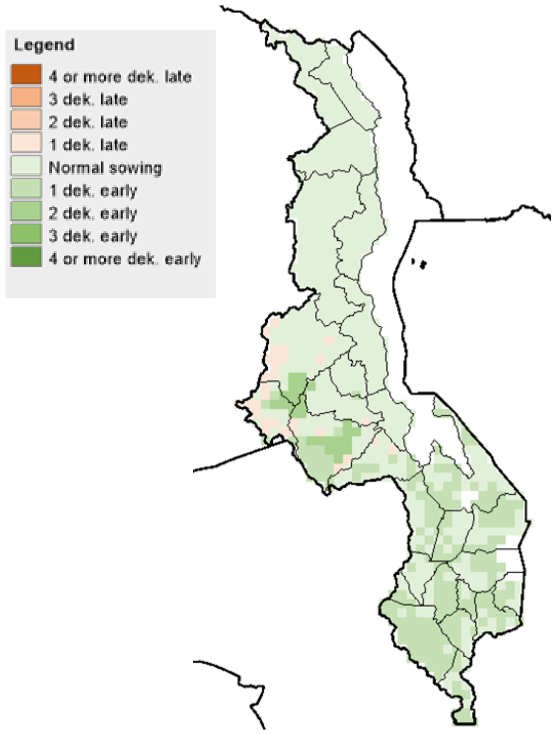

Figure 10: First sowing opportunity compared with the normal, RFE2

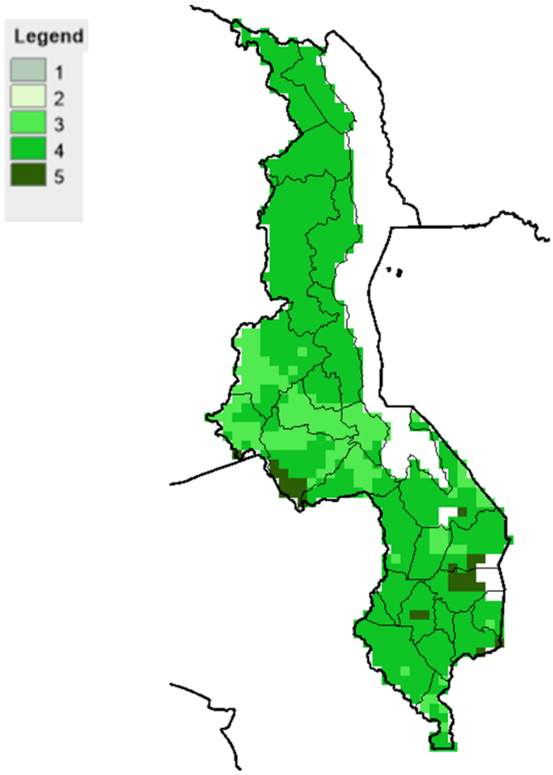

Figure 11: Number of sowing opportunities , RFE2

mated that the total population affected by drought is about 80,000, equivalent to 1% of the vulnerable population—Figure 16. In terms of the number of people affected, the year ranks as the fourth-lowest since 2001/02. The people affected are located in Chitipa (29,660) and Nkhotakota (51,105) districts.

Modelled Drought Response Costs

Based on the response cost selected by the in-country *Africa RiskView* customisation TWG, USD 42 per person, the Modelled Drought Response Cost (MDRC) for the 2020/21 season was estimated at USD 3.4 million—Figure 17.

ARC Risk Pool

Malawi has participated in the ARC Risk Pool for the 2020/21 agricultural season. However, given that the attachment level selected by the Government of Malawi was not reached, no pay-out will be triggered for the 2020/21 agricultural season.

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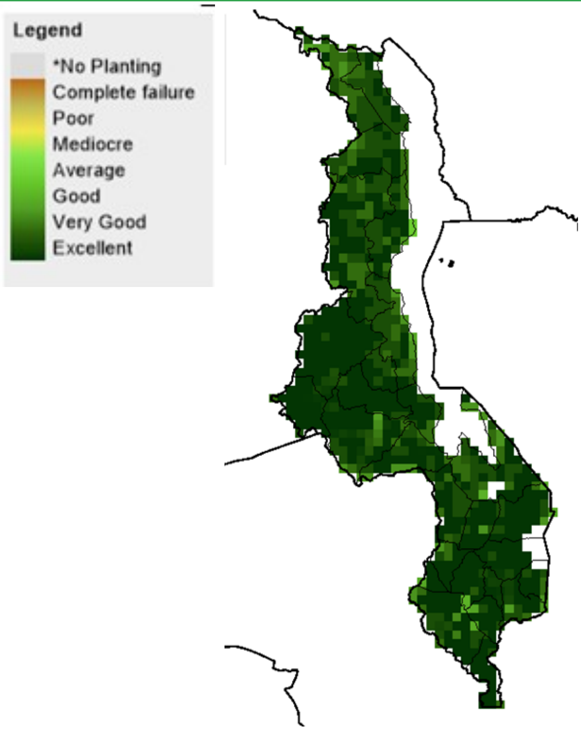

Figure 12: Final end-of-season WRSI for 100-day maize varieties (2020/21, RFE2)

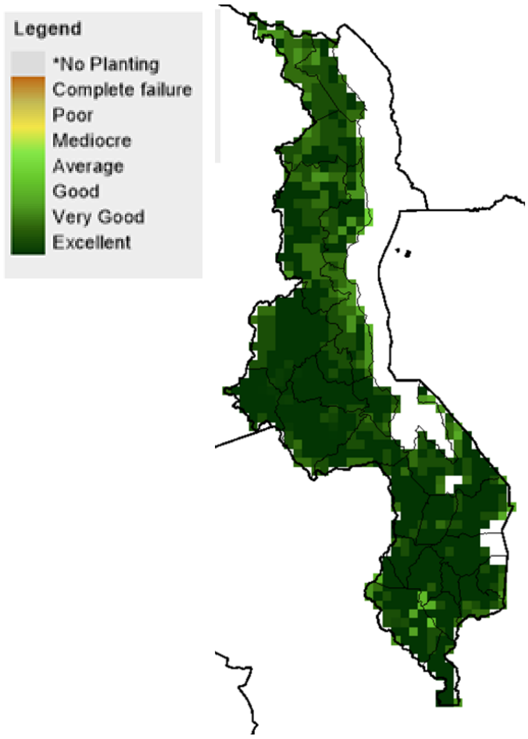

Figure 13: Final end-of-season WRSI for 120-day maize varieties (2020/21,RFE2)

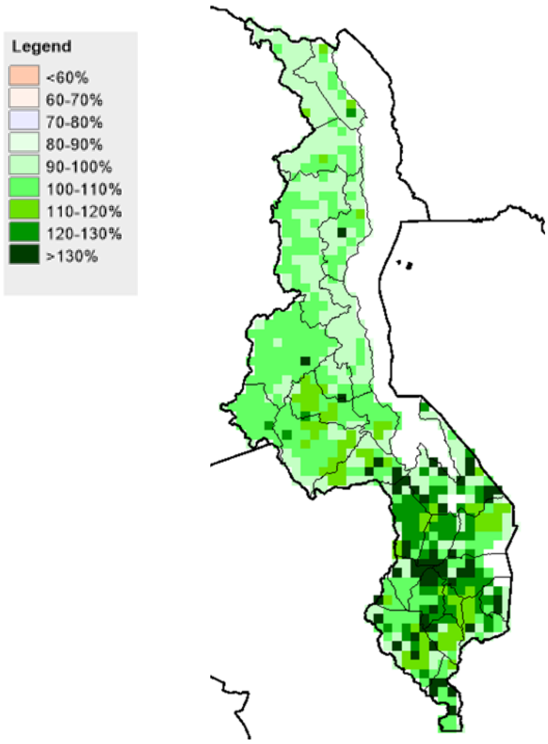

Figure 14: Final end-of-season WRSI compared to the benchmark for 100-day maize varieties (2020/21, RFE2)

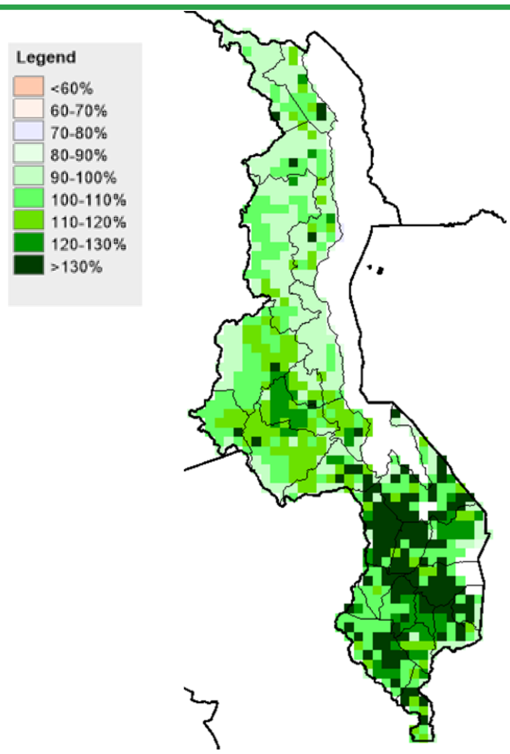

Figure 15: Final end-of-season WRSI compared to the benchmark for 120-day maize varieties (2020/21, RFE2)

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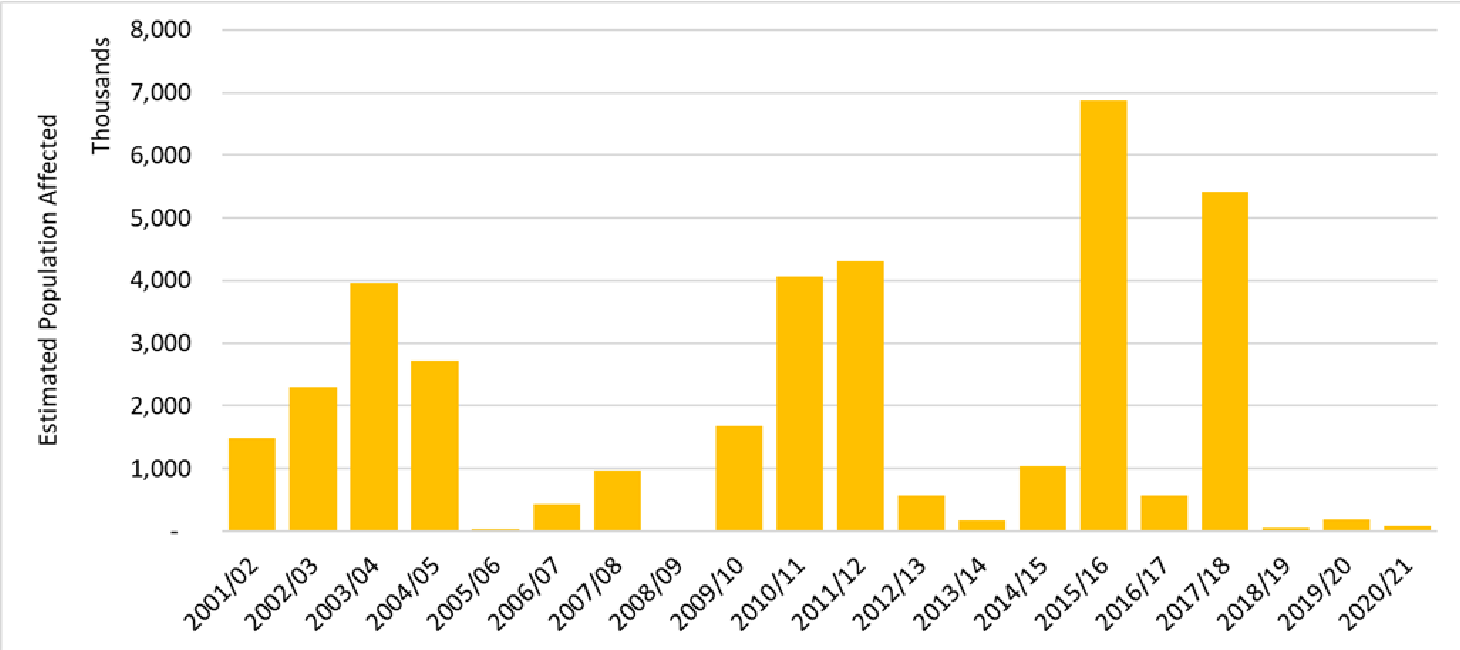

Figure 16: ***Africa RiskView*** **estimate of population affected by drought based on 2020 customisation, 2001/02-2020/21**

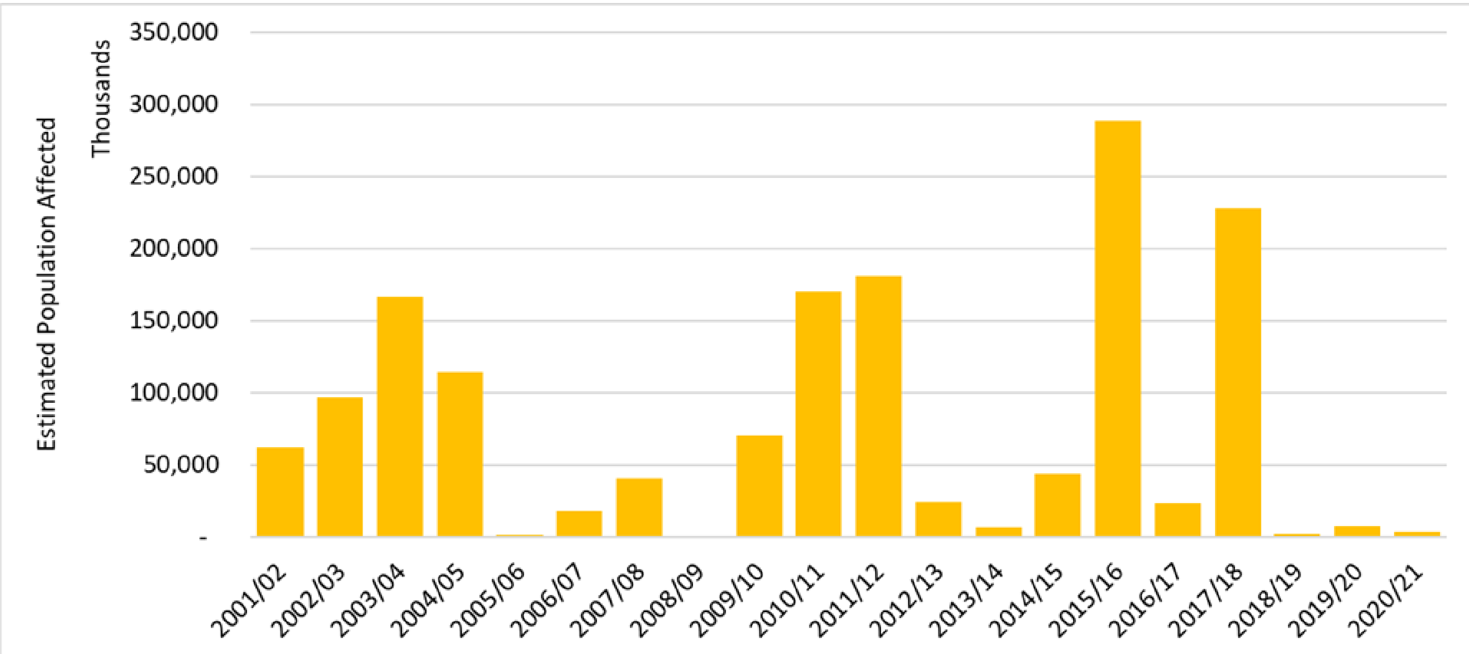

Figure 17: Modelled drought response cost by the end of the season, 2001/02-2020/21

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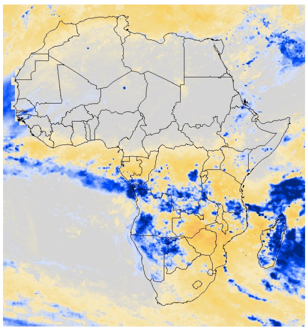
About ARC:

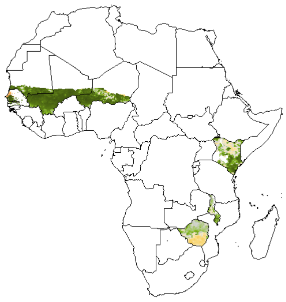
The **African Risk Capacity (ARC)** is a specialised agency of the African Union designed to improve the capacity of AU Member States to manage natural disaster risk, adapt to climate change and protect food insecure populations.

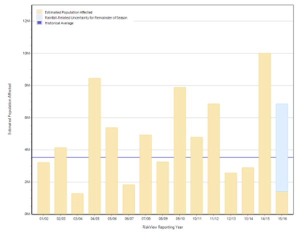
The ***Africa RiskView*** software is the technical engine of ARC. It uses satellite-based rainfall information to estimate the costs of responding to a drought, which triggers a corresponding insurance payout.

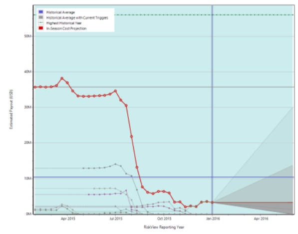
The **ARC Insurance Company Limited** is the financial affiliate of the ARC Agency, which pools risk across the continent through issuing insurance policies to participating countries.

Note on *Africa RiskView's* Methodology:









Rainfall: *Africa RiskView* uses various satellite rainfall datasets to track the progression of rainy seasons in Africa. Countries intending to participate in the ARC Risk Pool are required to customise the rainfall component by selecting the dataset which corresponds the best to the actual rainfall measured on the ground.

Drought: *Africa RiskView* 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 *Africa RiskView*, countries intending to take out insurance customise the software's parameters to reflect the realities on the ground.

Affected Populations: Based on the WRSI calculations, *Africa RiskView* estimates the number of people potentially affected by drought for each country participating in the insurance pool. As part of the in-country customisation process, vulnerability profiles are developed at the sub-national level for each country, which define the potential impact of a drought on the population living in a specific area.

Response Costs: In a fourth and final step, *Africa RiskView* converts the numbers of affected people into response costs. For countries participating in the insurance pool these national response costs are the underlying basis of the insurance policies. Payouts 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.

For more information visit our website: www.africanriskcapacity.org

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