

Mapping Field Boundaries and Developing Tailored Digital Learning Resources to Support Effective Land Management

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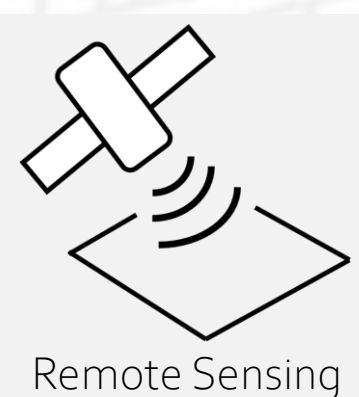
⁵ Initiative Prospective Agricole et Rurale (IPAR)

PROBLEM STATEMENT

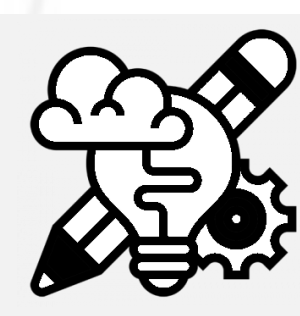


- ... Sub-Saharan Africa faces multiple risks (climatic, social, economic, ecological) with partly uncertain future developments
- ... An increasing population and limited yields at the same time guide the acceptance of certain measures by farmers
- ... Agricultural expansion to satisfy increased demands and compensate degradation
- ... Accurate knowledge of field size is key to avoid under- or overuse of seeds and fertilizer and thus improve sustainability

METHODS



Remote Sensing



Data Processing



Farmer Involvement Mobile Integration



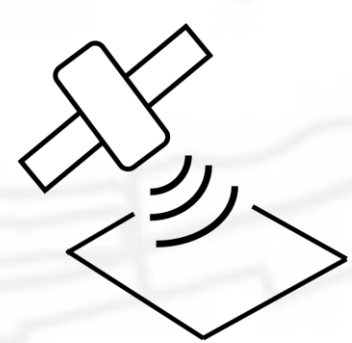
E-Learning



Sustainable Production



Remote sensing and participatory in-situ field delineation enable managing field supplies sustainably



FIELD BOUNDARY DELINEATION WITH REMOTE SENSING

Delineation of Field Boundaries Using a CNN

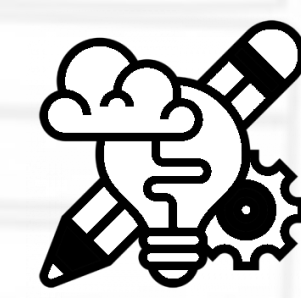
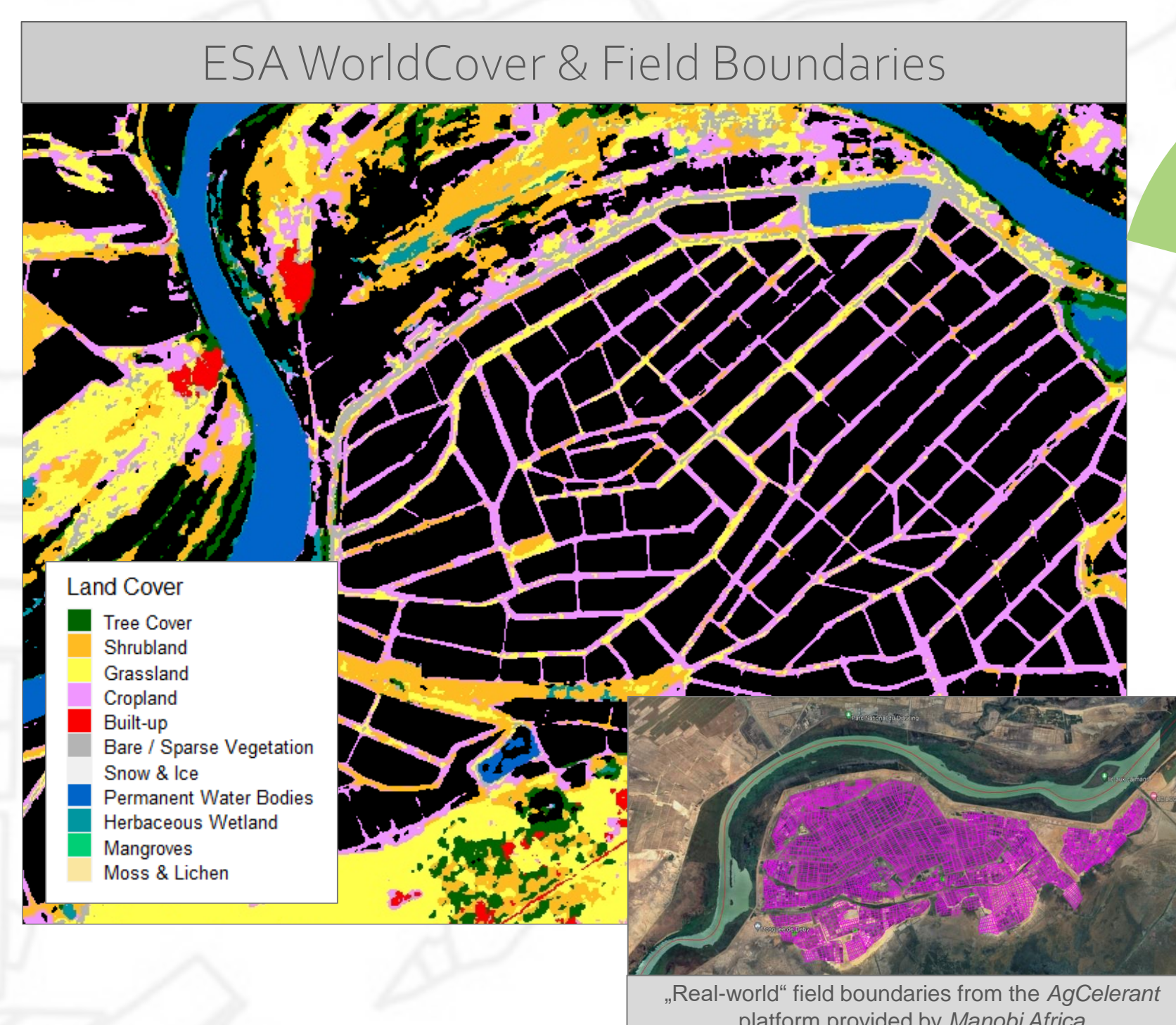
Planet data (NICFI)
2016-07 - 2023-07
(R, G, B, NIR, maxNDVI)

Training data creation

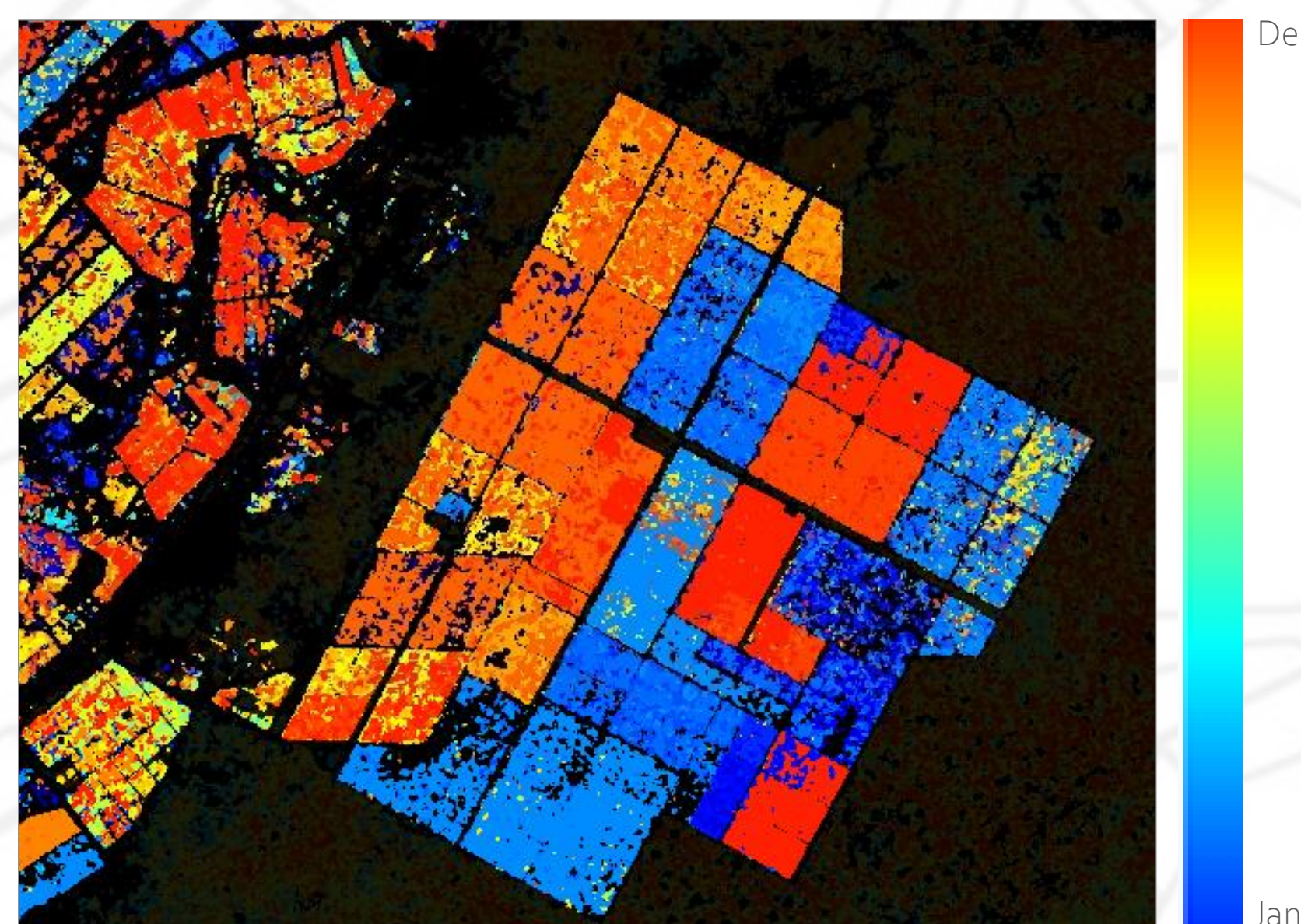
Preprocessing

Training of U-Net model

- Comparison of field boundaries delineated from Planet (NICFI) data:
- RGB high resolution image and ESA WorldCover
 - Field data provided to local partner to plan with exact field sizes



- Identification of management practices based on Sentinel-1 data:
- Can bridge the gap between farmers and credit/insurance institution
 - Reduces insurers' costs as crop failure checks can be automated
 - Automation and cost-effective monitoring



Canty, M.J.; Nielsen, A.A.; Conradsen, K.; Skriver, H. (2019): Statistical Analysis of Changes in Sentinel-1 Time Series on the Google Earth Engine. *Remote Sensing* 12, 46.

Identification of Agricultural Management with SAR-based Change Detection

Sentinel-1 data to identify agricultural management

Change detection as an indicator for management actions via Sequential Omnibus Algorithm by Canty et al. 2019

Validation of the management measures is in progress

INTEGRATION AND KNOWLEDGE CREATION TOWARDS SUSTAINABILITY



- Embedding of field boundary delineation into Manobi's agCelerant App



- Creation of content for the E-Certificate „Research and Innovation in Sustainable Land Management in Africa“ and for the cloud platform EO College



FARMER PARTICIPATION



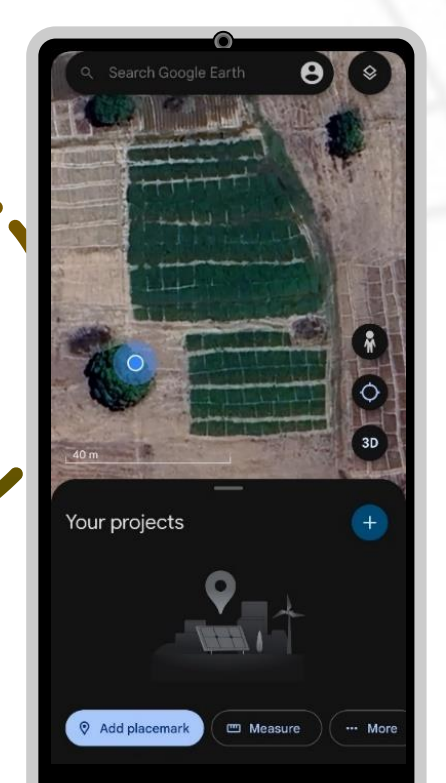
- Integration of farmers
- Provision of knowledge and entry points for self-management



- To improve the RS model in situ field boundaries are provided by local partners



- Training of geospatial tools during community workshops



- Field boundary detection with farmers during field visits

