Ready, set, go! An anticipatory action system against droughts

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Supplementary material

Section S1: Overview of ENSO states within rainy season of Mozambique

Table S1 Overview of the dominant ENSO signal within the rainy season of Mozambique based on the Oceanic Niño Index (ONI)

ENSO state	Rainy seasons in Mozambique
Neutral	1993/94, 1996/97, 2001/2, 2003/4, 2012/13, 2013/14, 2019/20
La Niña	1995/96,1998/99, 1999/00, 2000/01, 2005/06, 2007/08, 2008/09, 2010/11, 2011/12, 2016/17, 2017/18, 2020/21, 2021/22, 2022/23
El Niño	1994/95,1997/98, 2002/03, 2004/05, 2006/07, 2009/10, 2014/15, 2015/16, 2018/19, 2023/24

Section S2: Overview of severe drought events

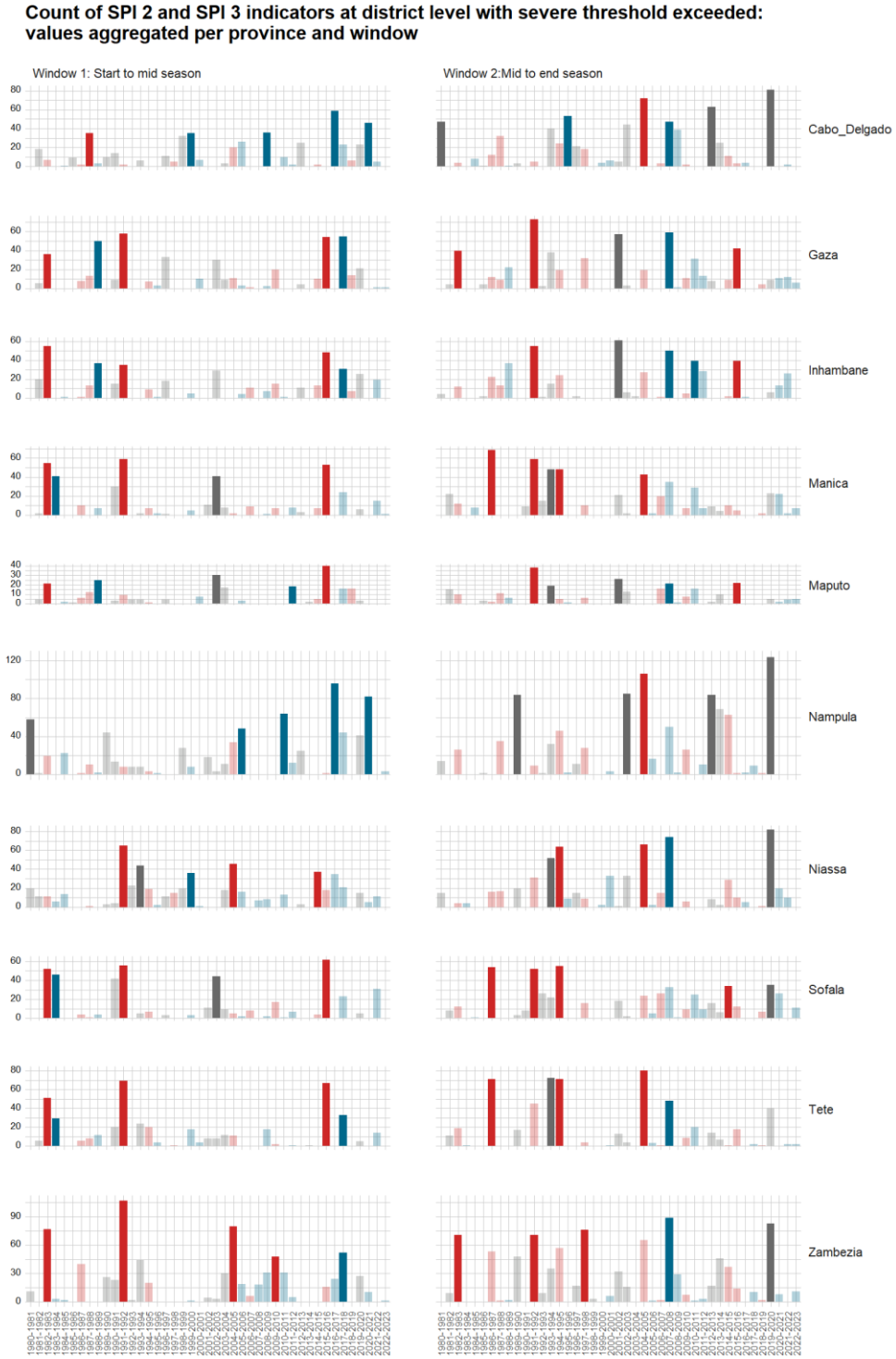

Figure S2.1. Frequency in which the extracted SPI 2 and SPI 3 indicators were per zone and window exceeded or equaled the severe threshold since 1981. First, the counting is done per district and subsequently aggregated at the province level within window 1 (left) and window 2 (right). For an overview of the SPI 2 and SPI 3 belonging to windows 1 or 2, see Table 2. Bars are colored according to the ENSO dominant phase during the rainy cycle in Mozambique (red = El Niño, blue = La Niña and grey=Neutral). Top 5 years are highlighted per window and zone.

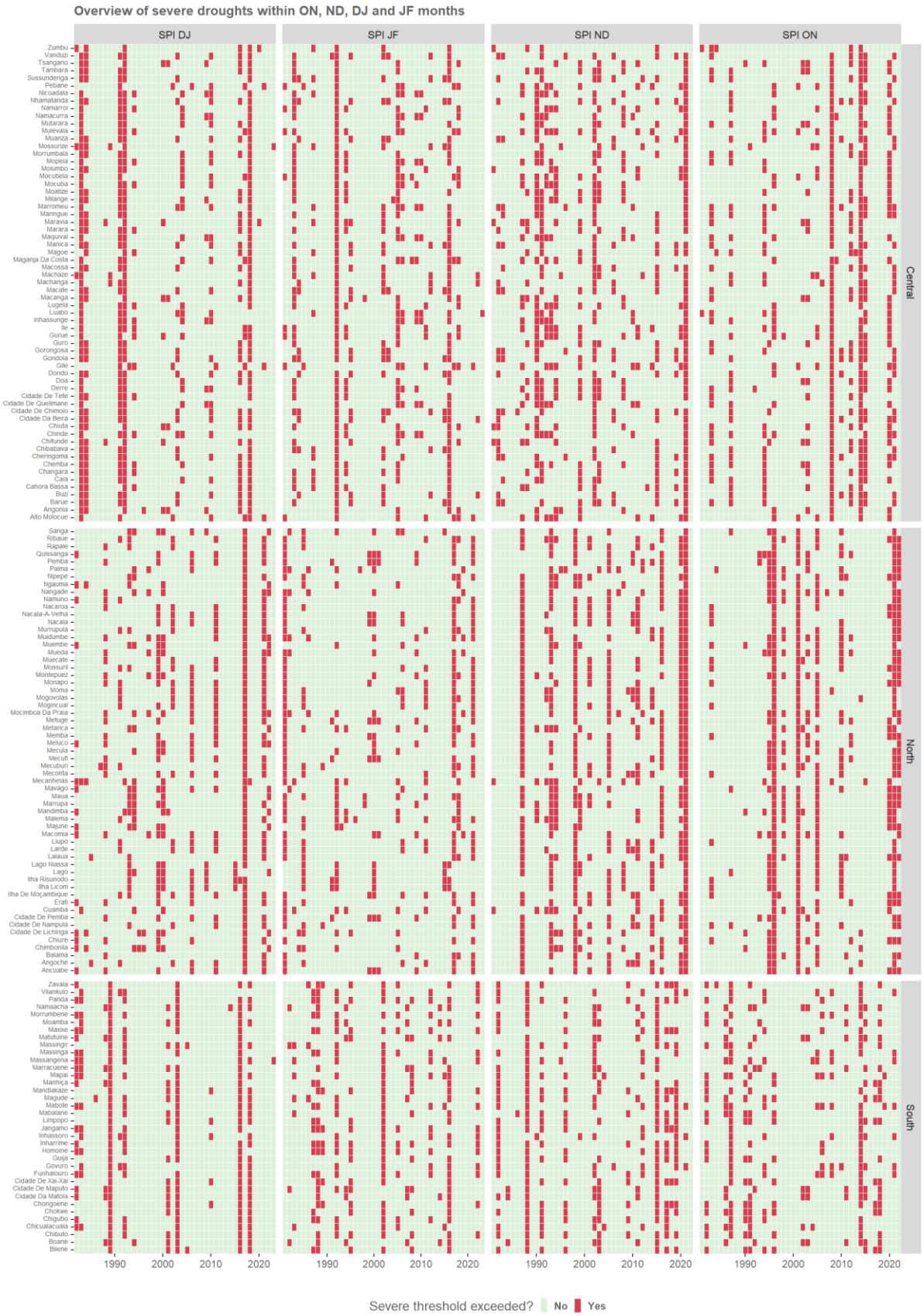

Figure S2.2. time series of drought events according to SPI 2 (ON, ND, DJ and JF) per district and zone

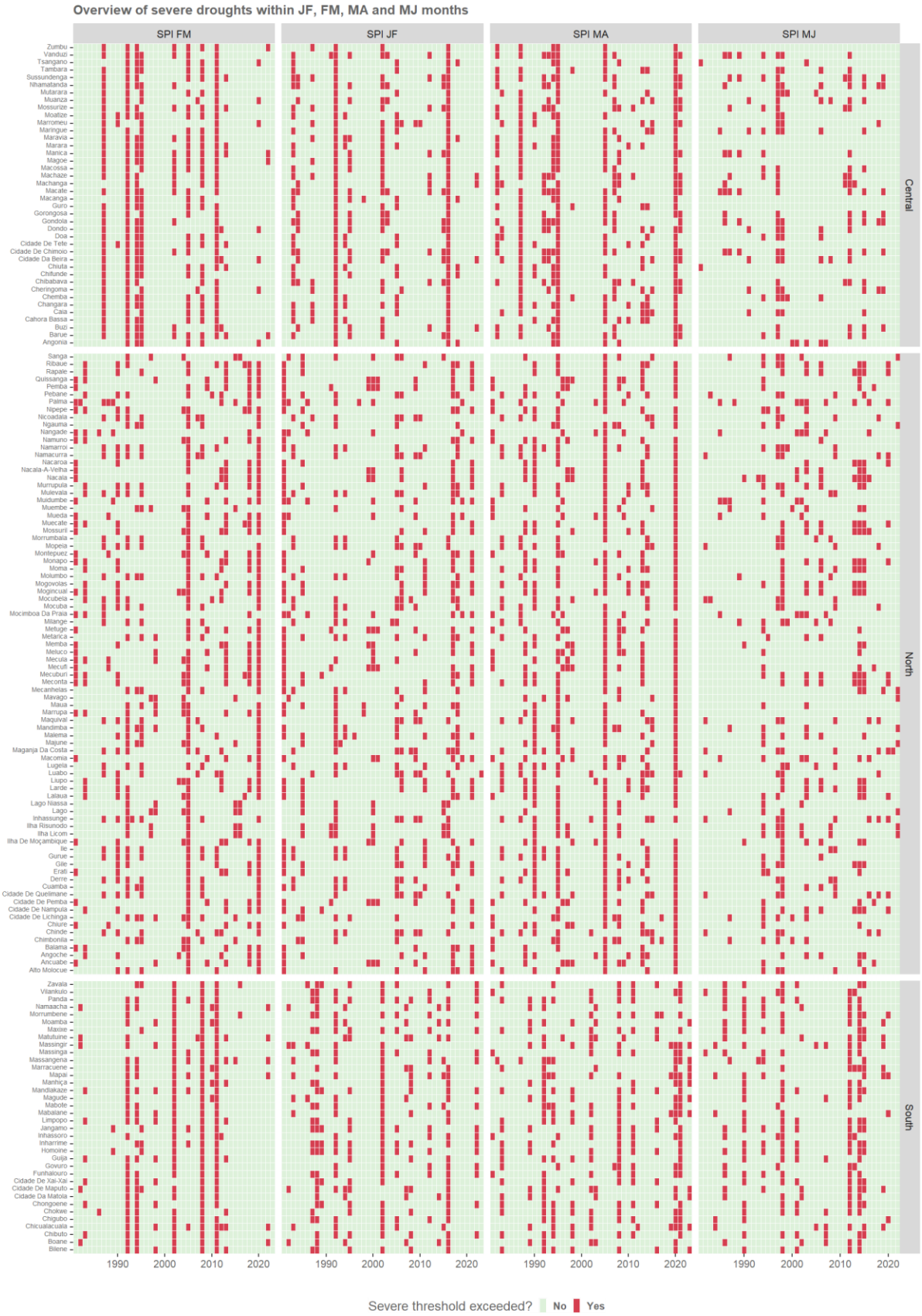

Figure S2.3. time series of drought events according to SPI 2 (FM, MA, AM, and MJ) per district and zone

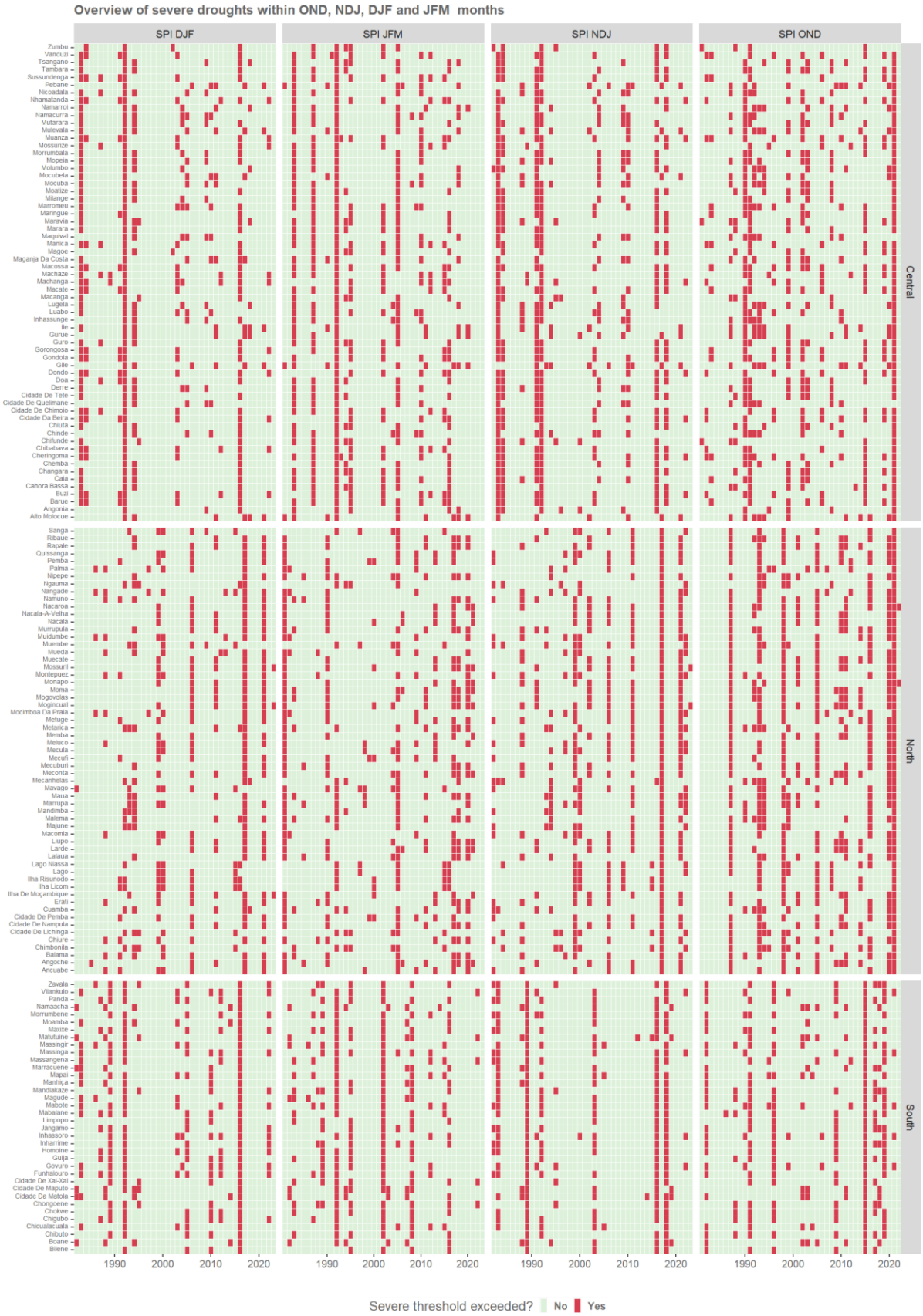

Figure S2.4. time series of drought events according to SPI 2 (OND, NDJ, DJF, and JFM) per district and zone

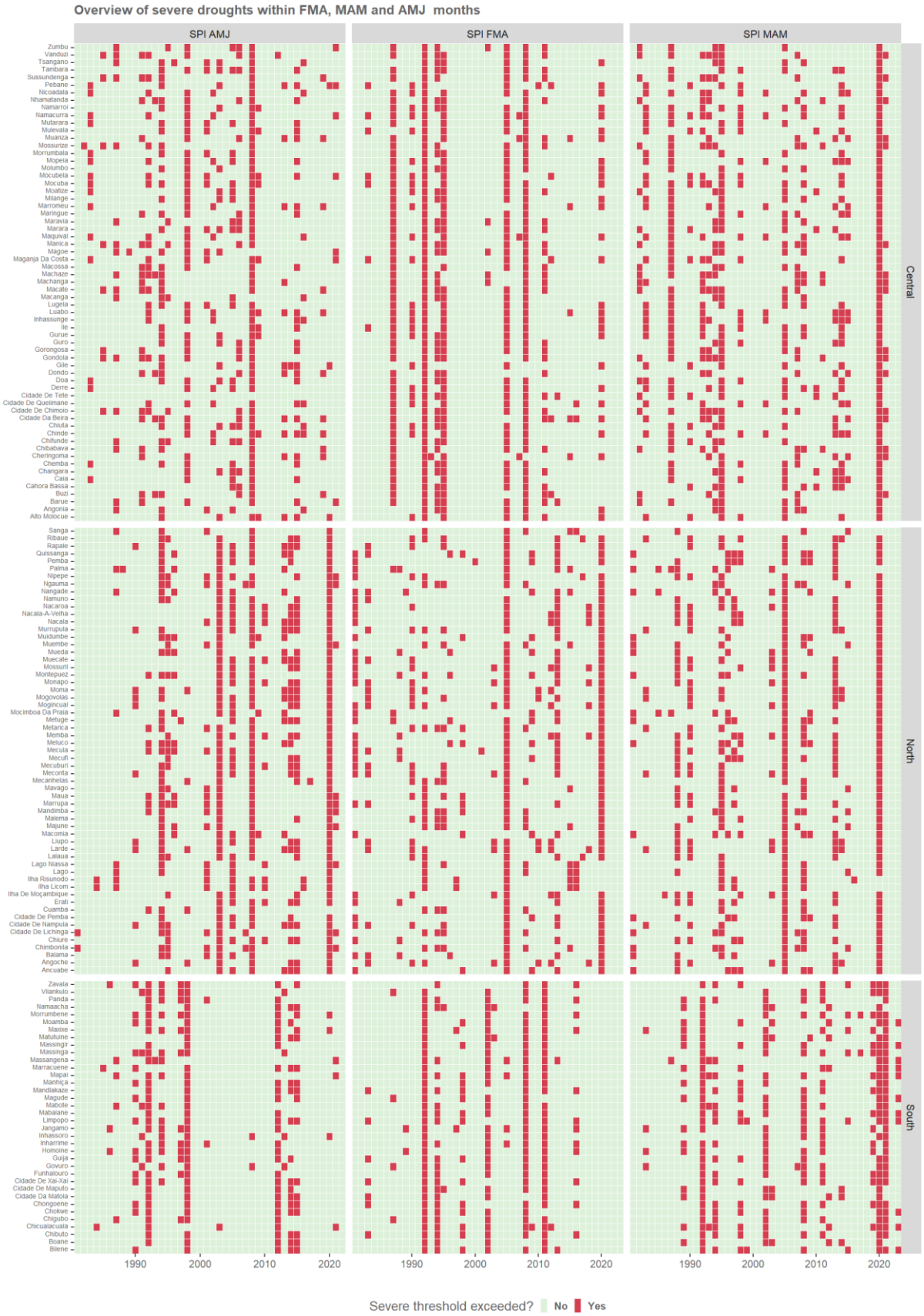

Figure S2.5. time series of drought events according to SPI 2 (OND, NDJ, DJF and JFM) per district and zone

Section S3: Bias correction spatial performance in relation to raw forecasts

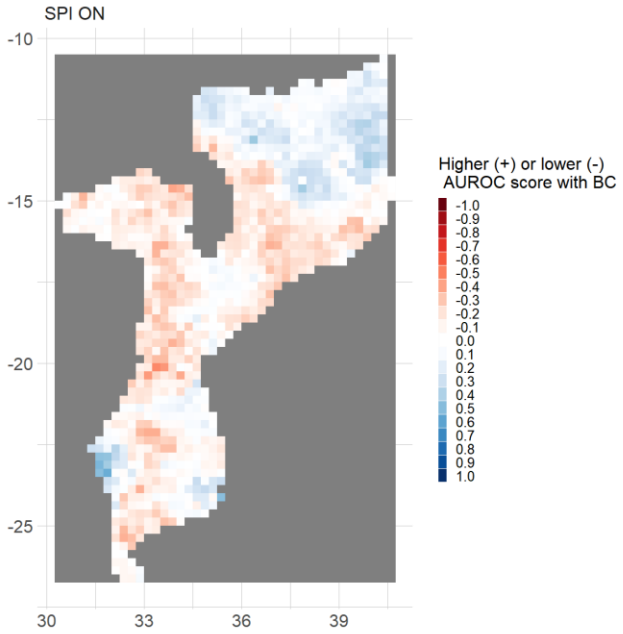

Figure S3.1. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in May.

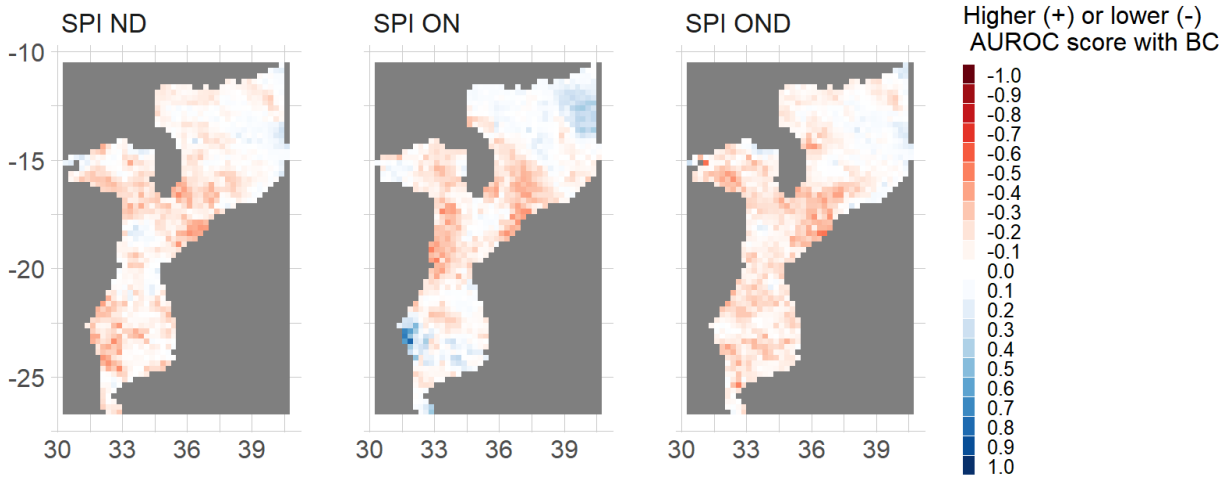

Figure S3.2. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in June.

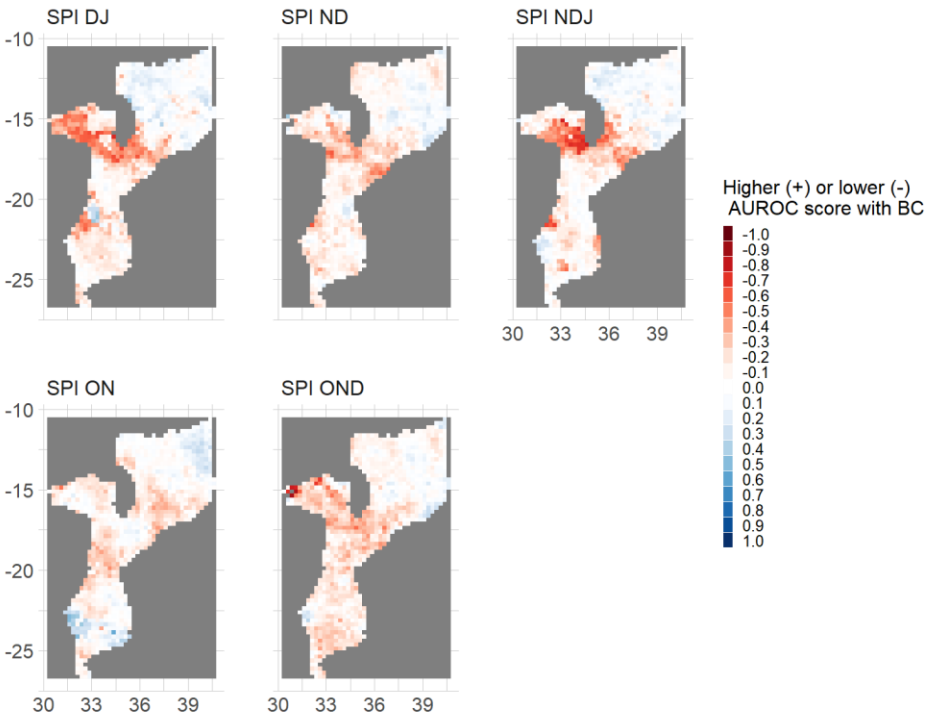

Figure S3.3. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in July.

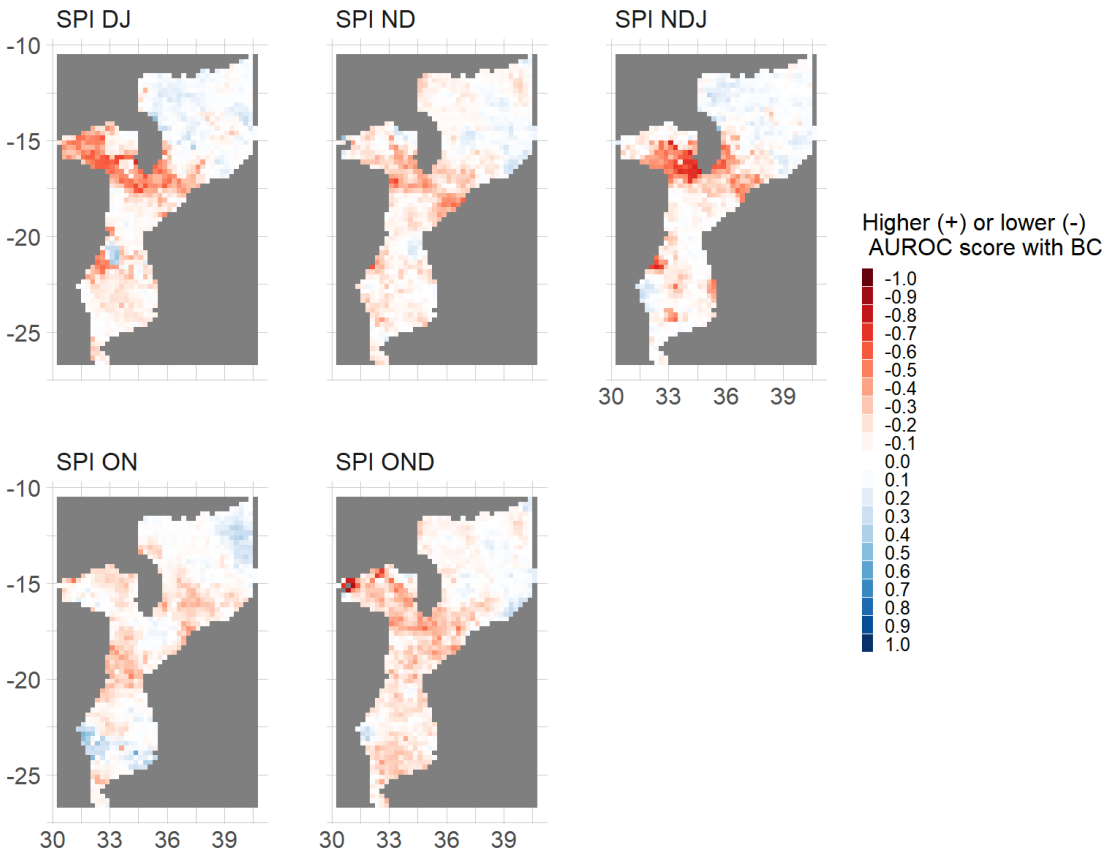

Figure S3.4. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in August.

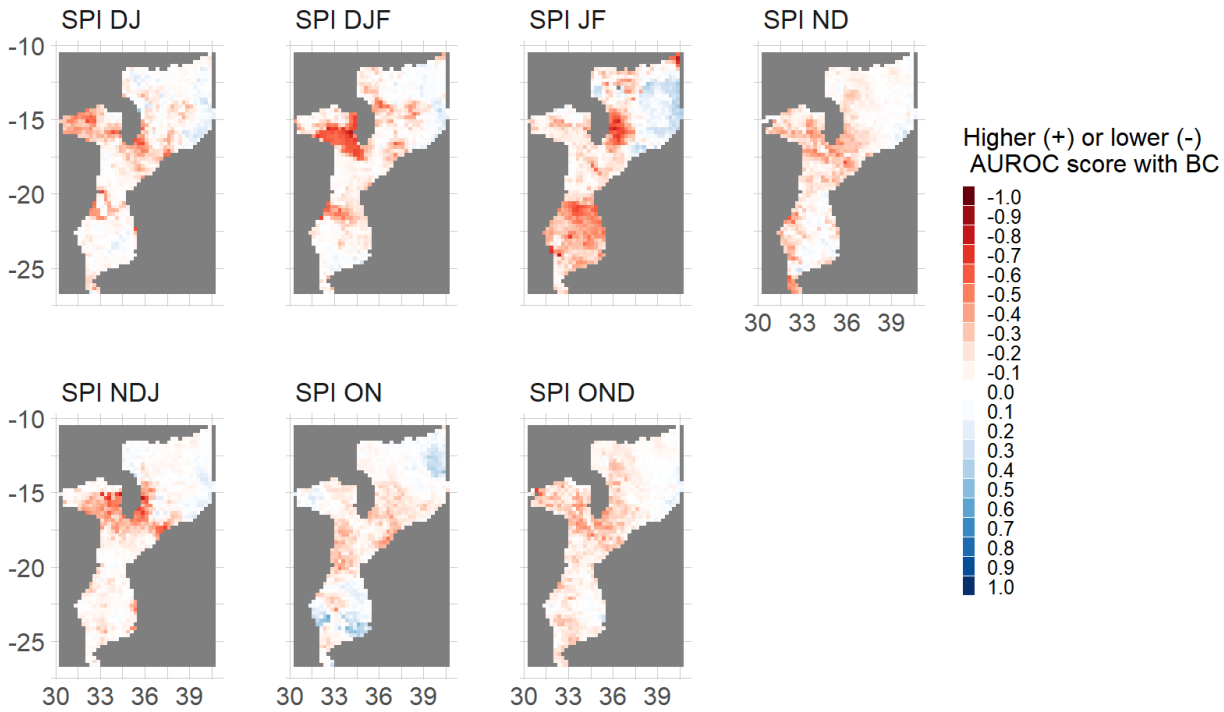

Figure S3.5. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in September.

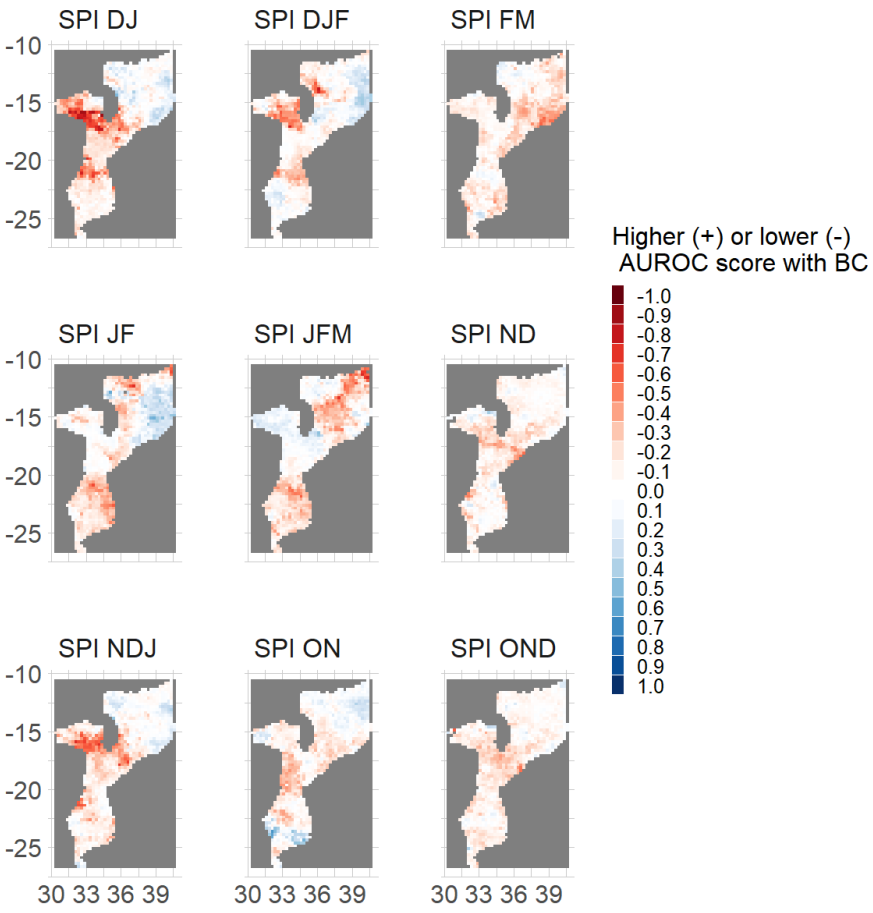

Figure S3.6. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in October.

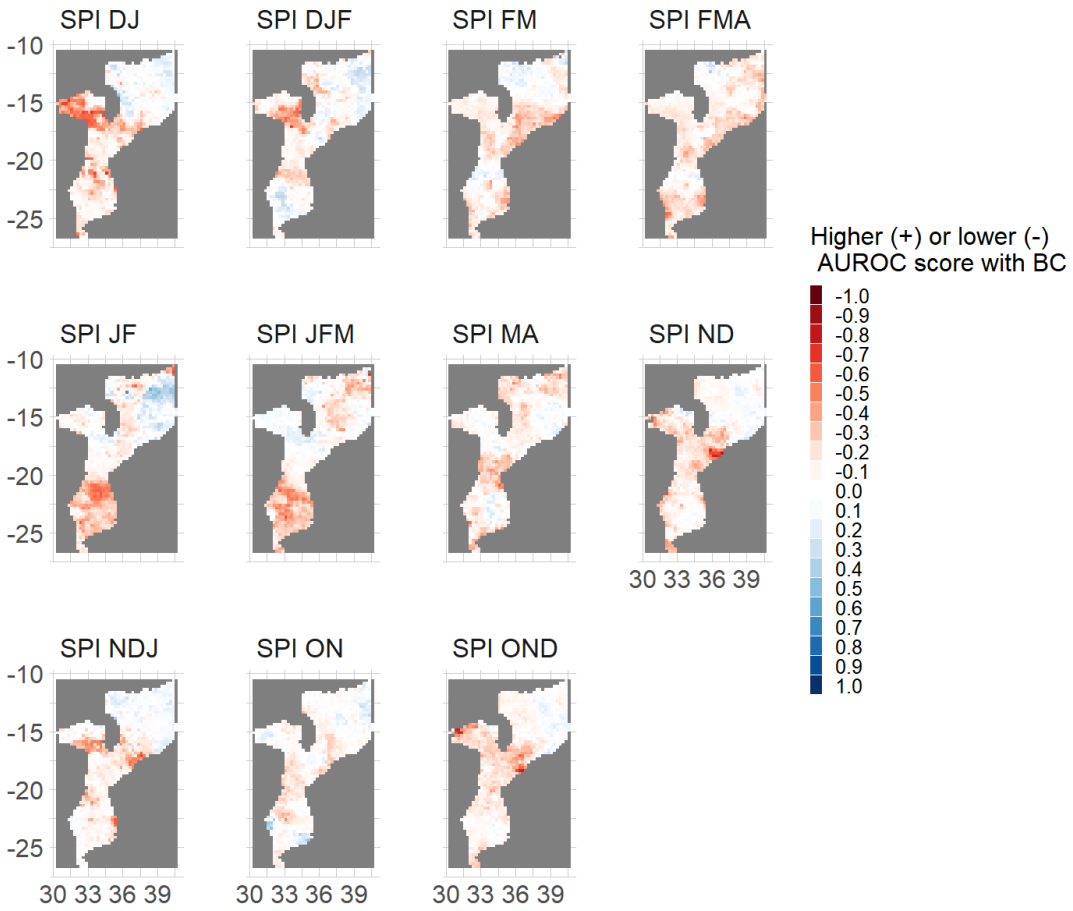

Figure S3.7. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in November.

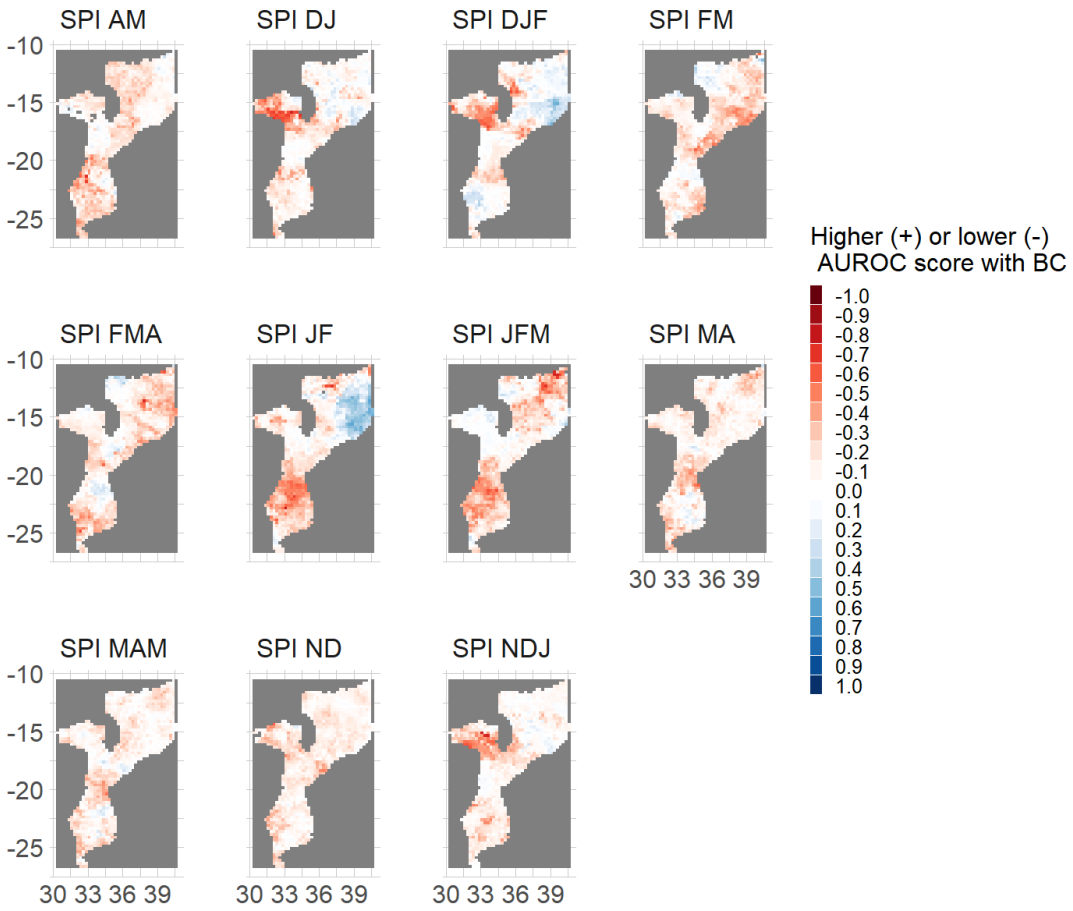

Figure S3.8. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in December.

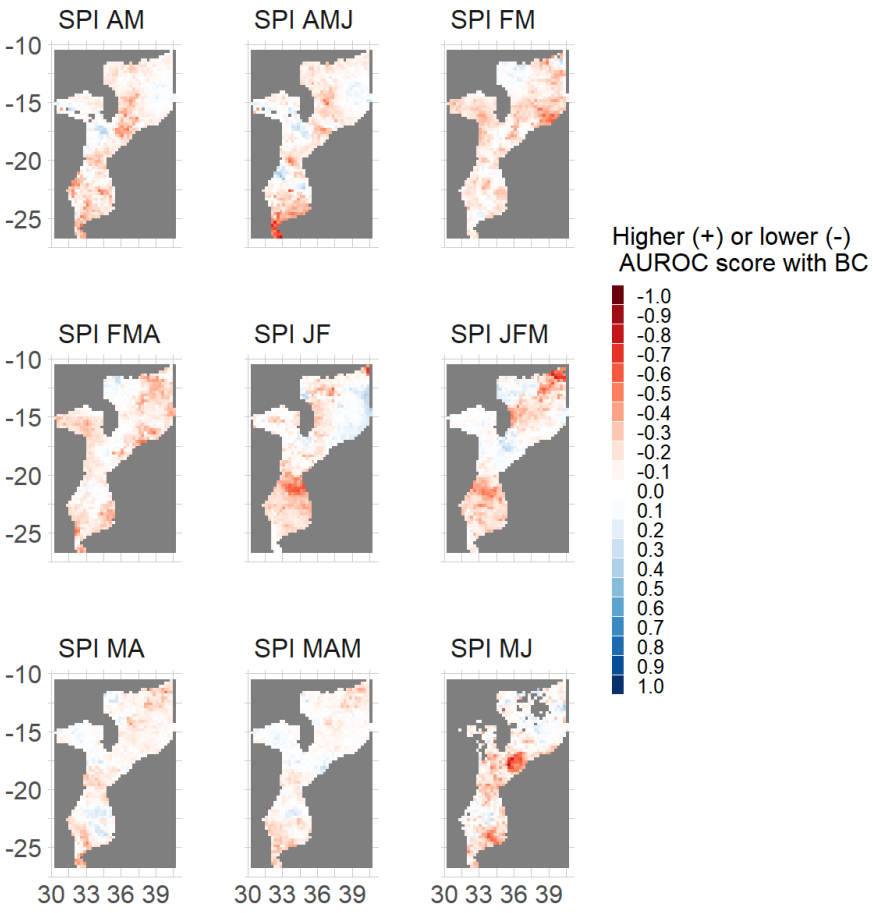

Figure S3.9. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in January.

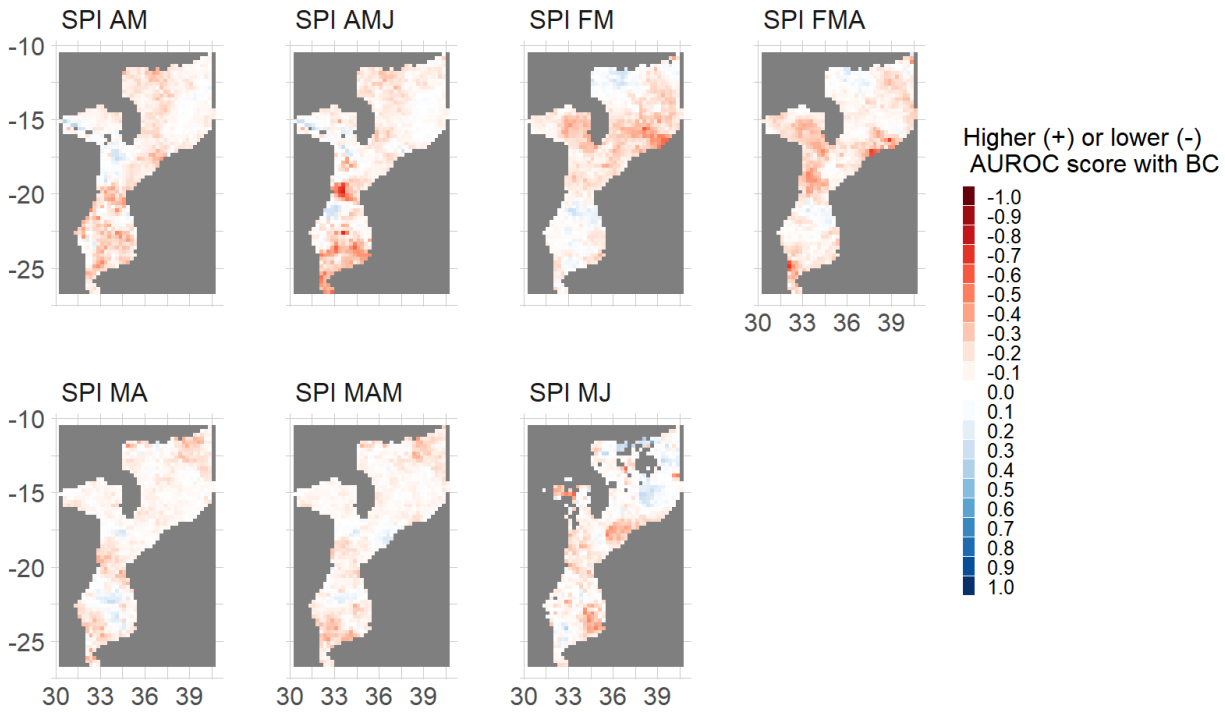

Figure S3.10. Differences between the AUROC for severe events using bias correction methodology minus the AUROC score from raw forecasts. Regions in blue show the added value of bias correction, whereas in red regions with decreased skill due to BC. The plot shows the skill of the forecast issued in February.

Section S4: Overview of the maximum ROC score

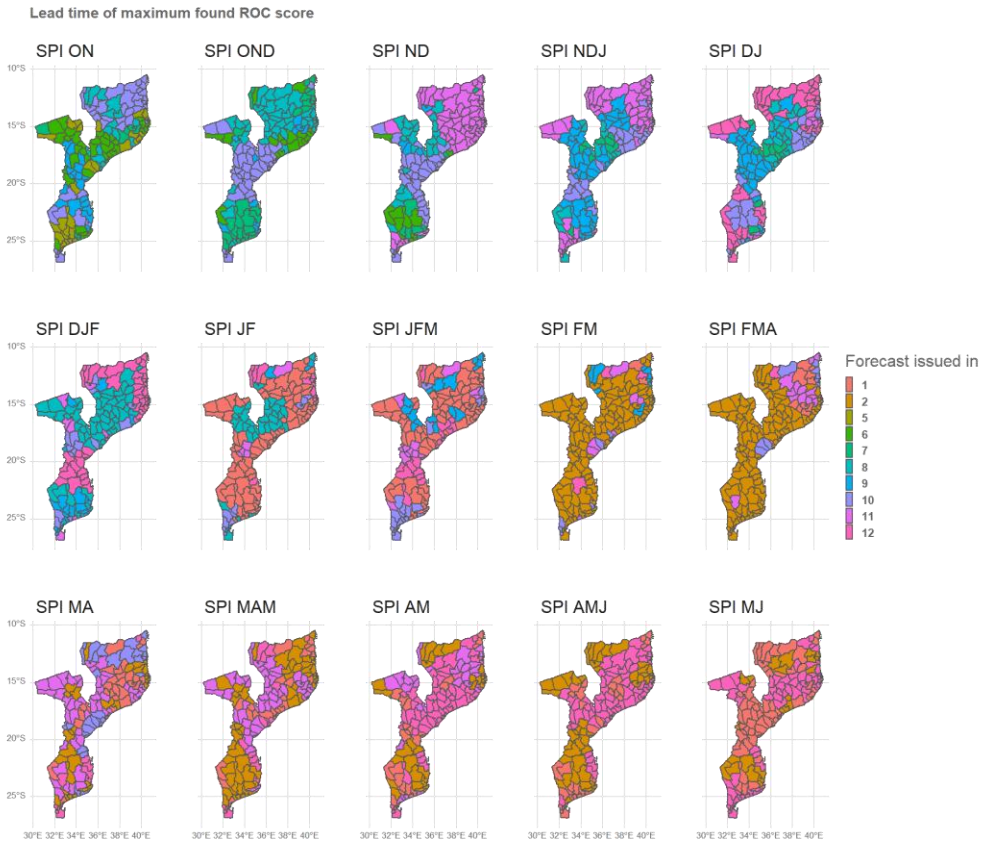

Figure S4.1. Month of the forecast that has the highest skill to predict severe droughts as per SPI 3 and SPI 2 index measured through the AUROC score.

Figure S4.2. Overview of the forecast that yielded the highest skill to predict severe droughts as per SPI 3 and SPI 2 index measured through the AUROC score.

Section S5: Detailed overview of the information chosen by Read, Set, Go! System

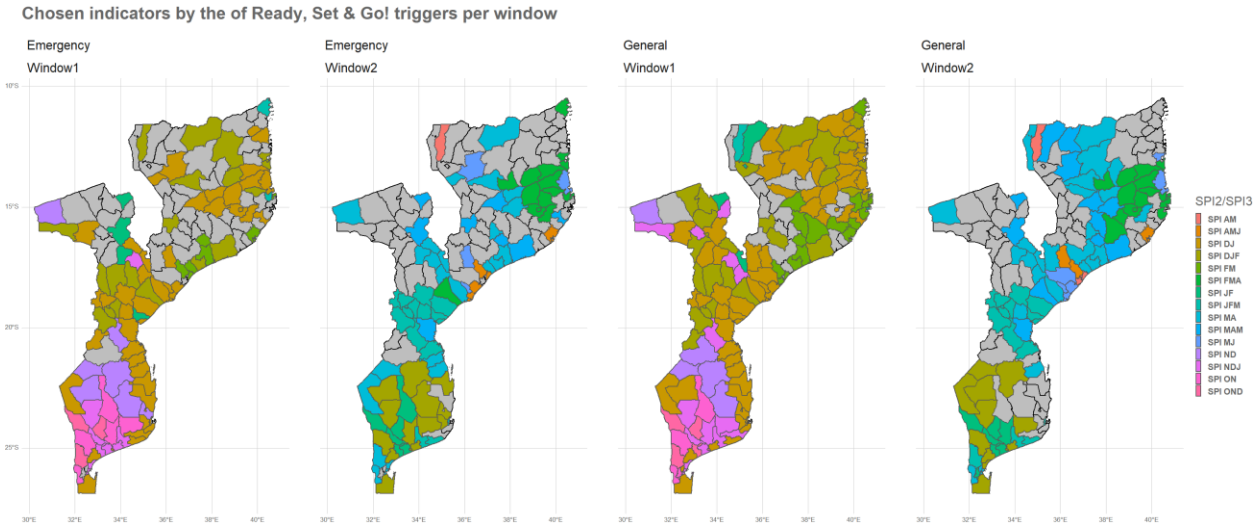

Figure S5.1. Chosen SPI2/SPI 3 indicator for the Ready, Set & Go! Trigger system for severe droughts for two trigger menu (emergency and general) and two windows of intervention (window 1 and window 2). No trigger for the Ready, Set & Go! for severe droughts were found for the districts in grey.

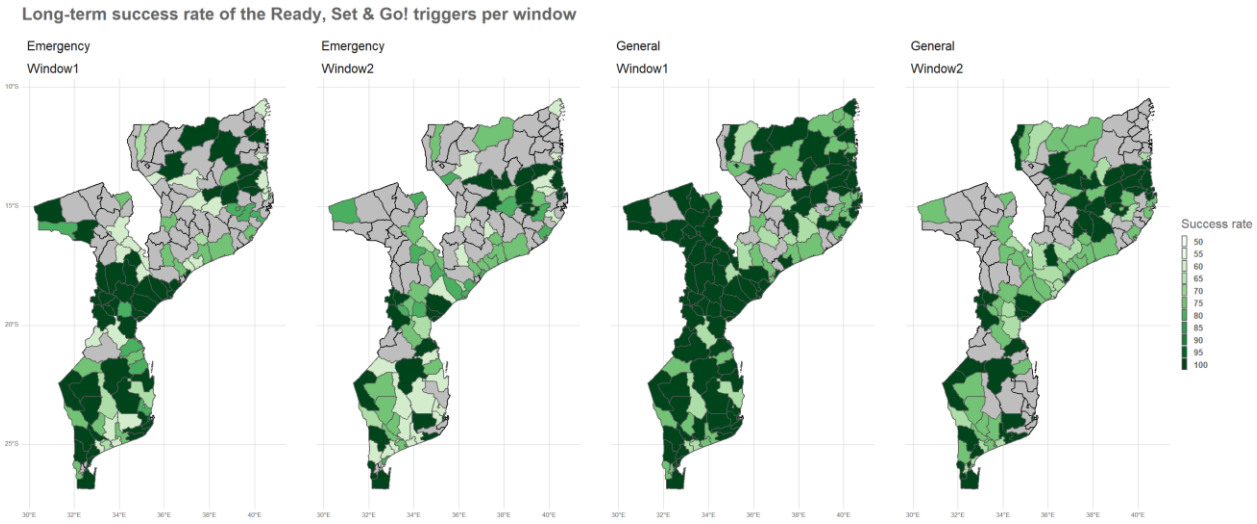

Figure S5.2. Expected success rate of the Ready, Set & Go! Trigger system for severe droughts for two trigger menu (emergency and general) and two windows of intervention (window 1 and window 2). No trigger for the Ready, Set & Go! for severe droughts were found for the districts in grey.

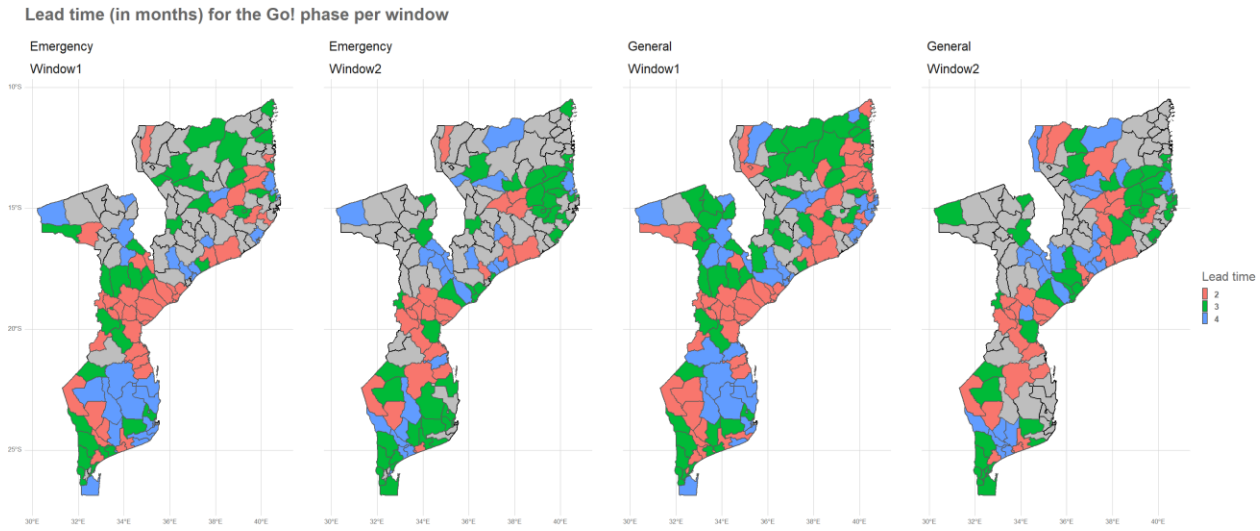

Figure S5.3. Lead time (in months) for the Go! phase to implement anticipatory action against severe droughts for two trigger menu (emergency and general) and two windows of intervention (window 1 and window 2). No trigger for the Ready, Set & Go! for severe droughts were found for the districts in grey.