

Author response to the comments from referee #2

We thank the reviewer for their recognition of the value of this work and for their constructive comments, which we have addressed as described below.

General comments response:

Page number	Line number	Referee comment	Correction made / Sentence added to the paper	Response
19	18	1. In the abstract, the example of Northern Ghana shows that predictions of rainfall and temperature are of limited use to decision makers, but is not followed up in the paper. Specifically, the paper walks through using different data within the TAMSAT ALERT but does not explain why different datasets were used. It would be useful to know if the mean temperature and precipitation forecasts that are issued are incorporated into the model.	Page 19 Line 18 onwards: In summary, Figures 12 and 13 indicate that if meteorological forecasts have sufficient accuracy and precision, they can add information to the decision-making process, especially in the middle to later part of the growing season. However, Figures 14-16 show that the tercile forecasts currently issued in northern Ghana do not have sufficient precision to information to yield risk assessments. A further application of TAMSAT-ALERT could be to investigate the level of skill that is required for meteorological forecasts to contribute useful information to such decision-making processes.	We used the WFDEI data set to evaluate the GLAM crop model over Ghana since the yield data we got is from all Ghana maize average from FAO. So, we evaluate and calibrate the model, but the evaluation of TAMSAT-ALERT system was evaluated using gauge data from Tamale. The reason is not to introduce more error due to the satellite data estimates of driving forces. But, we will evaluate the system using different data set in the future work. We have also extended the discussion of the use of seasonal forecasts within TAMSAT-ALERT.
1	27	2. It seems like this paper might be highlighting an issue of scale-local forecasts may be of more benefit than large, country-wide forecasts. In the conclusion, the benefit	This finding speaks to the pressing need for meteorological forecast products that are tailored for individual user applications.	Sentences were added in the abstract (Page 1, Line 27). The issue of providing bespoke forecast metrics is also addressed in greater

26	1	of TAMSAT ALERT may also be providing guidance on the design of forecast products (page 24, line 36). Since this may be a secondary use, it might be important to include that at the top of the paper (in both the abstract and the introduction).	Page 26 line 1 onwards: Our results do not suggest that there is no information available from seasonal forecasts. However, we do show that 90-day tercile forecasts of temperature and rainfall, even if perfectly skillful, provide comparatively little information to risk assessments for low maize yield. This could be because the sensitivity of crops to moisture is on a specific period of their growth and the sensitivity of crops to temperature is also not similar throughout their growth stage. In other words, our findings highlight the necessity of more specific and localized forecasts to benefit from inherent skills contained in the forecasts.	detail in the discussion (Page 26 Line 1) to highlight the point.
2	32	3. The target audience of all other early warning platforms are mentioned, but TAMSATALERT's target audience is not mentioned. Perhaps this should be included (page 2 line 22).	The impact model output and the weather risk associated with the output that can be obtained from TAMSAT-ALERT can be used by government, non-governmental organizations involved with providing farming information and aid, and weather index insurance providers can be benefited from continuous assessment of the risk.	Sentence was added to state target audience of the system (Page 2 Line 32).

Technical comments response:

Page number	Line number	Referee comment	Correction made / Sentence added to the paper	Response
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1	31	1. The first sentence of the introduction needs a citation (page 1, line 27). My suggestion would be Muller, Cramer, Hare, Lotze-Campen, 2011, "Climate Change Risks for African Agriculture", Proceedings of the National Academy of Sciences. In this paper they talk about naturally high levels of climate variability, reliance on rain-fed agriculture, and limited capacity to cope with climate variability makes Sub-Saharan Africans notably vulnerable.	Many African people depend on rain-fed agriculture, and are thus vulnerable to drought, and other weather-related hazards exacerbated by climate change (Muller et al., 2011).	Corrected!
2		2. The different platforms available for early warning on the 2nd paragraph of the introduction (pages 1-2) should probably have citations and links for them. Within that comment- the IRI platform is "IRI/LDEO Climate Data Library", and the maprooms are "IRI Climate and Society Maproom"	The Rainwatch-AfClix early warning system (RWX) (http://www.rainwatch-africa.org/rainwatch/), Famine Early Warning Systems Network Early Warning Explorer (FEWSNET-EWX) (https://earlywarning.usgs.gov/fews/ewx/index.html) International Research Institute (IRI) data library/map rooms (http://iridl.ldeo.columbia.edu/index.html?Set-Language=en), Africa Flood and Drought Monitor (AFDM) (http://stream.princeton.edu/AWCM/WEBPAGE/interface.php),	Corrected!
4	13 -16	3. Under the Model Specification, Point 1 (page 4 lines 13-16), the type of data that		The TAMSAT-ALERT system we have takes data from text files and reproduce it in the

		<p>ALERT can use is not specified. Must it be converted from .csv to .txt?</p> <p>What is the delimiter? Can it accept geotifs or netCDF files?</p>		<p>format required by the crop model used GLAM. When using a different model the data should be given in the format required by the model incorporated in the system.</p> <p>A user Manual is provided on how to run TAMSAT-ALERT and what data format you can use. See Code Availability: (https://github.com/tamsat-alert/v1-0).</p>
9	8	<p>4. Although TAMSAT-ALERT is designed to be flexible to different inputs, it might be important to include the spatial resolution of TAMSAT precipitation data in this paper, since it seems logical that TAMSAT precipitation data may be one of the most logical inputs?</p>	<p>Page 9, line 8 onwards:</p> <p>We chose to use Tamale because it is in the Northern part of Ghana (Figure 2) where most of the Maize is grown. The station in Tamale also has a long-term record of the driving data for the crop model.</p>	<p>Sentence has been added explaining the possibilities of using gridded data set and the resolution of the TAMSAT rainfall data (Page 9 Line 8).</p>
5	30	<p>5. The first time ECDF is mentioned (empirical cumulative distribution function) is on page 5 line 21, and it is not designated an acronym when it is first mentioned. However, later in the paragraph, (line 22), it is mentioned by acronym. Perhaps the acronym should be designated immediately after the first mention or the acronym on line 22</p>	<p>The empirical cumulative distribution function (ECDF)</p>	<p>Corrected!</p>

		should be replaced with the name since ECDF is not used again in the paper.		
7		6. On Figure 2 (page 7), there is a pre-existing map of Ghana: this might be a useful figure to include where Tamale is, since this is the example mentioned immediately on page 8 (line 10).		Corrected!
		7. On Figures 11e, 12e, 13e, 14e, and 15e - the probability of low yield is at 100%, but the 100% has been cut down to 10. That number should either be scrubbed off or should be 100% and completely visible.		Corrected!