Digital Earth Africa Cropland Area Map

A central focus for governments across Africa is the need to secure the necessary food sources to support their populations. It has been estimated that the current production of crops will need to double by 2050 in order to meet future needs for food production (GIS Geography, 2018). Nearly two-thirds of African countries are net importers of food, and with the COVID-19 pandemic, it is feared food shortages will severely impact food security. According to the World Economic Forum, the impact on supply chains in Africa could reach crisis levels.

Crop-monitoring at regional to continental scales requires the existence of high-quality, regularly updated baseline environmental layers. One of the most foundational layers for crop-monitoring is an accurate cropland area map that delineates where agriculture is taking place across the landscape. A cropland is defined here as "A piece of land of minimum 0.16 ha (4, 20 x 20m pixels) that is sowed/planted and harvest-able at least once within the 12 months after the sowing/planting date."

Moving towards an accurate, high-resolution, and regularly updated cropland area map for the African continent, Digital Earth Africa and its project partners including RCMRD, ICPAC, GEOGLAM, GPSDD, AfriGIST, OSS and any interested institutions will co-design and develop a cropland area map with the following specifications:

- Based on Sentinel-2 imagery
- Have a spatial resolution of 20m
- Initially developed using data from 2019
- Be reproduced on an annual basis.
- Separate cropland maps will be developed per simplified Agro-Ecological Zone (AEZs, 7 in total), which together cover the entire African continent.
- Achieve overall accuracies >= 80 % in regions with permanent cropping, with a smaller overall accuracy acceptable in fragmented landscapes where cropping is intermittent and intermingles with natural vegetation. The validation strategy will attempt to quantify spatially explicit uncertainties to highlight regions where the product is best suited for use.

The potential benefits of using the crop mask product include:

- Updating the baseline cropland extent layer in the GEOGLAM crop-monitor tool.
- Enabling national statistical agencies to target their crop sampling strategies for estimating annual food/fibre production.
- Allowing historical and future trend analysis through annual calculations of maximum cropland extent, highlighting how agricultural productions is shifting in the context of a changing climate.
- Enabling comparisons with neighbouring countries on seasonal crop performance, this can assist countries in determining where they should import food from should their own production fall short of demand.

Institutions focused on improving food security in Africa are welcome to participate to the development, testing and training of the model. The first phase of the project corresponding to the development of a provisional cropland mask is set to end by February 2021.