Provision of climate change information on rainy season indicators for the agricultural sector in Burkina Faso

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A. Introduction

Food security in Burkina Faso is strongly linked to its agricultural sector and it is estimated by the United States Agency for International Development (USAID) that roughly 20 percent of Burkina Faso's population are considered to be food insecure. It is therefore important to develop land management strategies to increase the resilience of the agricultural sector to the negative impacts of climate change in the country. These strategies can only be developed by taking the needs of farmers into account and tailoring climate change information adequately.

In the WASCAL WRAP 2.0 LANDSURF project, demand driven climate change information with focus on the agricultural sector is being generated and will be provided by the newly developed Decision Support System (DSS) for West Africa. Stakeholders and decision-makers, e.g. farmers, consulting companies, and regional and national administrative authorities from several countries, including Burkina Faso (Fig. 1), have identified rainy season parameters such as onset and cessation as key climate information to be included in the DSS.

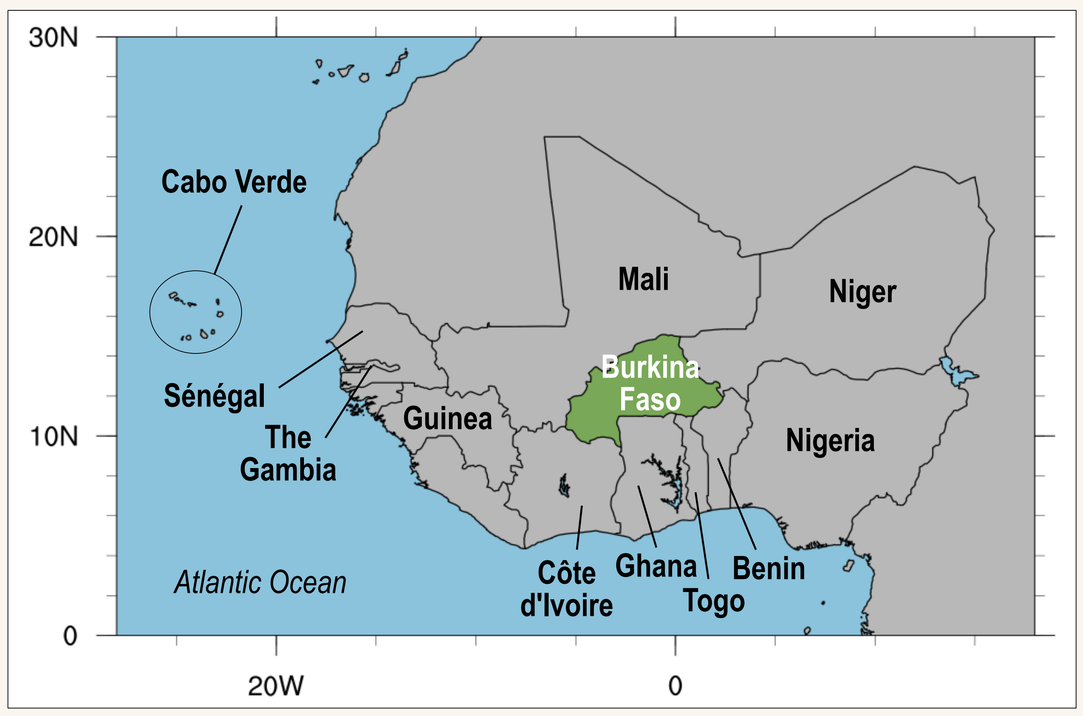

Fig. 1: Map of West Africa showing the WASCAL member countries including Burkina Faso (green).

B. Data and methods

The analysis for Burkina Faso shows initial results on the onset, cessation, and length of the rainy season as well as the number of dry days, total rainfall, and extreme precipitation (p99) during the rainy season under two emission scenarios using the Representative Concentration Pathways (RCPs) 2.6 and 8.5 for the end of the century (2071-2100 vs. 1981-2010).

Regional climate change information on rainy season indicators for Burkina Faso was generated using regional climate projections from the CORDEX-CORE AFR ensemble with a spatial resolution of about 25 km (Giorgi et al., 2022). This ensemble consists of nine regional climate projections from three different regional climate models (REMO2015, RegCM4-7, and CCLM5-0-15), which are dynamically downscaling three different Earth system models (MPI-ESM-MR/LR, NorESM1-M, and HadGEM2-ES) using CMIP5 projections. The rainy season indicators were derived according to the method of Liebmann et al. (2012) and Dunning et al. (2016) with slight modifications for each of the nine ensemble members and for the respective scenario.

C. Results

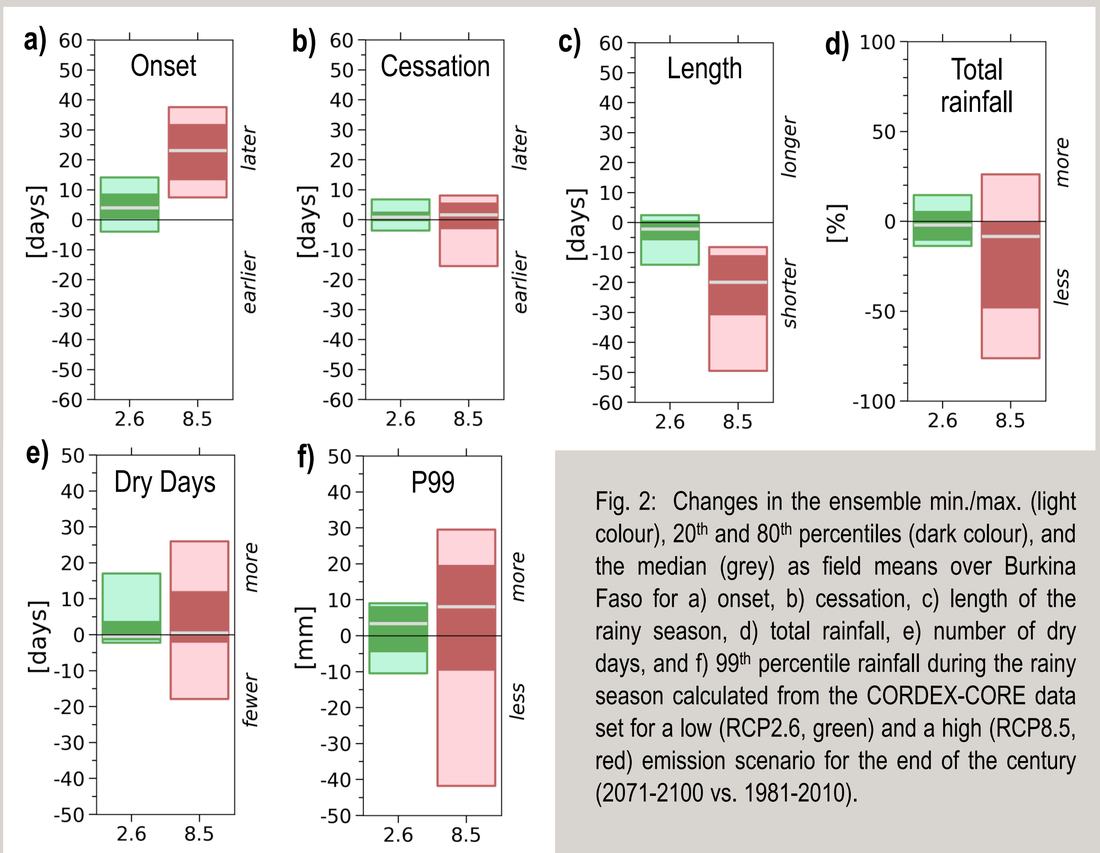

Fig. 2: Changes in the ensemble min./max. (light colour), 20th and 80th percentiles (dark colour), and the median (grey) as field means over Burkina Faso for a) onset, b) cessation, c) length of the rainy season, d) total rainfall, e) number of dry days, and f) 99th percentile rainfall during the rainy season calculated from the CORDEX-CORE data set for a low (RCP2.6, green) and a high (RCP8.5, red) emission scenario for the end of the century (2071-2100 vs. 1981-2010).

D. Summary and conclusion

The ensemble median of all rainy season indicators shows little or no change under the low emission scenario RCP2.6 towards the end of the century (2071-2100), but a later onset and shorter rainy season with a projected increase in extreme rainfall under the high emission scenario RCP8.5 for Burkina Faso (Fig. 2). In this scenario, the projected changes in the indicators coincide with a wide range of model ensemble bandwidths (uncertainties).

➢ The projected changes in the rainy season indicators for Burkina Faso can only be considered as a trend.

E. Outlook

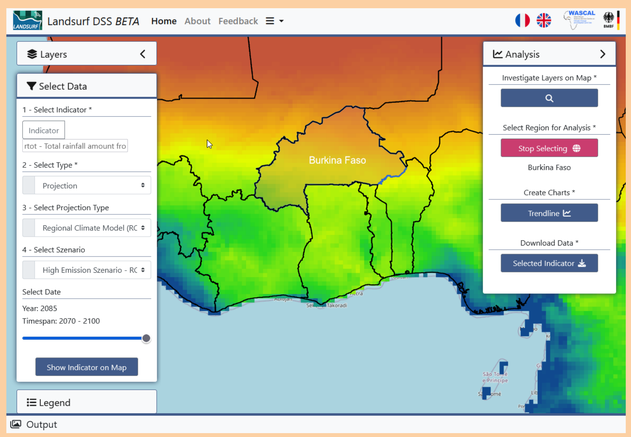

Fig. 3: Screenshot of the Decision Support System (DSS).

Analysed climate indices, mainly related to the agricultural sector and identified by end-users, will be disseminated through the web-based Decision Support System (DSS) (Fig. 3). This tool is currently being co-designed and co-developed with end-users in the LANDSURF project and will support stakeholders and decision-makers in adapting to climate change in West Africa.

F. References

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