**Info on**

# Variable Rain
# Irrigation Recommendation

**VariableRain** is a **site-specific irrigation recommendation for** optimising crop management in potatoes, sugar beet, sugar cane, maize, soybeans, lucerne and cereals. It is **a management tool to simplify farm operations** by planning the irrigation sequence in advance.

## VariableRain is based on scientific principles:

VariableRain is created from processed satellite data (leaf area index, LAI) in a 10x10 m grid, the use of the physical plant growth model Promet and the application of existing crop production expertise. The growth of the specified crop is simulated by an algorithm called Promet starting from the sowing or planting date by taking the meteorological data of the repective location into account.

From satellite data, the biomass is determined via the leaf area index (LAI), growth stage and other parameters, and thus the simulated **growth curve is** calibrated. Based on this information, the current demand of the plants for nutrients and water can be determined in a 10x10 m grid. With the inclusion of the weather forecast, this data can be derived in advance for future requirements, which are provided weekly with the following information:

- Crop Water Demand (CWD) in a 10x10m grid and on average for the field
- First day of water stress for the crop
- Leaf area index (LAI*)

* = with cloud-free satellite image, which is no problem for the winter crop.

## Creation of the VariableRain irrigation recommendation:

Once a week the crop consultant for VariableRain prepares a field- or sub-field-specific irrigation recommendation,  which is based on the crop water demand (CWD) and the 1st day of water stress for the crop. The recommendation is also taking the farmers needs and his irrigation technology (e.g. pivot, sprinkers etc.) into account.

## Execution of the VariableRain watering recommendation:

The farmer executes the irrigation recommendation according to priorisation (the field most urgently needs water comes first) of the fields. Depending on the existing irrigation technology, this can be done in the following 3 stages:

1. Switch-on and switch-off date for the next irrigation cycle with the indication of an average irrigation quantity per field.

2. In addition to 1.: Execution of the segment-specific irrigation quantity per segment (segment in the circular sprinkler or section along the irrigation lane of the sprinklers). This is the stage where the watersaving comes in, since the segments receive different amounts of water.

3. In addition to 1. and 2.: completely site-specific irrigation in a 10x10 m grid on an irrigation system with segment and individual nozzle control, which is regulated via a platform.

**Leaf area index LAI* as a decision-making basis for plant cultivation measures:**
LAI can be used for site-specific fertilisation and crop protection measures as well as for other crop management measures and can be read into and processed in existing NEXT Farming, a BayWa Farm Management Information Software (FMIS) system.

**VariableRain offers the farmer the following advantages:**
1. Prioritisation of the areas to be irrigated according to urgency in water demand, see Figure 1.
2. Segmenting of the irrigated areas with indication of the irrigation quantity per field as an average recommendation or as a segment specific irrigation quantity per segemnt, see Figure 1 and Figure 2.
3. Decision support when, where, which crop is to be irrigated with which amount of water.
4. LAI as an additional decision-making basis for crop production measures is provided at no further cost.

With **VariableRain, these goals can be achieved:**
- Optimal and continuous water supply to the crop - Reduction of drought stress
- Safeguarding yield and quality
- Saving water, energy and management time
- Maximum utilisation of existing sprinkler capacities
- Reduction of leaching and surface runoff of nutrients.

**With VariableRain, these crops can be irrigated**: Potatoes, sugar beet, maize, soya and cereals.

**VariableRain is available in these product variants:**

**VariableRain:**                     Site-specific irrigation recommendation + LAI*
**VariableRain Plus:**                site-specific irrigation recommendation +LAI* + crop advice
**VariableRain Plus Scientific:**  site-specific irrigation recommendation +LAI* + crop advice + water use efficiency

**Unique information required for VariableRain:**
- Field boundary as KML, XML or SHP file
- Seed/planting date
- Indication of the culture

**Information required for VariableRain 1x per week** (as feedback for the irrigation recommendation):
- Irrigated amount (mm and date)
- EC stage of the culture

**Contact:**
Zambian – German Agricultural Knowledge and Training Centre (AKTC)
**Helmut Anschuetz**
helmut.anschuetz@afci.de

**Leslie de Jager**
leslie.dejager@afci.de

**Attachments:**



**VariableRain** is a product of AKTC's private sector partner BayWa AG. BayWa AG is an internationally active group headquartered in Munich, Germany. It was originally founded in 1923 to support domestic agriculture. Later, the company expanded its activities to the construction and energy sectors. Today BayWa has over 20.000 employees and an annual turnover of above 17bn Euro.
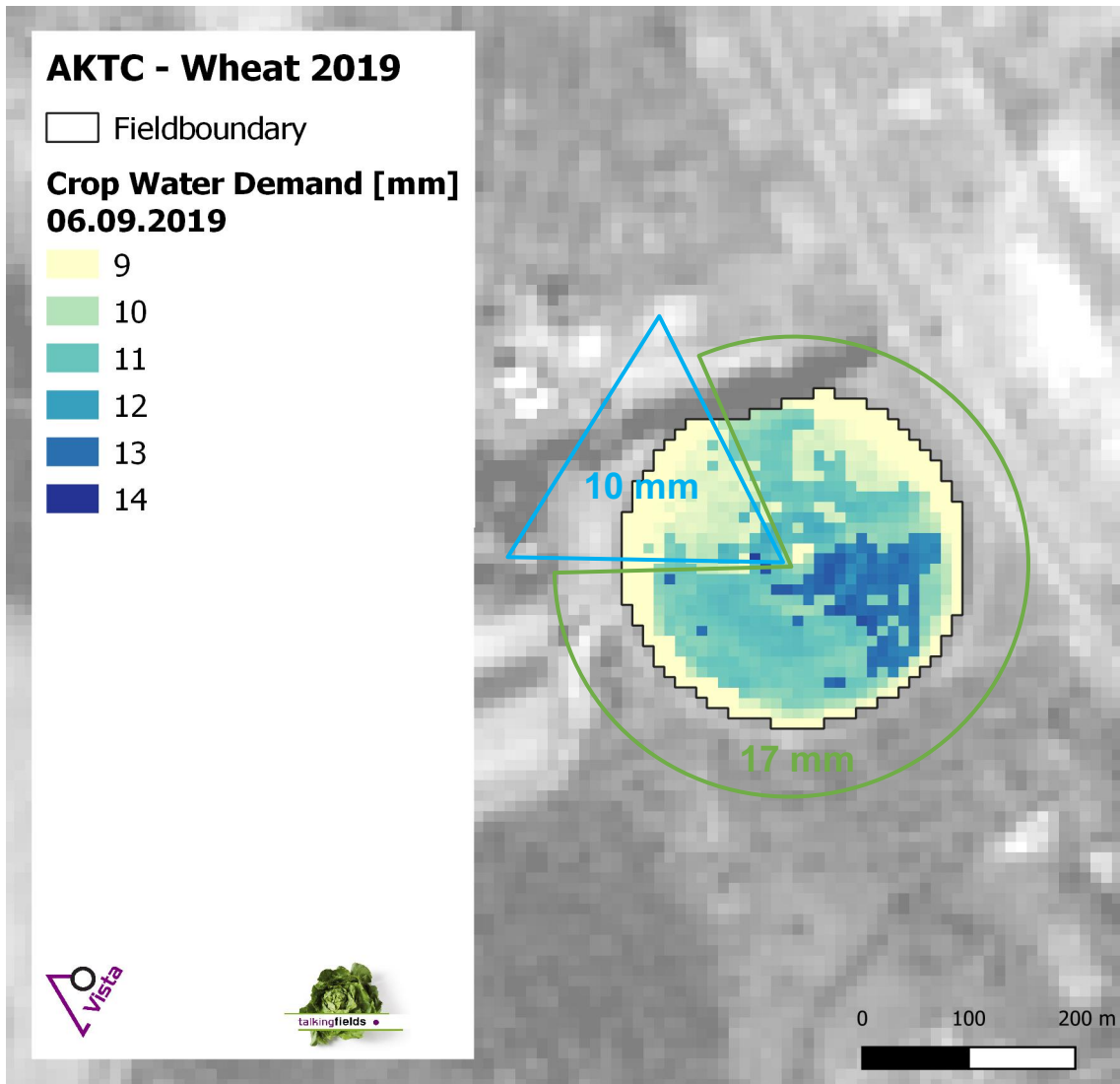


The above picture shows an example of the sector/segment specific irrigation recommendation on AKTC's 10ha pivot. The segment marked by the blue triangle needs 7mm less of irrigation water.