# **Opportunities for level-controlled drainage**



# Instituut voor Landbouw-, Visserij- en Voedingsonderzoek

Drainage system (Fig 1.a and b) prevents soil saturation which facilitates farm practices and prevents yield reduction. In polder areas, ground water is constitute of fresh water lens on top of saline water. Due to drying conditions and fresh water lens removal, saline water can rise to the root zone that reduces crop productivity. Therefore, in order to keep the saline water in deeper depth, fresh water lens can be recharged through conservation practices. To do so, controlled drainage (CD, Fig 1.c & d) artificially increases the fresh water lens especially in winter with high rainfall, while this water can still be transpired by plants in summer time and saline water deep enough.



Fig 1. Scheme of conventional (a, b) and controlled (c, d) drainage with a control unit for water control, drainage pipes in the field and an open ditch.

### 2. Case Study

we compared two fields in Belgian polders, one in controlled drainage, one as reference in conventional drainage. We use piezometer (pipe in the ground to see water table) equipped with divers and resistivity stick (showing the resistivity or electrical conductivity, EC of soil water in depth). The monitored sites with one soil

profile for each are shown in Fig 2.

Fig 2. Location of piezometers, soil water content sensors and ERT (electrical resistivity tomography) sticks in three points in reference field (Ref 1, 2, 3) and controlled drainage field



#### (CDF 1, 2, 3)

## 3. Results

Fig 3 shows the climate data and general decreasing trend of piezometric head (water level) approaching the summer season. Preliminary results show large increase of EC (i.e. decrease in resistivity) for piezometer with a low water table, confirming the presence of saline water from the past sea.

# 4. Conclusion and outlook

Although both fields have the same soil type and are close to each other, the dynamics of water table and EC are different, and the intra heterogeneity of EC values are also high for each field. We aim to estimate the potential of CD on

- increasing fresh water lens.
- crop yield changes.
- Evaluating the best times to adjust the level of ground water for both water retention and salinity reduction.

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Fig 3. Time series of weather data, ground water level and EC values for piezometers at the depth of 3m

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