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# Drought monitoring system for Austrian agriculture

## (ACRP Project AgroDroughtAustria (ADA) – ada.boku.ac.at)

## INTRODUCTION

Most regions of Austria are humid or semi-humid but the main important crop production regions are frequently and with an increasing trend over the past decades affected by agro-meteorological droughts (often combined with heat stress), where water deficit and/or heat effects leads to significant yield decrease of various crops. Many studies show that these conditions will accelerate under future climate scenarios in Central Europe and affect most Austrian crop production regions (Fig. 1).

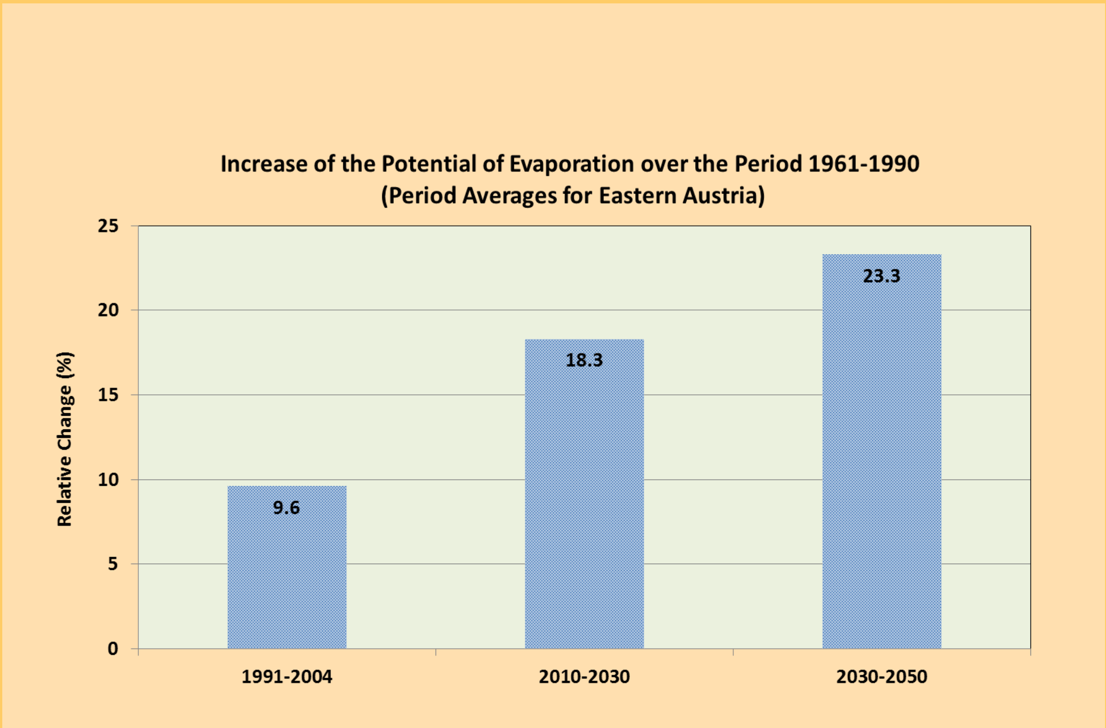


Fig.1. Increase of potential evapotranspiration under future climatic conditions in Eastern Austria.

## OBJECTIVES

The aim of the project (2014-2016) is to develop and test a crop specific drought and heat monitoring and forecasting system for agriculture in Austria by reaching the following objectives:

- Establishing a data base and developing methods for crop drought and heat stress detection and impact for main crops (wheat, barley, maize, sugar beet, grassland).
- Adapt and validate methods and test the crop specific drought/heat monitoring system for operational use.
- Establishing a forecasting approach modelling drought and heat occurrence.
- A web portal for presentation and test of the crop specific drought monitoring and forecast.

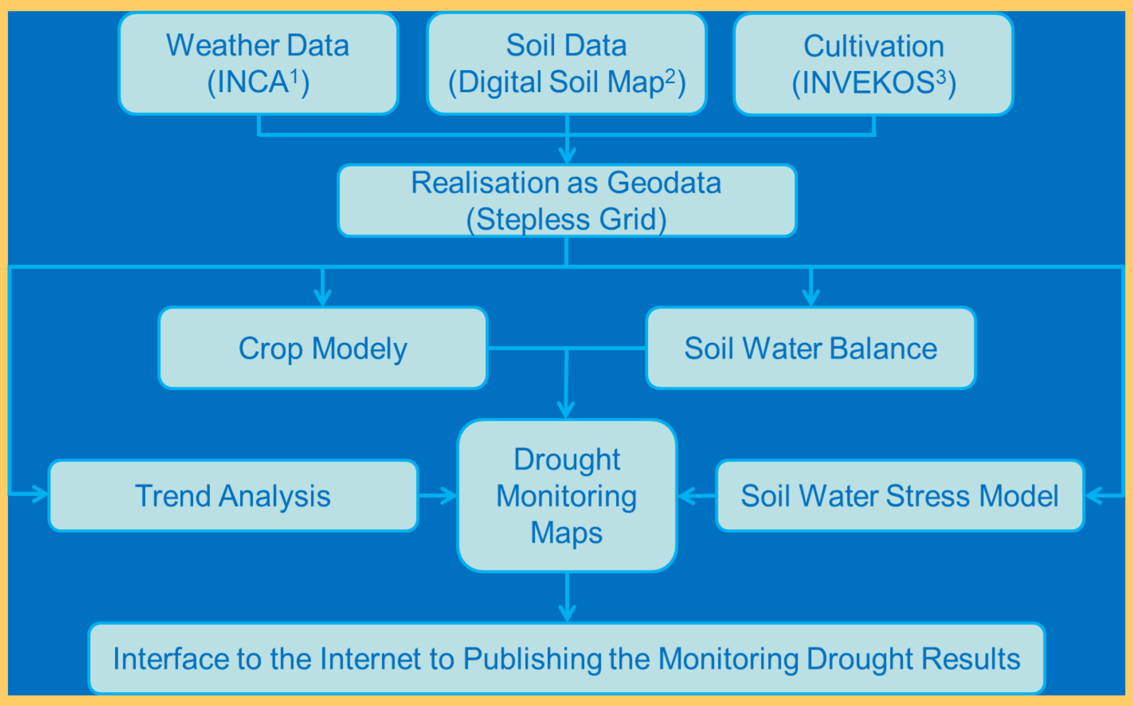


Fig.2. Concept of the drought monitoring system for crops.

## METHODS and TOOLS

- The drought monitoring system (Fig. 2) combines already existing tools GRAM (Trnka et al., 2006; Schaumberger, 2011) and SoilClim (Hlavinka et al., 2011) extended by crop specific phenological model and drought/heat stress and impact indicators.
- Set of calibrated indicators and methods on crop specific drought and heat vulnerability and impacts based on measured yield data and crop model application.
- Adapting and validating methods for crop drought and heat stress detection implemented in a GIS based monitoring system with high spatial and temporal resolution (0.5x0.5km, daily outputs) for main vulnerable arable crops.
- Implementing a 10 days and a medium term forecast method for drought occurrence.
- Testing the crop specific drought monitoring system for operational use including stakeholder and selected farmers involvement.

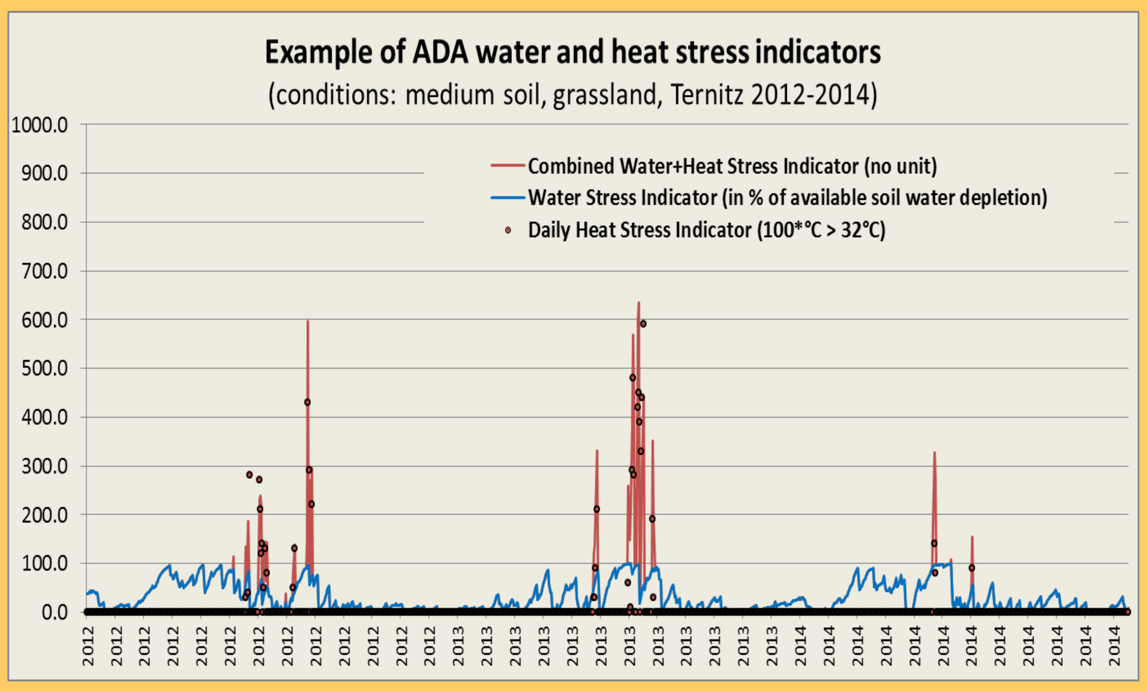


Fig.3. Time series of ADA crop drought/heat indicators.

## RESULTS

- Established data base on drought conditions and drought/heat effects on crops including field experimental and statistical yield data.
- Calibrated soil water balance model for various sites and crop conditions in Austria.
- Set of crop specific phenological models and drought/heat stress and impact indicators calibrated for various periods, sites and crops (Fig. 3).
- Models and data flows implemented in GIS and tested (Fig. 4)
- Implementation of tailored features for stakeholder use and interaction (ongoing).

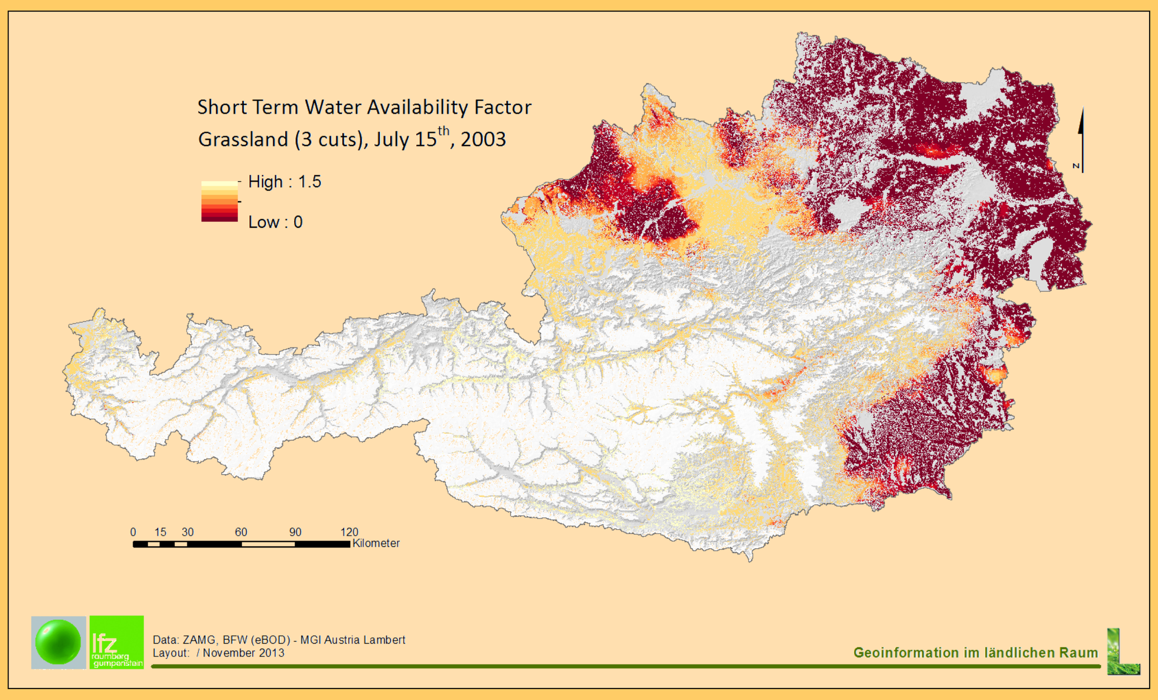


Fig.4. Example of GIS presentation for a grassland drought indicator based on the GRAM model.

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