INTERNATIONAL WORKSHOP ON HIGH-RESOLUTION THERMAL EO

EO AFRICA Water Resources Management (WRM)

A support to farmers and planners to improve irrigation water management

11 May, 2023

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→ THE EUROPEAN SPACE AGENCY

Introduction

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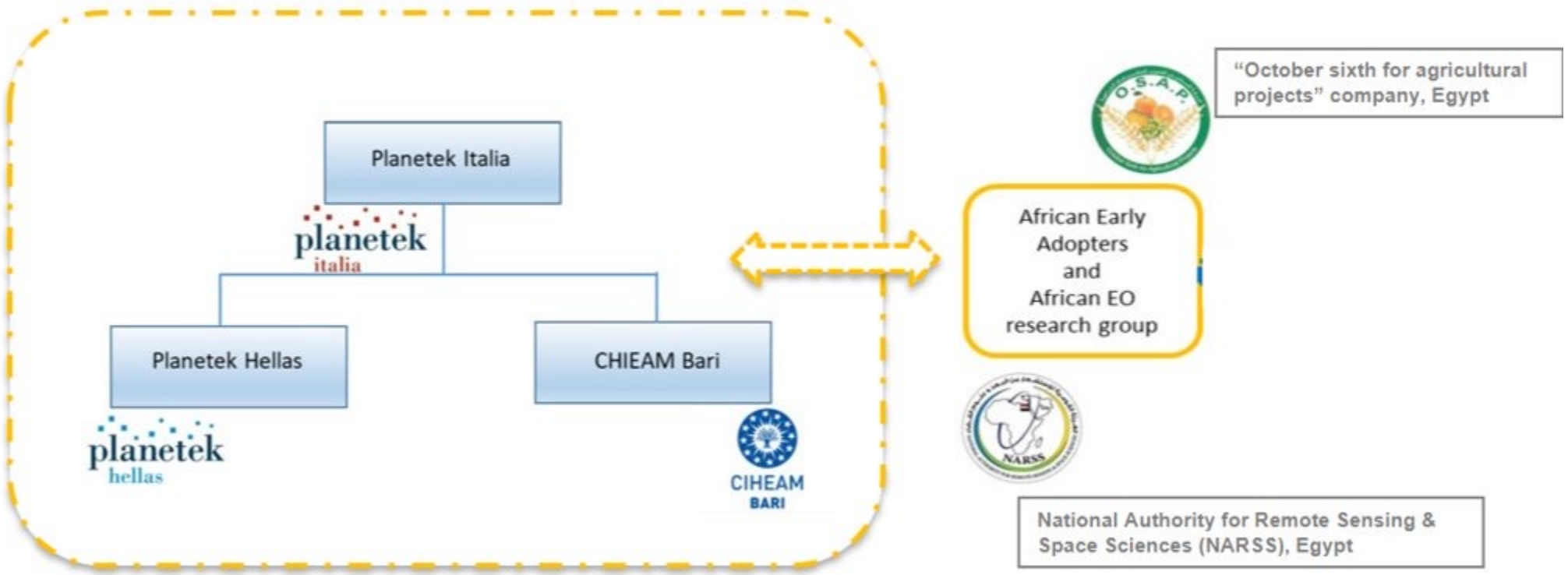
The project team

- Funded by ESA within the EO Africa Explorers framework and carried out by a consortium led by Planetek Italia



Introduction

- Irrigation farming is the largest water-consuming sector in Africa. As a result, many countries are facing acute water shortage.

- This is not sustainable and pose a threat to the environment and our future survival.

- Some of the factors causing this water scarcity includes climate change, water quality degradation, inadequate cooperation within the Nile basin countries, and increased agricultural activity to achieve critical food security goals.

Introduction

- Resolving this challenging requires a thorough re-evaluation of how inland water is managed at the agricultural sectoral level, and then repositioning it for modernization and sustainability

- Precision irrigation represents a unique approach for a sustainable irrigation farming, and this project is designed to demonstrate that.

- Exploiting thermal EO offers an opportunity for an accurate and cost-effective assessment of the actual evapotranspiration (ETa) of the crops, thus of a precise estimation of their water requirements, and consequently supports the development of irrigation scheduling models and plans that improve water use efficiency

Introduction

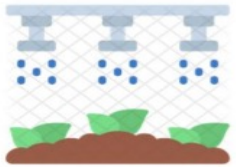
- Furthermore, advanced monitoring of water consumption is a potential lever for minimizing agricultural vulnerability and increasing farmers resilience

- This project aims to validate an open-source innovative model to assess actual ETa using EO-derived reference data.

Demonstration site

- Egypt: El Salheya El Gedida - Sharqia governorate

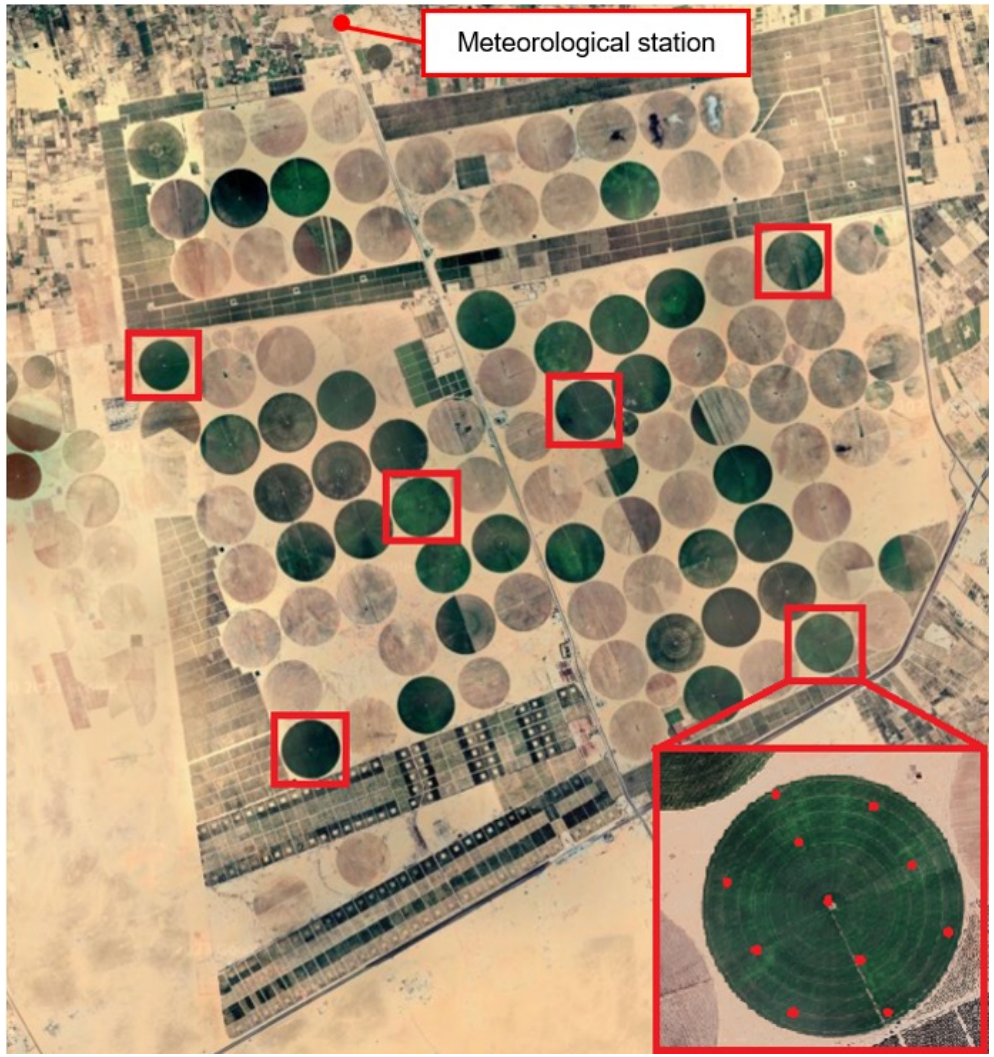
An area of **13.800 hectares**



120 irrigation pivots

Annual water consumption of **140 million m³.**

Wheat, **peanuts** and **maize** 40% of the total area.



Demonstration site

The Egyptian territory was selected for the following reasons:

- Egypt is facing a severe water shortage. Water scarcity is projected due to many challenges such as climate change, water quality degradation, cooperation with the Nile basin countries and increased agricultural activity to achieve critical food security goals.
- Strong possibility to have public and private stakeholders on the consortium
- Stakeholders are keen to share their local knowledge and data with the project
- This choices, without doubt, will play a key role in guaranteeing a robust validation of the model performance in the selected test area

Objective

- To develop and validate an experimental EO analysis techniques to estimate crop water stress and evapotranspiration, exploiting ECOSTRESS and PRISMA data.

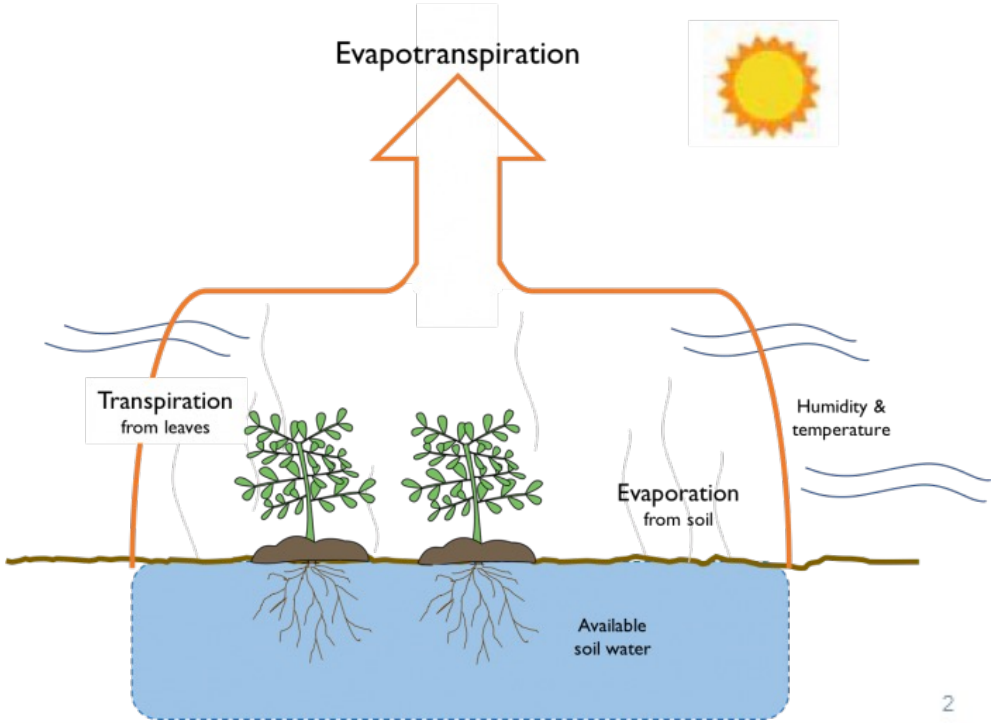
Expected outcome

- An open source innovative model will be developed to assess actual crop evapotranspiration (ETa) using EO-derived crop coefficient (Kc) and crop water stress index (CWSI).

- The model will be integrated into a web platform as a Decision Support System (DSS) to improve irrigation water management.

Methodology

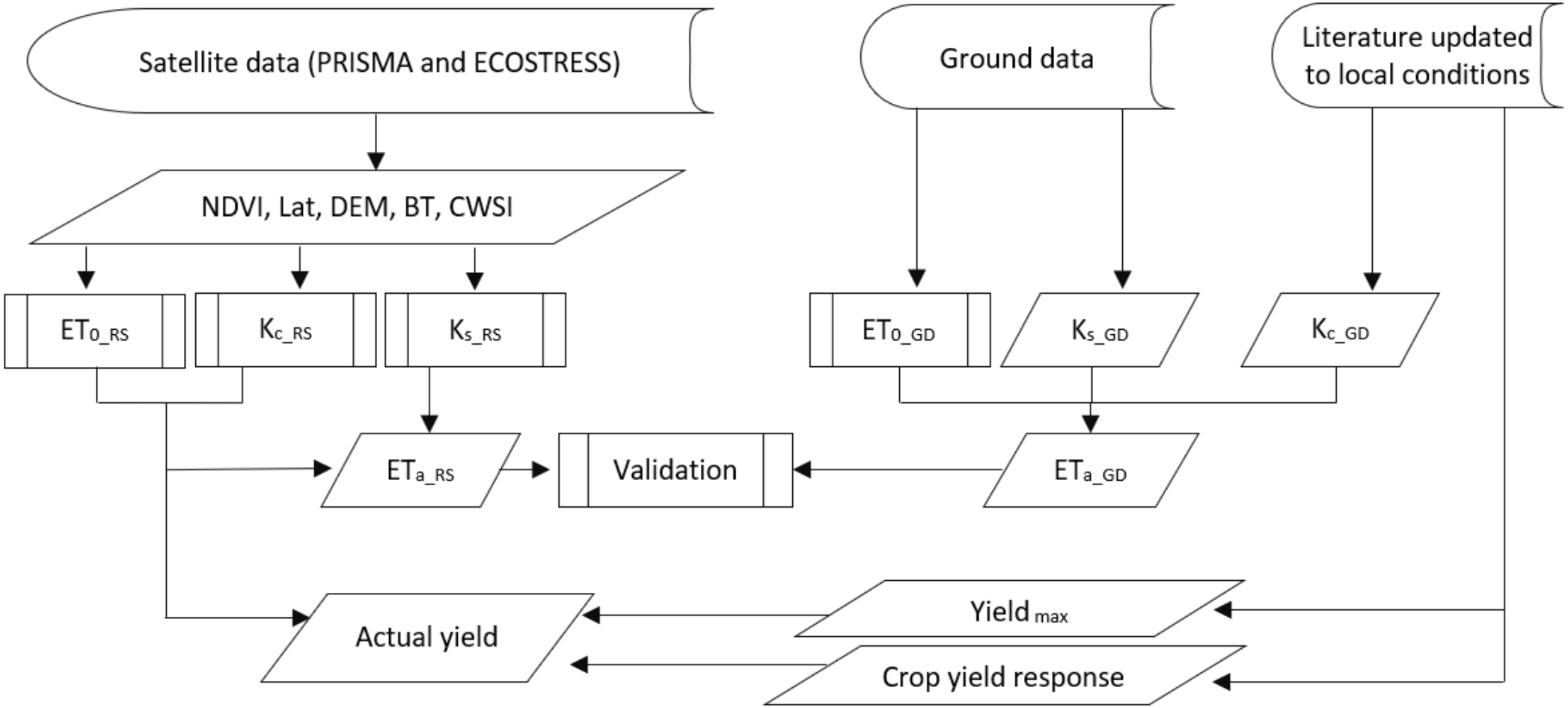
- EO-derived references such as evapotranspiration (ETo), crop coefficient (Kc) and water stress coefficient (Ks) will be used in an open-source model in-view of assessing actual evapotranspiration (ETa)
- The strength of this assessment is estimating crop water stress and evapotranspiration by exploiting ECOSTRESS and PRISMA data using experimental EO analysis techniques.



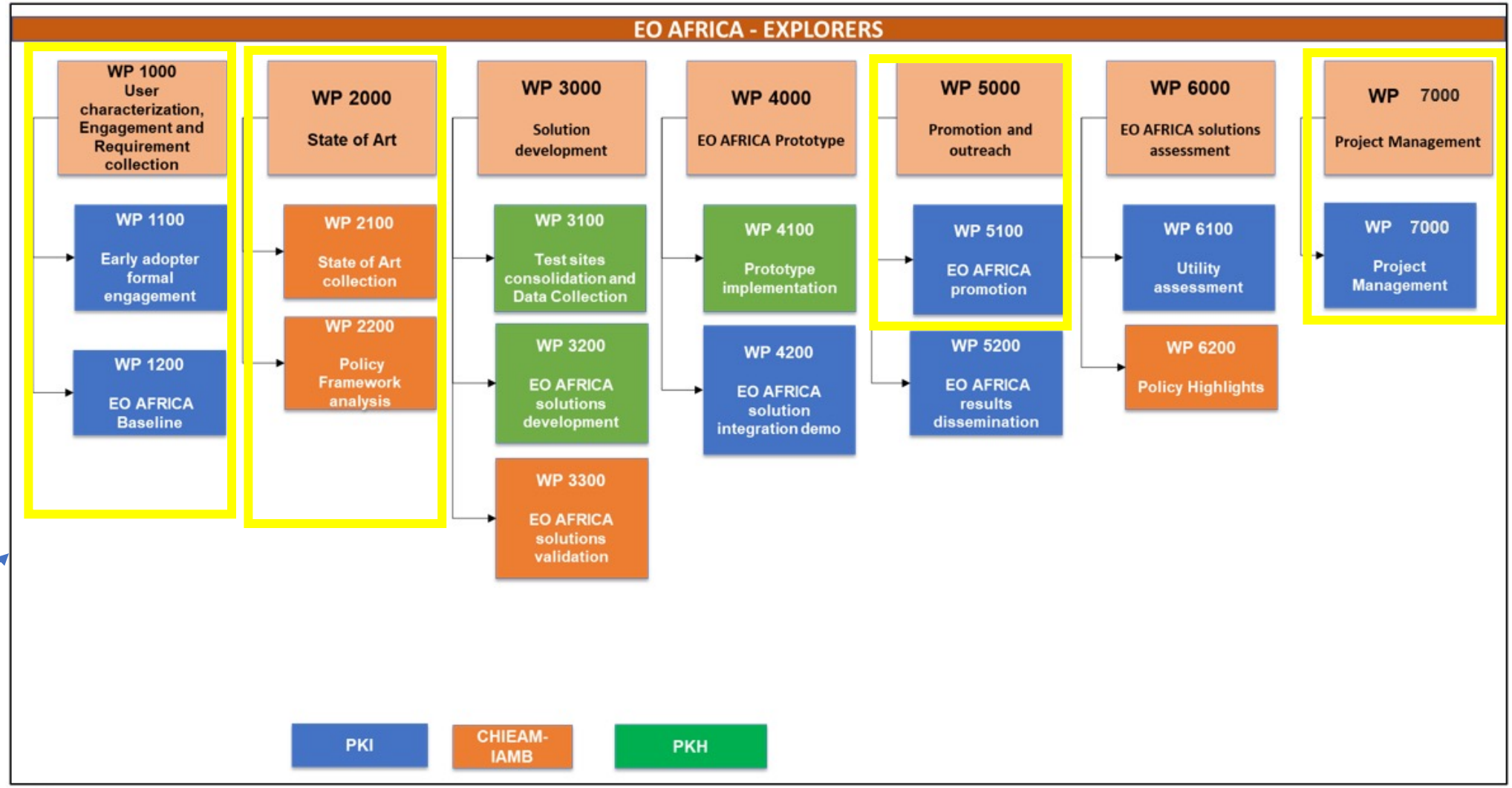
Methodology

- Six pivots, 4 at the farm edge and 2 at the center, were selected for in-situ data collection.
- The soil variability, the uniformity of water application and of irrigation system efficiency will be considered by collecting data from well distributed points at each pivot.
- Measurements will be repeated 5 times at each point, and the mean value will be considered.
- **IMPORTANT:** The above sampling will be **synchronised** with the satellite passing time, expected to be once each 15 days. The number of observations and measurement points location is made to best represent the area of interest and the different microclimates.

Methodology



Next steps



Ongoing activities

Next steps

Project start: 7th of November 2022

Project duration: 24 months

Current project activities is focused on testing the applicability of PRISMA data in the accurate estimation of actual evaporation transpiration at medium to large scale.

Thank you!