Africa Risk View

END OF SEASON REPORT | MADAGASCAR (AGRICULTURAL SEASON 2020/2021)

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 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 ARC season monitoring reports are being continuously refined with a view to providing early warning to ARC member countries.

OVERVIEW

RAINFALL:

- The agricultural season 2020/21 has been characterized by acute rainfall deficits, particularly from October to January. Drought conditions improved from February due to excess rainfall amounts brought ashore by tropical depressions.

DROUGHT INDEX:

- The comparison of the Water Requirement Satisfaction Index (WRSI) with the long term average (2001-2019) indicates that the agricultural season has been below normal in Amboasary, Ambovombe-Androy, Bekily, Beloha and Tsiombe but above normal in the western districts of Betioky, Toliara II and Ampanihy.

DROUGHT-AFFECTED POPULATIONS:

- The estimates of Africa RiskView indicate that about 400,000 people were directly affected by the drought conditions experienced during the agricultural season of 2020/21. This estimates is more or less the same as the average annual estimate for the period 2001 to 2019.
- Considering all causes of food insecurity, including the carryover effects of the consecutive droughts during the past two years, the effects of COVID-19 and the sand storms, the analyses of the Integrated Food Security Phase Classification indicates that about 1.13 million people are currently facing acute food insecurity (IPC phase 3 or above).

RISK POOL

- The estimated number of people directly affected by drought during the 2020/21 season is lower than the attachment level selected for the 2020/21 insurance policy and as such, no pay-out has been triggered.

RAINFALL

The agricultural season of 2020/21 in the Grand South of Madagascar was characterised by severe rainfall deficits within the period from October to January, followed by excess rainfall amounts within the month of February. The beginning of February (dekad. 4) was particularly wet as a consequence of tropical depressions that brought rainfall ashore. From March to April, the area was again affected by below average conditions (Fig. 2-9). Due to the excess rainfall during the month of February, the cumulative rainfall in the western part of the Grand South was, however, above normal (the average of 2001/02 to 2019/20) (Fig 1).

The observations of the joint bulletin of FEWSNET and NOAA "Global Weather Hazard Summary" confirm that until

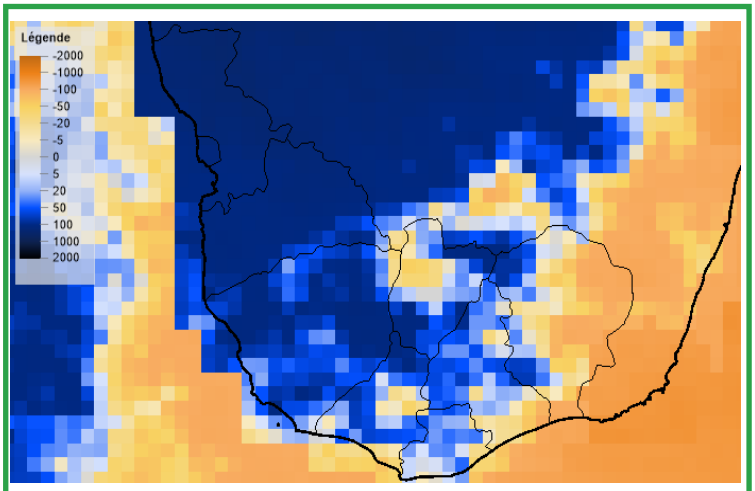

FIG 1: CUMULATIVE RAINFALL AMOUNTS IN MM COMPARED TO THE AVERAGE OF 2001 TO 2019 BASED ON ARC2 SATELLITE ESTIMATES (SURPLUSES IN BLUE AND DEFICITS IN YELLOW), 1 OCT 2020-30 APRIL, 2021

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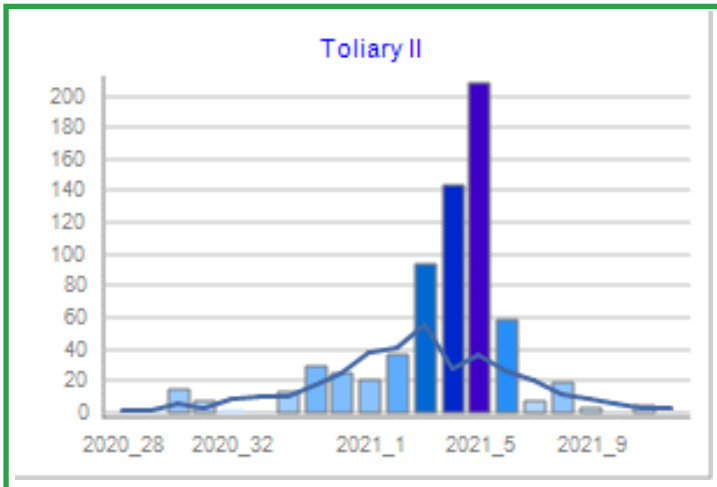

FIG 2: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, TOLIARY II

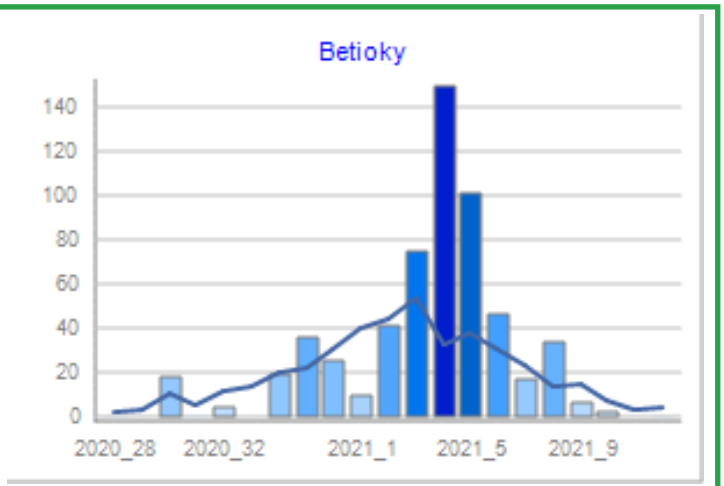

FIG 3: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, BETIOKY

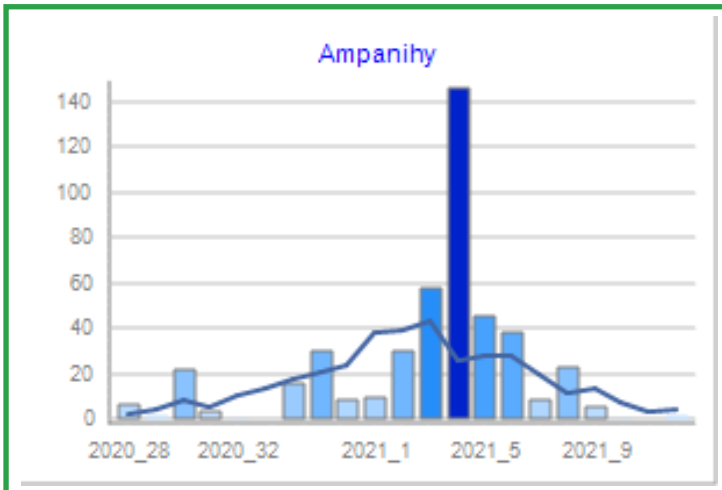

FIG 4: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, AMPANIHY

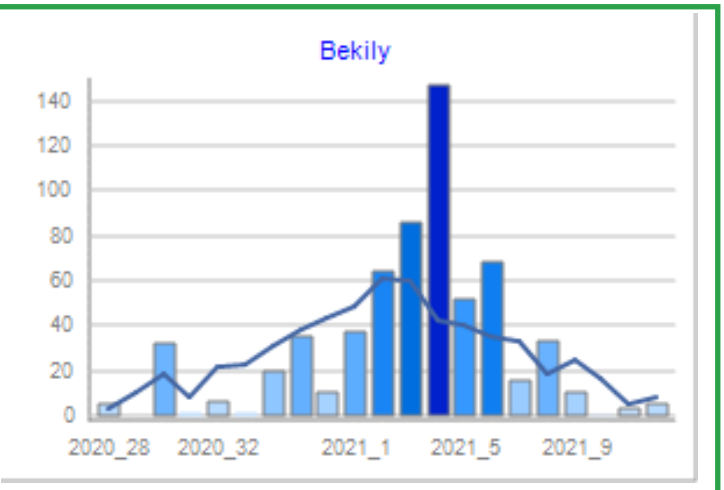

FIG 5: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, BEKILY

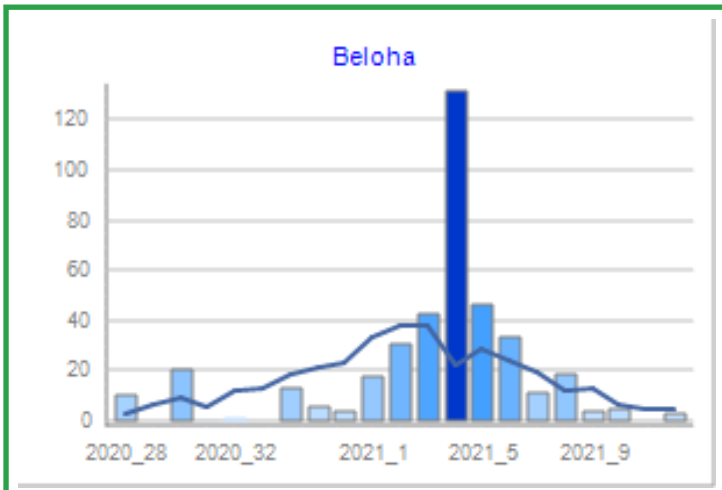

FIG 6: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, BELOHA

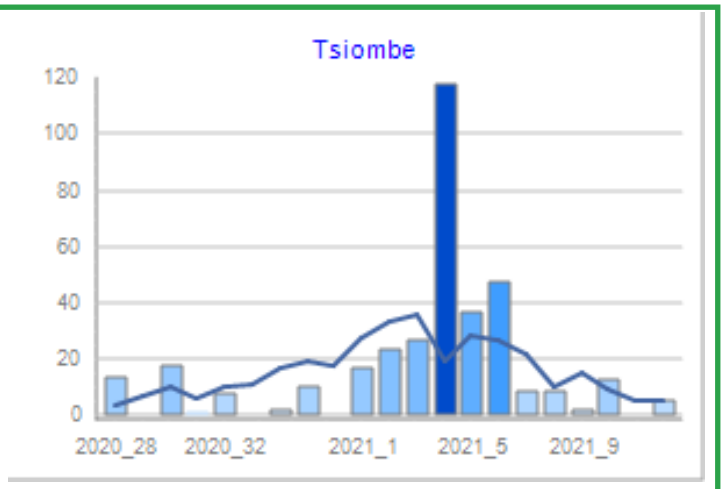

FIG 7: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, TSIOMBE

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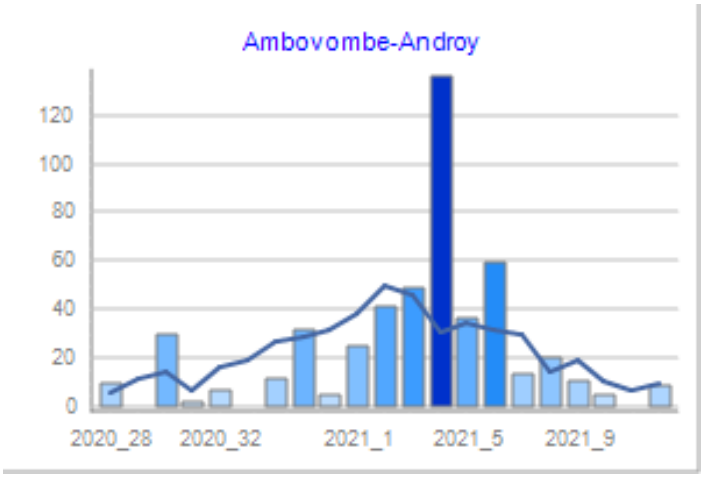

FIG 8: DEKADAL RAINFALL IN MM, 1 OCT– 30 APRIL 2021, AMBOVOMBE-ANDROY

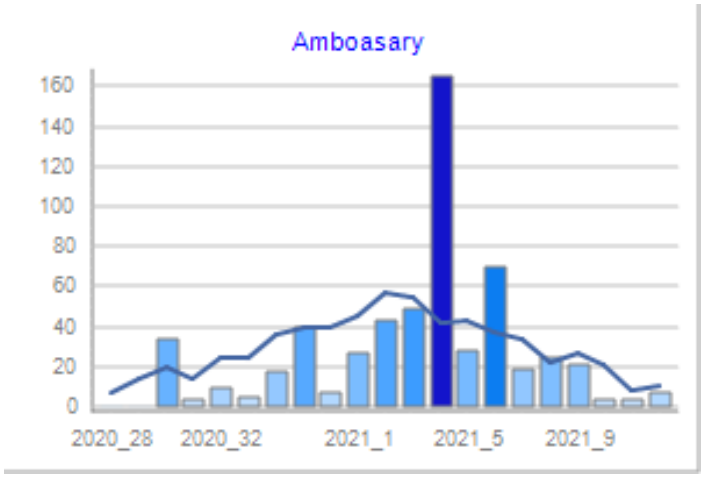

FIG 9: DEKADAL RAINFALL IN MM, 1 OCT 2020—30 APRIL 2021, AMBOASARY

the end of January, conditions in southern Madagascar were abnormally dry (FEWSNET/NOAA: Global Weather Hazard Summary, 5-11 February 2021) and that drought conditions improved after having received excess rainfall amounts during the month of February (FEWSNET/NOAA: Global Weather Hazard Summary, 5-11 March 2021). The bulletin also confirms the return of rainfall deficits within the month of March (FEWSNET/NOAA: Global Weather Hazard Summary, 5-11 March 2021).

IMPACT ON AGRICULTURAL PRODUCTION

The estimates of Africa RiskView's drought model for Madagascar vary by district. The Water Requirement Satisfaction Index (WRSI) shows that the agricultural season was below normal in Amboasary, Ambovombe-Androy, Bekily, Beloha, and Tsiombe, but above normal in the western districts of Betioky, Toliara II, and Ampanihy. According to Africa RiskView, Beloha and Tsiombe were most severely affected by the prevailing drought conditions. The WRSI values in these two districts are 82% and 92% below the long-term average, followed by Amboasary (-31%), Ambovombe (-19%) and Bekily (-15%) (Fig. 11). These estimates are comparable with the Water Satisfaction Index (WSI) estimates of the Joint Research Center (JRC) of the European Commission (Fig. 12). The WSI is based on the same principle as ARC's WRSI, but the calculation includes some different processing steps. The WSI estimates for the season of 2020/21 indicate that 99% of Androy region has

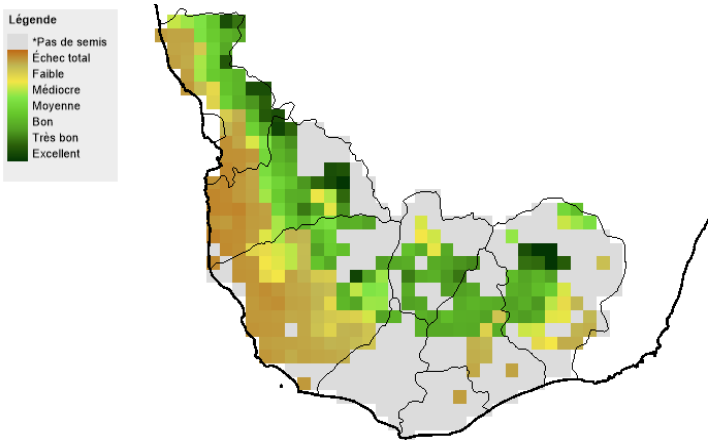

FIG 10: END-OF-SEASON WRSI , GRAND SUD, MADAGASCAR

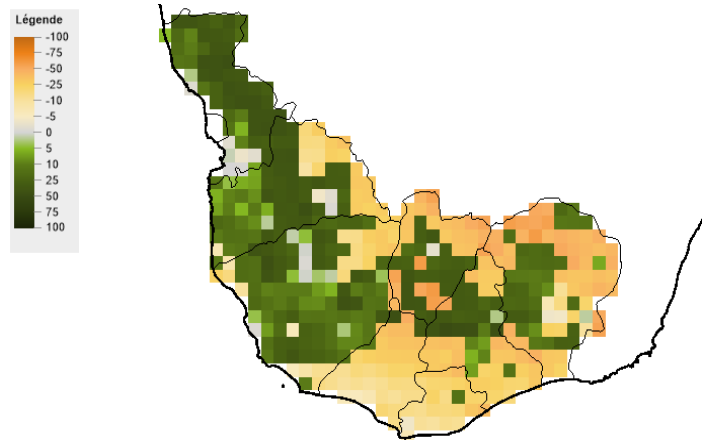

FIG 11: END-OF-SEASON WRSI COMPARED TO NORMAL (AVERAGE OF 2001-2019), GRAND SUD, MADAGASCAR

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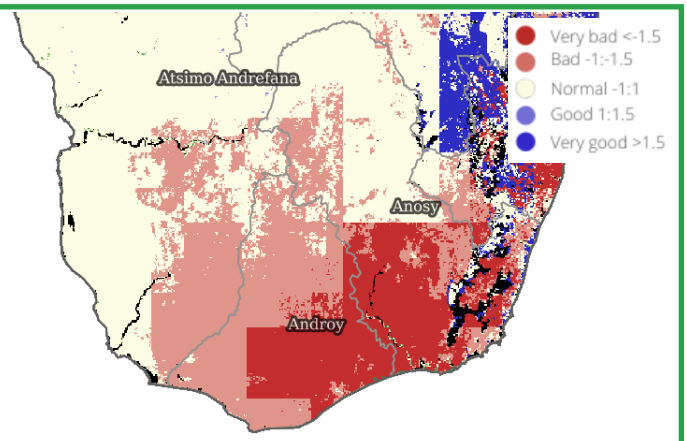

FIG 12: WSI Z-SCORE AT THE END OF DEKAD 12 (SOURCE: ASAP HOTSPOT ASSESSMENT OF THE JOINT RESEARCH CENTRE OF THE EUROPEAN COMMISSION)

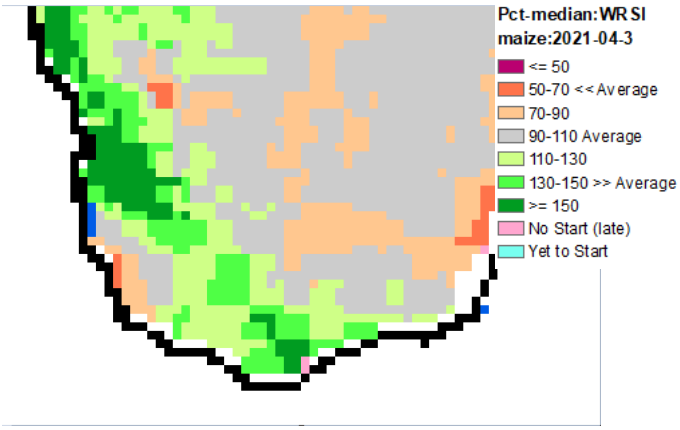

FIG 13: WRSI ANOMALIES AT THE END OF DEKAD 12 ACCORDING TO USGS FEWSNET (SOURCE: FEWSNET DATA PORTAL)

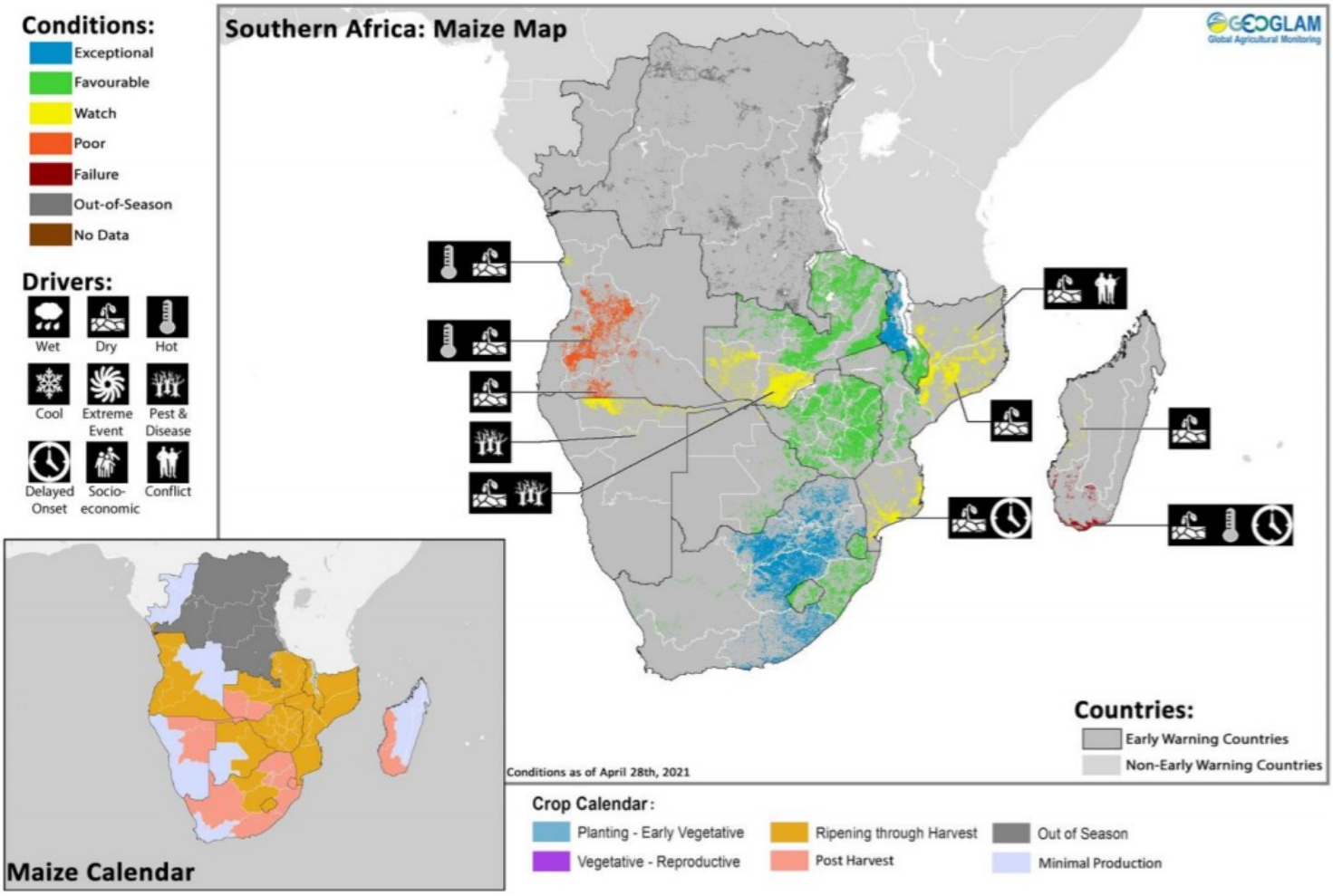

FIG. 14: AGRICULTURAL CONDITIONS IN SOUTHERN AFRICA AT THE END OF APRIL 2021 (SOURCE: GEOGLAM CROP MONITOR FOR EARLY WARNING NO.60)

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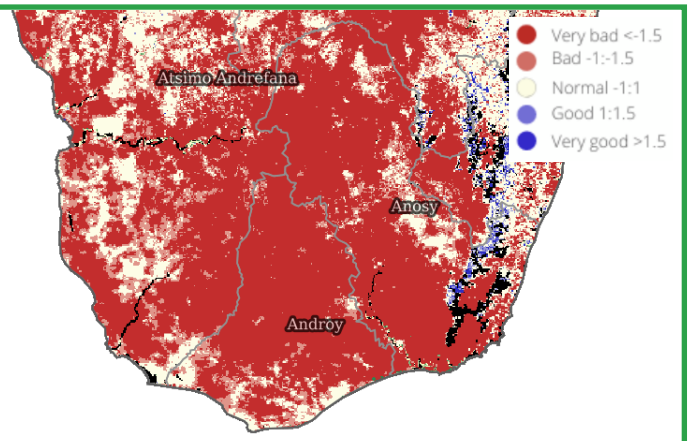

FIG. 15: Z-SCORE OF THE CUMULATIVE NDVI AT THE END OF DEKAD 12 (SOURCE: ASAP HOTSPOT ASSESSMENT OF THE JOINT RESEARCH CENTRE OF THE EUROPEAN COMMISSION)

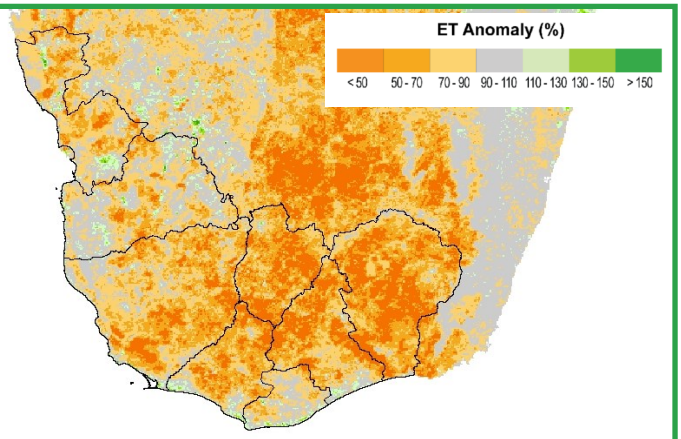

FIG 16: CUMULATIVE EVAPOTRANSPIRATION ANOMALIES BASED ON THE SSEBOP APPROACH FROM DEKAD 28 TO DEKAD 12 (SOURCE: FEWSNET DATA PORTAL)

been affected by severe or very severe rainfall deficits - compared to 55% of Anosy region and 12% of Atsimo-Adrefana region, respectively (Fig. 12). The WRSI estimates of USGS and FEWSNET, by contrast, detect mostly favourable conditions across the Grand South (Fig. 13).

The expected yields are, in fact, well below average (GEOGLAM Crop Monitor for Early Warning No. 60). These yield losses are due to a number of causes including the severe rainfall deficits, the late start to the season, and high temperatures. These conditions have been very favourable for Fall Armyworm (FAW) infestations, which were reported to have destroyed up to 50% of the maize crops planted since January (FEWSNET February 2021). Crop development has also been affected by severe sandstorms, also called "tiomenas", that caused serious damage to crop plants, particularly in Androy region (https://news.mongabay.com/2021/01/dusty-winds-exacerbate-looming-famine-in-madagascars-deep-south/).

Indices that measure vegetation health, such as the Normalized Difference Vegetation Index (NDVI) (Fig. 15) and cumulative evapotranspiration anomalies (Fig. 16) are able to capture the total effect of the combined hazard effects. The vegetation health-based indicators thus detected a higher severity of crop damage compared to the water satisfaction-based drought models. According to the NDVI estimates from the JRC, vegetation health was severely or very severely affected in 92% of Anosy region, followed by Androy and Atsimo Adrefana where 79% and 70% of the area was severely or very severely impacted, respectively.

DROUGHT-AFFECTED POPULATION

Africa RiskView estimates that by the end of the season 391,197 people will be food insecure due to the direct effects of drought. This estimate is close to the annual average estimate of about 450,000 for the period from 2001-2019. In mid-January, mid-season projections reached their highest level. Afterwards, they decreased due to the above average rainfall within the month of February (Fig. 14).

The agricultural season of 2020/21 has, however, been characterized by multiple hazards which negatively impacted the food security of the Grand South: insufficient rainfall, plant pests, sandstorms, insufficient seed and food stocks due to the effects of severe droughts in the last two years (2018/19 and 2019/20), inflation caused by COVID19 restrictions, and limited labour opportunities due to the COVID19 pandemic. (FEWSNET February 2021; CPI Analysis of Acute Food Insecurity April-December 2021).

According to the “Evaluation du démarrage de la campagne agricole et de la sécurité alimentaire“ (EDCASA 2021), for which data had been collected in February, more than one-

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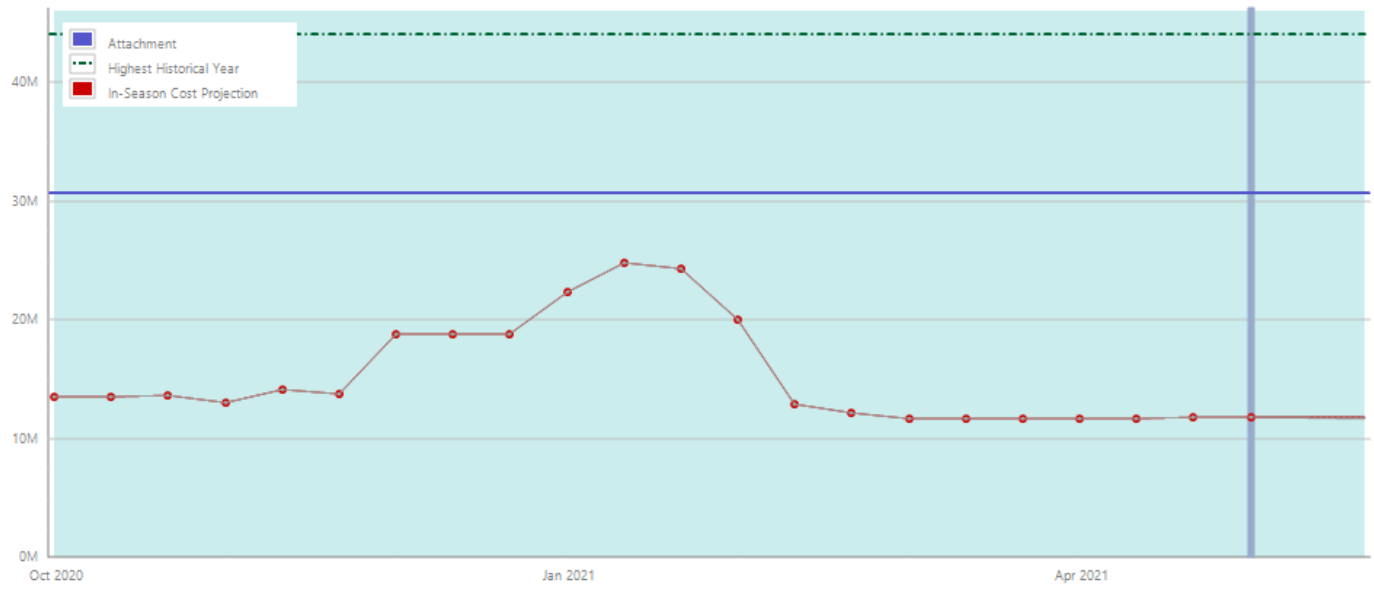

FIG. 17: MODELLED DROUGHT RESPONSE COSTS WITHIN THE AGRICULTURAL SEASON

third of the households in the southern districts had low food consumption scores, except in the districts of Betioky, Betroka, and Tulear II. Androy region and the districts of Ampanihy and Amboasary were most affected: more than 75% of households were reported to be using crisis or emergency coping strategies, including the sale land or the remaining livestock in order to migrate to urban areas (FEWSNET March 2021). Overall, the current IPC analyses (April to September 2021) estimates that 1.14m people need urgent assistance in the Grand South (IPC Phase 3 or more). This figure is projected to rise to 1.3m people during the lean season from October to December 2021.

ARC RISK POOL

Madagascar has been collaborating with ARC since 2017 when the country signed a Memorandum of Understanding with ARC. During the 2019/20 agricultural season, Madagascar participated in the ARC Risk Pool for the first time. As a result of the extreme drought experienced in 2019/20, the Government of Madagacar received a pay-out of US$ 2.1m to respond to the effects of the drought. Moderate drought conditions have been modelled in 2020/21 by the ARC drought model which uses the same parameters that estimated a severe drought in 2018/19 and an extreme drought in 2019/20. As such, the attachment point for the drought policy taken by the Government of Madagascar has not been reached and a pay-out has consequently not been triggered.

SYNTHESIS ON THE FOOD INSECURITY SITUATION IN THE GRAND SOUTH OF MADAGASCAR

The Integrated Food Security Phase classification undertaken in April 2021 reported high levels of acute food insecurity in the Grande Sud. Over 1.1 million people are in high acute food insecurity (IPC Phase 3 or above) due to insufficient rainfall, rising food prices and sandstorms. The lean season is expected to begin earlier than usual for the current consumption year, as households will deplete their low food stocks due to minimal production. During the current analysis period (April-September 2021), which begins with a harvest period, 1.14 million people need urgent action (IPC Phase 3 or above).

During the 2018/19 agricultural season, a severe drought was experienced in Southern Madagascar with over

800,000 modelled as affected using the Africa RiskView agricultural drought model. This was followed by an extreme drought during the 2019/20 agricultural season where over 1.4 million people were modelled as affected by drought in the same region. The ARC model estimate of 2019/20 was the highest estimate of people affected by drought during the last 20 years and is about three times the modelled estimate of drought affected people during the 2020/21 agricultural season. Moreover, these modelled estimates were generated by the same parameters during the last three seasons. The acute food insecurity being experienced in the Grand South in 2021 is a consequence of several co-variate factors including the carry-over effects of severe droughts in 2018/19, 2019/20, moderate drought in 2020/21, the effects of sand storms that reduced arable land and covered some of the planted crops and pasture, COVID19 disruptions that limited market access and rising food prices.

It is important to note that Africa RiskView drought model is only able to model the direct effects of drought in the current season and not able to model the effects of other underlying factors that drive food insecurity nor the carry-over effects from rainfall deficits experienced during past seasons. This explains the "discrepancy" between Africa RiskView model estimates for 2020/21 and the number of people experiencing acute food insecurity as identified by the current IPC analysis (April – December 2021). Whereas the drought of 2019/20 triggered a pay-out to the Government of Madagascar, the drought experienced during 2020/21 is modelled as moderate and thus, did not trigger a pay-out based on the risk transfer parameters selected.

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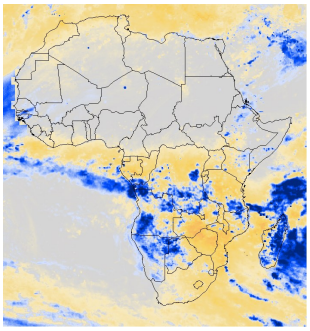
About ARC:

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.

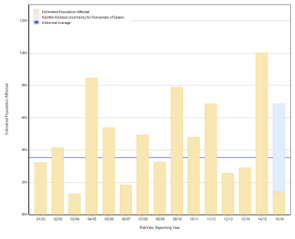
The **ARC Insurance Company Limited** is the financial affiliate of the ARC Agency, which pools risk across the continent through issuing insurance policies to participating countries.

Note on *Africa RiskView's* Methodology:

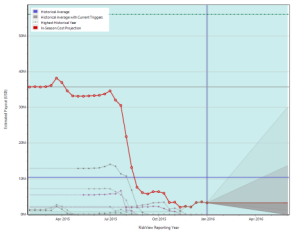


Rainfall: *Africa RiskView* uses various satellite rainfall datasets to track the progression of rainy seasons in Africa. Countries intending to participate in the ARC Risk Pool are required to customise the rainfall component by selecting the dataset which corresponds the best to the actual rainfall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

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