

# Supporting decisions on irrigation and fertilizer application in large farms in Angola

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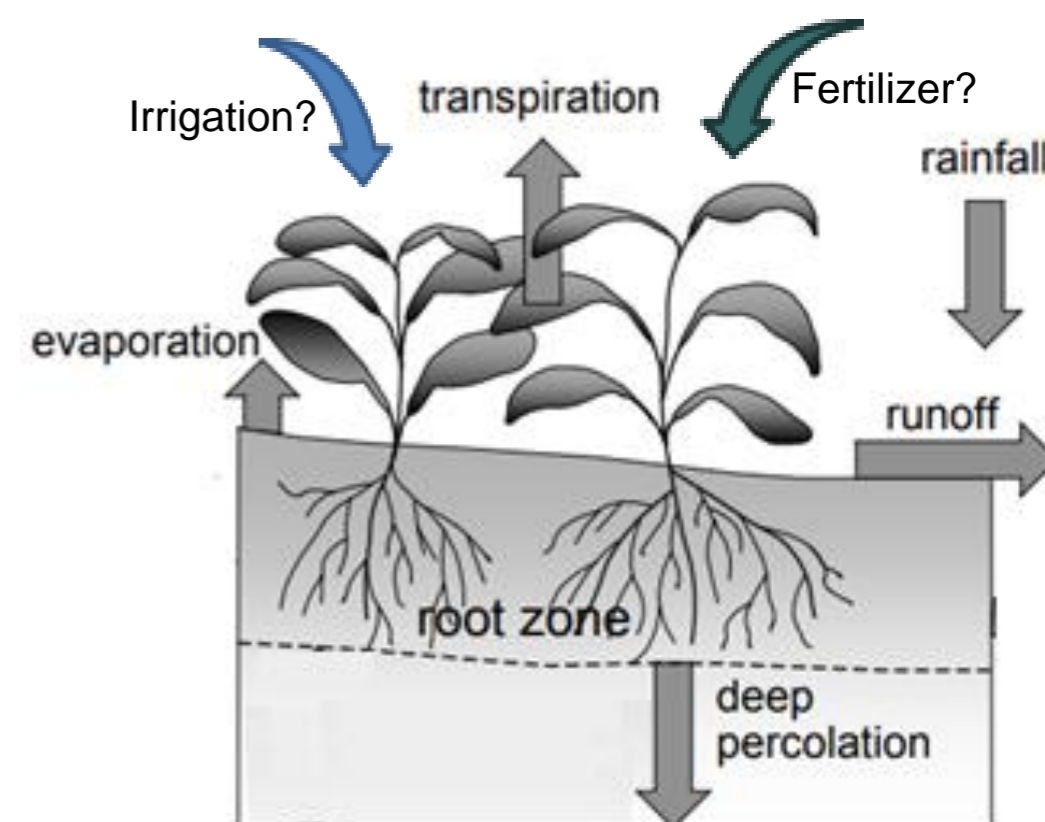
## Introduction

The overall goal of the **Mavo Diami project** is to improve sustainable food and income security for >100,000 smallholder farmers in Angola, by accelerating their agri-business performance through informed decisions supported by **KRES services** built on weather, soil and crop signals and other relevant data and indicators. The focus is also on large farms where KRES services can support field management activities. In large farms, the main field management issues are the elevated costs associated to **irrigation** and **fertilizer application**. Hence, an information service has been developed to support decisions on when and how much to irrigate and fertilize.



## Methodology

For supporting decisions in irrigation it is key to provide the **crop water requirements**. The crop water requirements are defined as the depth of water needed to meet the water consumed through evapotranspiration by a disease-free crop. In KRES service, the crop water requirements are determined with reference evapotranspiration forecasts and crop coefficient (Kc) values. Also important is to quantify the rain water reaching the root zone defined as the effective rainfall. The effective rainfall is obtained with rainfall forecasts and runoff coefficient values.



The **fertilizer loss risk** is an indicator developed to support decisions on fertilizer application in irrigated areas. The fertilizer loss risk is defined as the probability of fertilizer loss due to deep percolation. For different soil textures (e.g. Sandy Loam) rainfall thresholds were established when deep percolation starts occurring. The fertilizer loss risk is determined using rainfall forecasts and the pre-established rainfall thresholds.

## Results

The crop water requirements and fertilizer loss risk service is provided for the **Agrolider farm** through a dashboard Shiny application. For a selected irrigation area (e.g. Pivot 1), crop type (e.g. potato), planting date (e.g. 2020-06-05) and runoff coefficient (e.g. 0.5), the farm operator receives the forecasted crop water requirements, and forecasted fertilizer loss risks **up to 9 days ahead**. Forecasted crop water requirements can vary between 1 mm/day (little demand) to 9 mm/day (very high demand). Forecasted fertilizer loss risks can vary between 0% (no risk) and 100% (very high risk). This service can be provided to any irrigated farm with any crop type in Angola. Further development of the service is to include the forecasted **irrigation water requirements**. Feedback from the farm operator is necessary on how much irrigation water was applied the day before to provide an accurate irrigation advice for the days ahead. In that sense, an activity tracker for the farm operator has been developed in a Telegram application.

## Dashboard for daily forecasts on crop water requirements and fertilizer loss risk (up to 9 days ahead)

KRES: Daily Forecast of Crop Water Requirements

