



# High throughput sensing of agronomical and physiological traits of tropical maize hybrids in the vegetative stage

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## Rationale

- Climate change and shortage of water for agriculture
- Fast increasing world population
- Maize important for global food security
- Enhanced drought resistance of maize
- Effective use of limited water resources
- Optimized nitrogen fertilizer application

## Objectives

- Detect
  - Canopy water mass (CWM)
  - Aerial biomass
  - Nitrogen uptake
- Of several tropical maize hybrids
- Experiencing different drought stress levels
- => Screening drought tolerance in plant breeding
- => Optimization of maize management decisions

## Materials and Methods

National Corn and Sorghum Research Center (Thailand), dry seasons 2007 - 2009



Drought stress levels generated by irrigation treatments through withholding irrigation for various periods



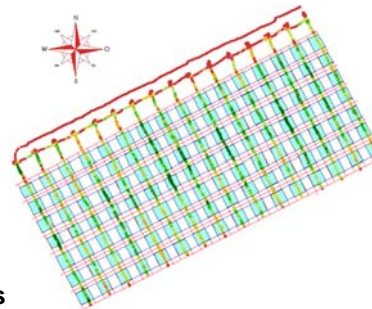
Non-destructive sensor measurements and destructive biomass samplings regularly until flowering of maize



Standardized fertilization rate



- Spectrometer (wavelength 300 - 1700 nm)
- GPS antenna
- Optics
- Light fibers
- IR-thermometer
- Distance measurement devices



7 hybrids  
4 stress treatments  
4 replications  
= 112 Plots

Index  $R_{780}/R_{700}$  values with correspondent GPS coordinates in plots

## Perspective

The optimal assessment of biomass, nitrogen and water status of plants by high throughput sensing measurements is a promising technique for management decisions and breeding purposes