

Sentinel-1 and-2 data fusion for mapping smallholder cropping areas in southern Africa to support crop monitoring and yield forecasting

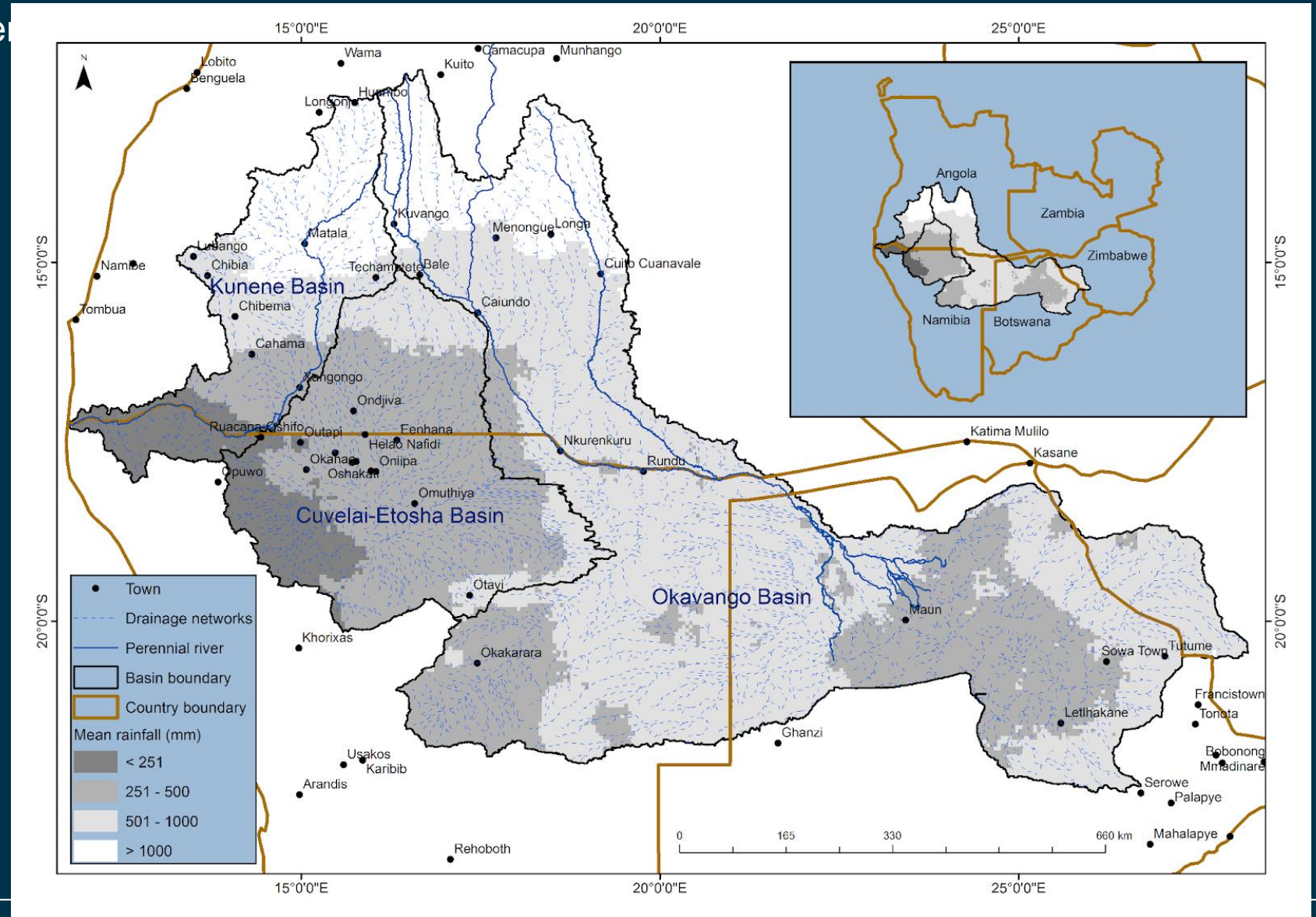


(List of the project team members starting with Co-PIs)

- Small-scale and rain-fed crop farming is the backbone of livelihood for millions of people in sub-Saharan Africa
- Climate change is however increasingly affecting crop production in this region through frequent droughts and floods, often accompanied by pest outbreaks, leading to crop failure or low yields
- Governments and the donor agencies provide food supplies to many rural resource-poor households in the events of crop failure
- But this effort is often undermined by lack of reliable and timely information on areas which are most affected
- Development of early warning and food security information system powered by earth observation can be used to address this gap
- However, lack of accurate spatially explicit dataset for field boundary of smallholder crop farms hinders farm-level crop monitoring and yield estimation using earth observation
- This project aims to fill this gap by :
 - (i) creating consistent reference dataset for cropland boundaries to train and validate EO algorithm for mapping cropping areas,
 - (ii) developing an innovative EO algorithm and workflow for mapping cropping areas across a diversity of landscapes in southern Africa using imagery from European Copernicus Sentinel-1 and -2 satellites.

Study Area

Covering three water basins (Kunene, Cuvelai-Etosa, Okavango) in southern Africa



(Please briefly explain your research plan emphasizing data sources, analysis workflow, and expected outputs)

- **Step 1:** Create elaborate and consistent polygon-based reference dataset for cropland boundaries to train and validate EO algorithm for mapping cropland areas
- **Step 2:** Develop workflow/algorithm for mapping cropland areas using a combination of data from Sentinel-1 and -2 satellites
- **Step 3:** Applied the algorithm/workflow over the entire study area to map cropland areas at 10 m resolution using the cloud-based computational resources provided under the ESA EO AFRICA R & D Facility.
- The following outputs are expected:
 - At least one peer-reviewed publication
 - Polygon-based reference data digitised at 200 areas of 5km x 5km size each
 - Point-based reference data (50 000 samples)
 - A 10m resolution map of cropland areas for the study area

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