



AKADEMIYA

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## Changing Growing Conditions in a time of Crisis: The Case of Sorghum in Burkina Faso.

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Initially perceived as a public health issue, the Covid-19 pandemic is having real impacts across sectors through measures that policy and decision-makers have been taking to mitigate its propagation. In the agricultural sector, a food crisis is ultimately feared due to disruptions in inputs availability and cost, limited labor force, cross-border trade restrictions, among other disturbances along the food supply chain. While consequences of the aforementioned measures are being studied, other aspects such as inadequate growing conditions can push countries to the brink of a food-security crisis even faster through food crop production decrease. Therefore, identifying anomalies in biophysical parameters can help in assessing if such inadequate growing conditions have been playing a role. In this brief, we computed Normalized Difference Vegetation Index (NDVI), Land Surface Temperature (LST), and rainfall anomalies in Burkina Faso for Sorghum during the growing season.

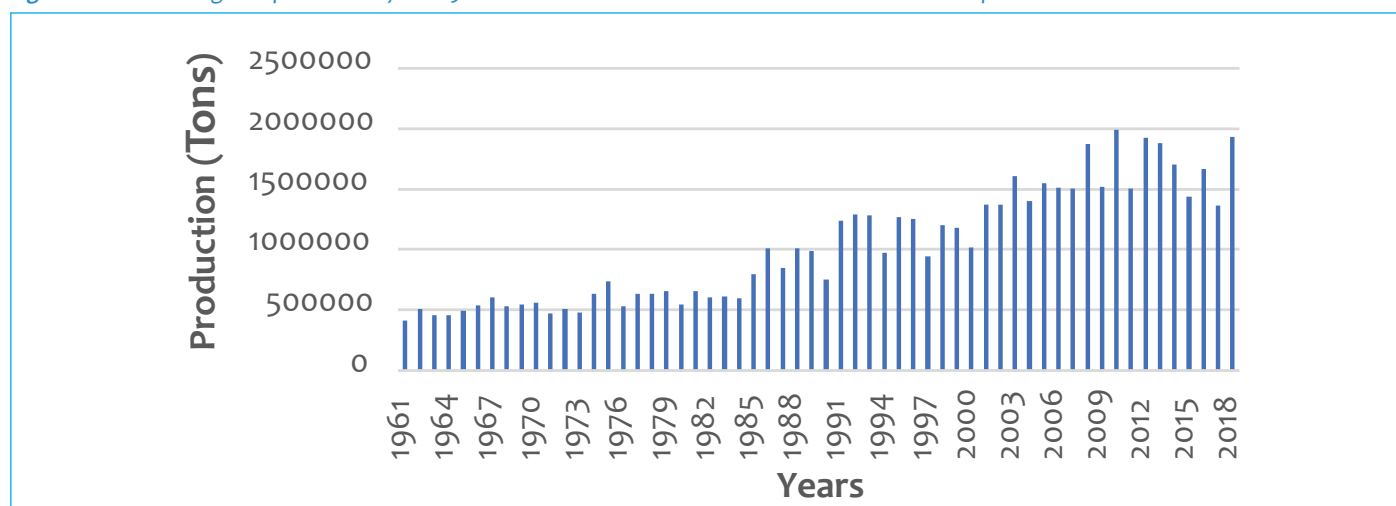
<sup>1</sup> FAOSTAT

### Exhibit 1: Sorghum Production in Burkina Faso

Sorghum is one of the primary food crops grown in Burkina Faso. It is the main staple food of rural populations. Since 1961, the production has been fluctuating with a peak of close to 200,000 tons in 2009<sup>1</sup> (Figure 1).

NDVI, land surface temperature (LST), and rainfall anomalies can explain such disparities in production. Vegetation, rainfall, and temperature indices are key data sources for crop monitoring. Precipitation and temperature are necessary conditions for crop development, while vegetation indices observations provide important vegetation health information. Therefore, anomaly maps of those indices can be helpful to identify how and where prevailing rainfall, temperature, and vegetation patterns are different from usual patterns. They can indicate the location and size of areas with potential risks of crop production shortfall. The routinely availability of such information,

Figure 1. Burkina Sorghum production from 1961 to 2018 in Burkina Faso. Data source: FAOSTAT. Graph source: Author.



therefore, constitutes an important contribution to the analysis of food security and planning of potential response strategies.

In this Brief, we use the percentage difference between the 2020 values of NDVI, LST, and rainfall from the respective long-term averages for the period 2000-2019 as indicator of anomaly. A negative value of the indicator, for instance for NDVI, implies that vegetation health was better during the period 2000-2019 compared to 2020. Conversely, a positive value means that vegetation health in 2020 is better compared to the long-term average (2000-2019).

We then apply the Sorghum crop mask<sup>2</sup> to identify and isolate pixels of interest to construct the three anomaly maps in Figure 2. The NDVI anomaly map shows that vegetation health in 2020 is comparable to the long-term average with no significant changes for most areas across the country. The main areas with anomalies are located on the eastern part of the country, which display the highest concentration of reduced photosynthetic activity. The map also shows a few scattered areas with lower NDVI values across country. The LST anomaly map also shows that 2020

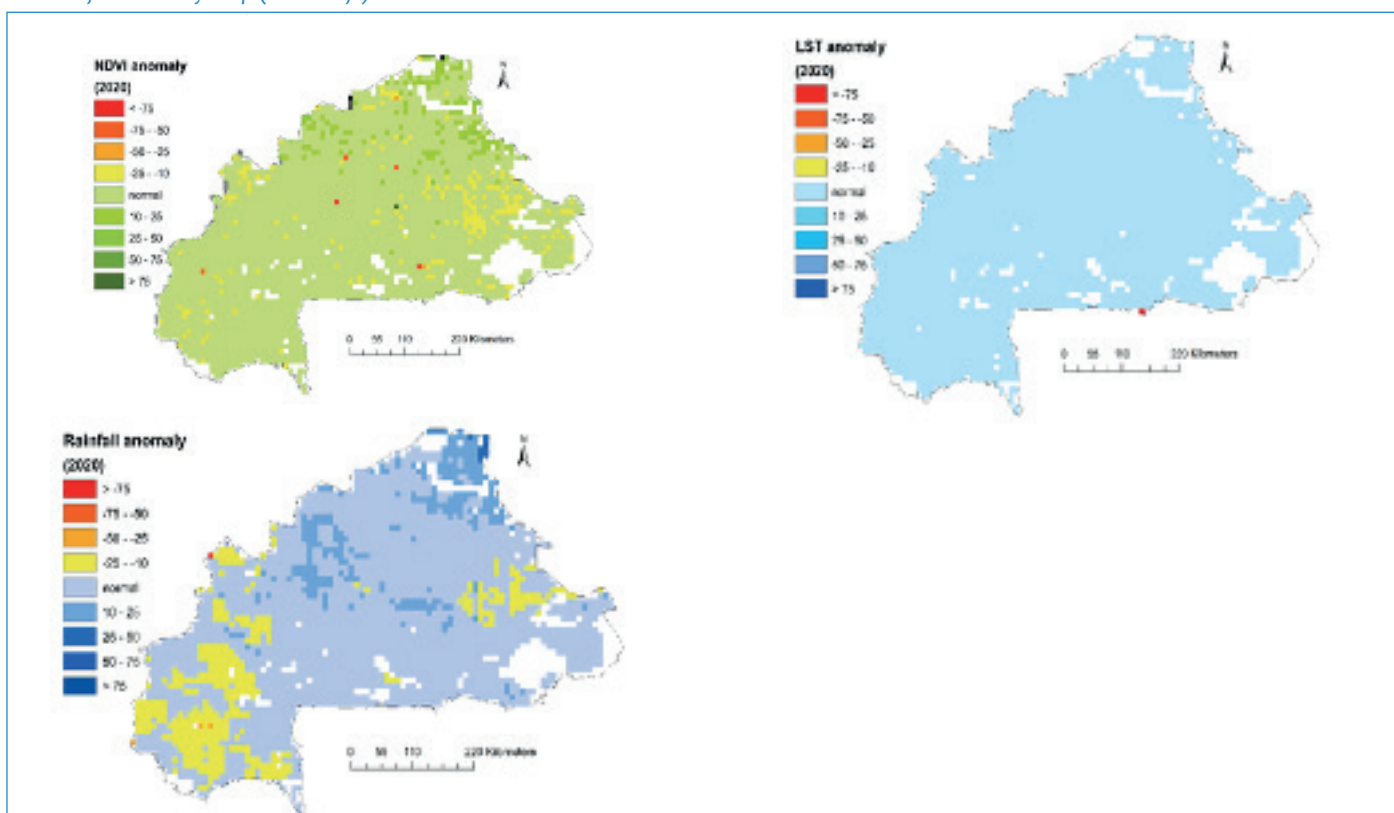
land temperature values that are close to the long-term average (2000-2019). It is only the rainfall anomaly map that shows cases of marked deviations, primarily concerning areas in the western and the eastern of the country. These areas seem to have received less rain in 2020 as compared to long term trends. In contrast, several localities in the country's central and northern areas experienced higher than usual rainfall levels.

### Notices

*The boundaries and names shown as well as designations used on the maps do not imply official endorsement or acceptance by AKADEMIYA2063.*

<sup>2</sup> <https://www.mapspam.info/>

**Figure 2.** NDVI anomaly map during Sorghum growing season (upper left): LST anomaly map in (upper right): and rainfall anomaly map (lower left) – Burkina Faso 2020



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