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Exploring the food-climate-migration nexus in West Africa by analyzing land surface dynamics and weather extremes in combination with expert interviews

Abstract

It is well known that environmental conditions, encompassing rainfall variability, frequency of droughts and floods, as well as land degradation, influence human migration patterns in West Africa. The most recent IPCC report forecasts an increase in extreme weather events in the region, leading to an increase in flooding along with agricultural droughts and dry spells. To deal with adverse climatic conditions, poverty and food insecurity, migration has been a strategy in this region for centuries.

Within the context of the MIGRAWARE project, the aim is to define hypothesis regions, meaning to identify regions where several unfavorable conditions could promote out-migration, or regions where the presence of several favorable conditions could encourage in-migration. For this purpose, we use freely available geospatial data. While the Climate Hazards Group InfraRed Precipitation with Station (CHIRPS) dataset is used to analyze historical precipitation indices, the ERA5 dataset serves to determine historical temperature indices. Further, the Normalized Difference Vegetation Index (NDVI) based on the MODIS NDVI dataset provides information on spatial and temporal changes in vegetation to assess food security. Time series analyses using Mann-Kendall tests are performed for the period 2011-2020 to quantify temporal trends.

To address the complexity of the phenomena, environmental factors are integrated into the network of drivers and processes of migration. Interaction between the different drivers of migration are additionally explored by including data on armed conflict and population density in the analysis. Expert interviews conducted in Ghana subsequently contribute to the weighting of the importance of various factors influencing migration decisions.

It is expected that this multi-method approach, combining spatial data and qualitative interviews, will result in valid information on current migration patterns in West Africa. Furthermore, the results of this study will help shape recommendations for stakeholders to better target climate change adaptation measures and develop governance tools and policy briefings tailored to the local, national, and intergovernmental levels. At the same time, this study contributes to the advancement of policies and solutions related to the food-climate-migration nexus in the region.