

# Irrigation decision support systems for climate change adaptation

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# Introduction

- Climate change in the Mediterranean region is expected to cause a decrease in precipitation rates and an increase in temperatures (IPCC technical paper 2008, IPCC fifth assessment report 2013)
- Increased temperatures will cause further increase in the evaporation rates
- Both phenomena will further stress the water resources
- Globally, agriculture is the main consumer of water resources (70 %) (UNESCO – WWAP, 2014)
- The EU requires implementation of water pricing policies (WFD)
- There is a need to save water in agriculture

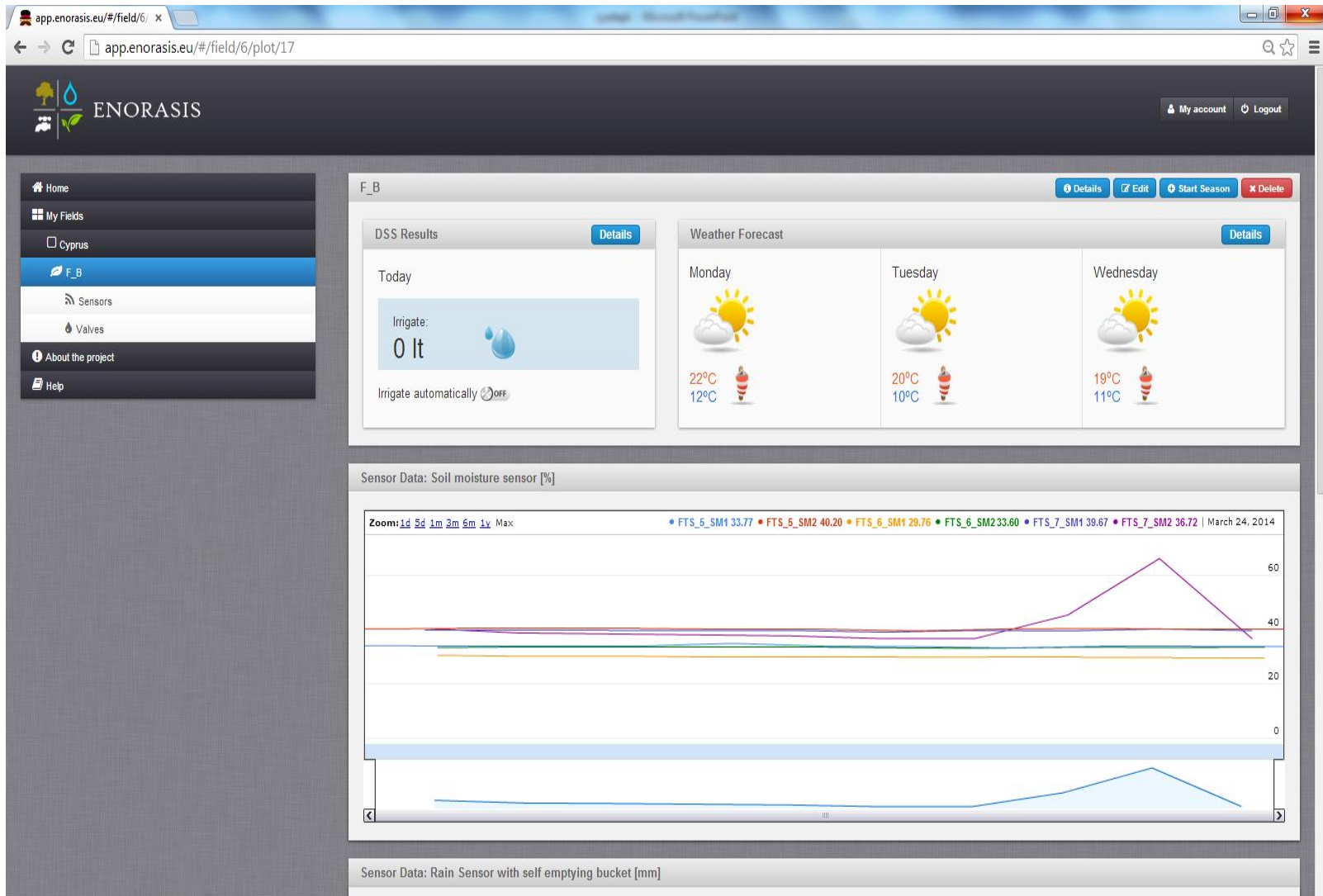
# Irrigation decision support system – ENORASIS

- ENORASIS is a revolutionary smart irrigation system for farmers and water providers
- It helps to monitor water use and **irrigate only where and when is needed and only for as long as needed**
- Basic components are a wireless sensor network and the Weather and Research Forecasting model (WRF)
- The **Decision Support Subsystem** combines: information on the sensors, the meteorological forecasts, the Irrigation Knowledge Base parameters (FAO56 model) and information for each land zone in the system
- All the information regarding the field can be accessed through a laptop, a tablet or a smartphone

# ENORASIS Android application



# ENORASIS Webpage



## ENORASIS application in Cyprus

- 2 hectare Grapefruit field at Fassouri Plantations Co.
- 6 soil moisture sensors (3 trees) and a small meteorological station were installed
- Hourly measurements of soil moisture, temperature, precipitation, wind speed, wind direction and relative humidity
- All data can be accessed through the ENORASIS webpage and the android application
- WRF model provides a 3-day weather forecast
- DSS advises the farmer if he should irrigate or not and how much.

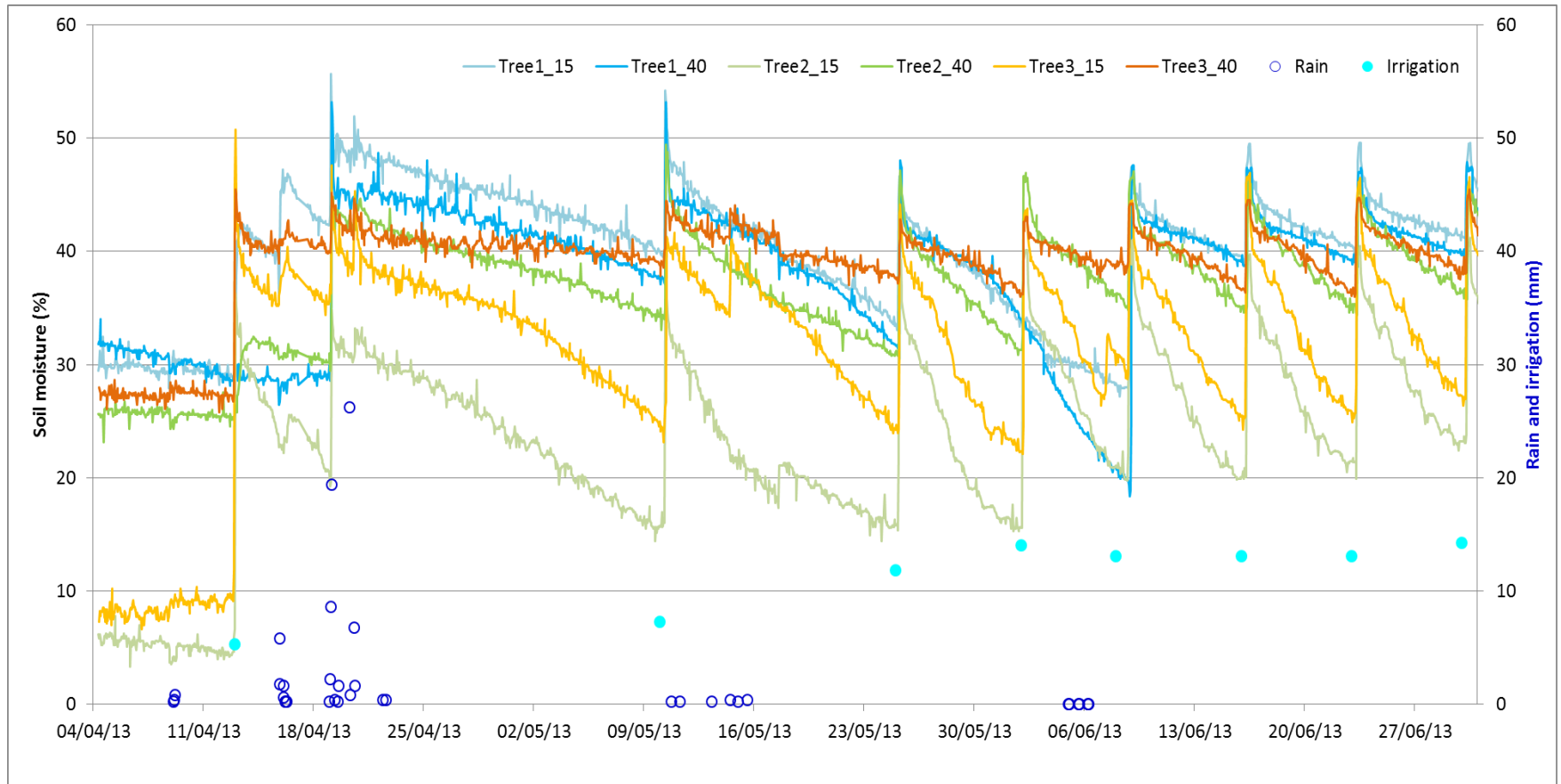
# ENORASIS application in Cyprus



# Results

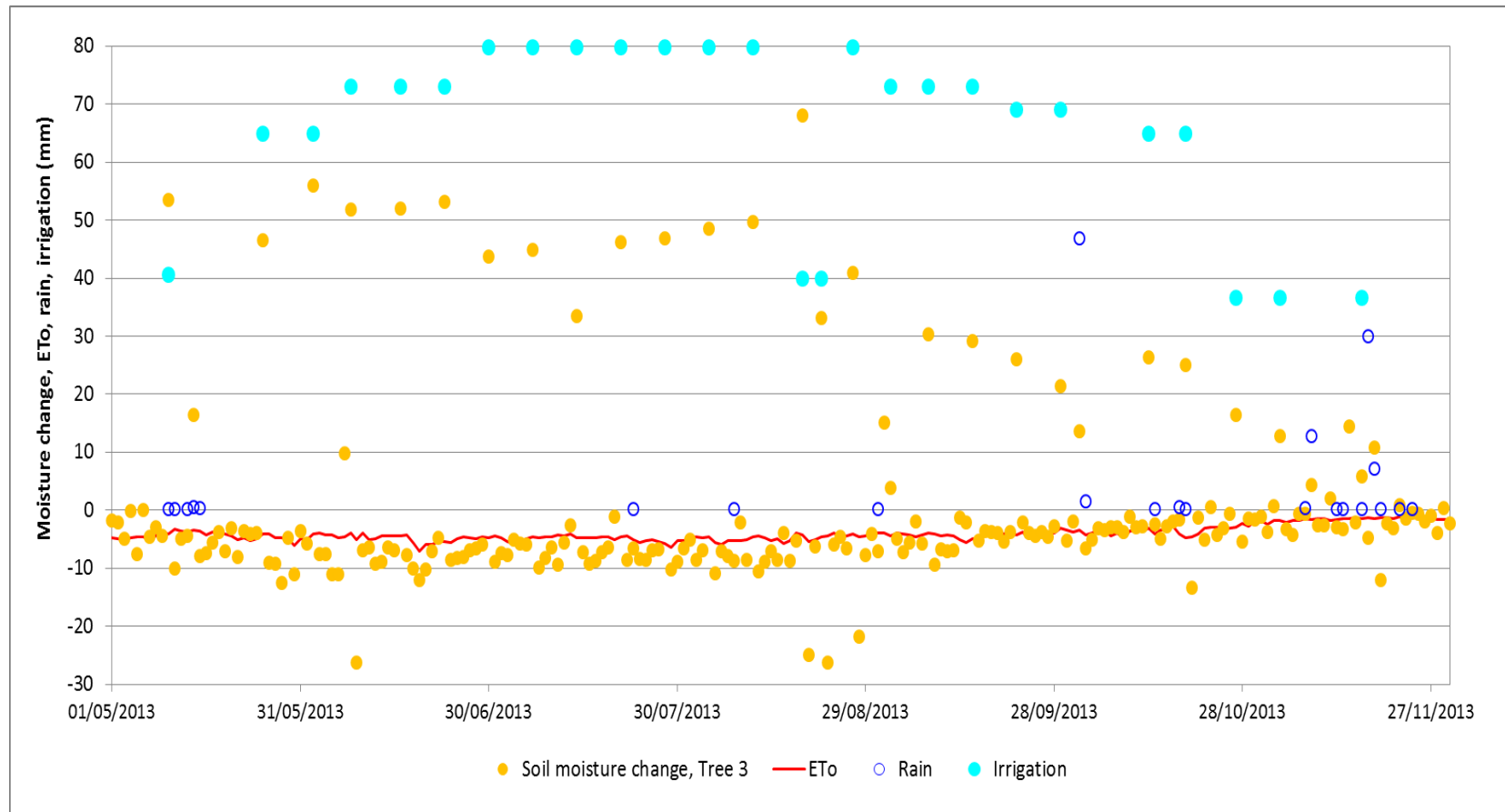
- The soil moisture observations indicate that the trees do not experience water stress
- The increase in soil moisture in the 52-cm root zone after irrigation is always less than the amount of irrigation applied
- The irrigation water is moving below the 52-cm root zone and perhaps also further in horizontal direction
- Soil augering indicated that bedrock starts below 45-cm
- Thus, there may be a loss of applied irrigation water
- There is scope for reducing irrigation water use

# Hourly soil moisture at 15 and 40-cm depth at three trees, precipitation and irrigation applications, April to June 2013



# Daily change in soil moisture in the 52.5-cm deep root zone of Tree 3, reference evapotranspiration (ET<sub>o</sub>), rain and irrigation

Note: negative values are soil moisture losses



## Conclusions

- Climate change will further stress water resources
- There is a need to adapt to these changes
- Agriculture is the main water consumer
- Water pricing policies will encourage farmers to find ways to save water
- Results at Phassouri Plantation indicate that there is water lost during irrigation
- ENORASIS DSS will help the farmer to **save water and secure crop yields**

## Acknowledgments

- Special thanks to the Phasouri Plantations people (Nicolas Zenonos, Odysseas Paraskeva, Christos Simon) for their hospitality and their contribution to the Enorasis Project

Thank you ...

[www.enorasis.eu](http://www.enorasis.eu)  
FP7-ENV ENORASIS project (GA 282949)