

## ***Interactive comment on “Exploring drought vulnerability in Africa: an indicator based analysis to inform early warning systems” by G. Naumann et al.***

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We would like to thank Dr. William Pozzi for the constructive comments and suggestions to improve the manuscript. The specific comments are addressed in detail below.

One of the main concerns of the reviewer is why the overall result of DVI does not correspond to the FSNWG identified countries, particularly Kenya and Tanzania. The reviewer also states that the renewable natural component that reflects the high vulnerability of the eastern Africa countries is somehow neglected by low scores in the other categories. In the following sections we will try to analyse the main concerns of

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the reviewer, including the reason why the DVI-identified vulnerable countries do not exactly overlap with the FSNWG identified countries, particularly in East Africa.

1. The Food Security and Nutrition Working Group (FSNWG) is certainly a valuable regional platform that provides up-to-date food security and nutrition situation analysis. The maps and information presented by FSNWG offer a forum that build consensus on critical issues such as food insecurity. As stated in the FSNWG web page the consensus is built through monthly meetings where current and foreseen food security conditions (prepared by technical sub-groups) are discussed and assessed. As stated, four sub-groups are operational: Nutrition, Integrated Phase Classification (IPC), Livestock and Pastoralism; and Markets and Prices. This approach is much more comprehensive than our drought vulnerability index and therefore it is difficult to do a direct comparison.

2. The resolution and quality of the input data determines the accuracy and relevance of the derived information. At the continental scale, we had to use data available across the entire African continent, which usually are available only at national level. This will mask disparities within a country and as such can result in the discrepancies as mentioned by the reviewer. We agree with Dr. Pozzi that this is an important issue. Its solution would, however, require the availability of high quality data with adequate spatial and temporal resolution. Currently this can only be achieved at smaller scales (e.g., regional or country level).

In general the IPC maps are oriented towards small regions and communities that of course have different conflicts and needs. As reflected by IPC and UNOCHA there is a high heterogeneity between countries in Africa (related to social patterns and livelihoods). Moreover, this heterogeneity is also observed at smaller scale within each country. We acknowledge that better data resolution (and quality), including a richer set of variables, would contribute to more relevant results for national and local scale drought management planning and that these could then be better linked to food

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security assessments such as the FSNWG. We have discussed these limitations of the current calculation of DVI at continental scale in the discussion and conclusions.

3. All the countries classified by the DVI have an internal geographical variability that is not depicted by the DVI since data on all the factors (variables) determining this vulnerability are available only at national level. This is probably the reason why some countries were classified as moderate to low vulnerable although we know that there is high vulnerability in some parts of the country. For the case of Kenya and Tanzania, this could be due to the fact that, as shown in the pixel and sub-basin level analysis, there is a high spatial variability when considering the renewable natural component of vulnerability alone. In fact there are observed pixels with a high renewable natural component of drought vulnerability and others that have a low vulnerability (see Figure 2). When computing the DVI with national level statistics that also include the remaining vulnerability components, this can lead to a low to moderate drought vulnerability DVI.

4. Although some of the data used in the country level analysis was available also at sub-national resolution for individual countries this was not the case for the whole continent and hence we could not use them in our analysis. More comprehensive and better quality datasets would allow to perform a more complete and accurate identification of drought vulnerability hotspots at sub-national level.

5. The DVI was developed as a multi-component indicator. It means that the study of each component separately allows identifying the main sources of vulnerability for each region. For instance East Africa was classified as moderate to high vulnerable with the Renewable Natural Capital component. This result should be considered when planning for mitigation and adaptation strategies. Furthermore, it must be noted that the national determinants of vulnerability used cannot represent the local conditions. For instance, the fertilizer consumption is representing the adaptation

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capacity mainly of larger (and fewer) farmers. However the behaviour of smaller farmers hardly can be represented in a country assessment.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 12217, 2013.

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