





 Ministry of Transport, Public Works and Water Management

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## A new adaptation tool for Dutch farmers to cope with drought and excess water

Lodewijk Stuyt  
Alterra, Wageningen, The Netherlands



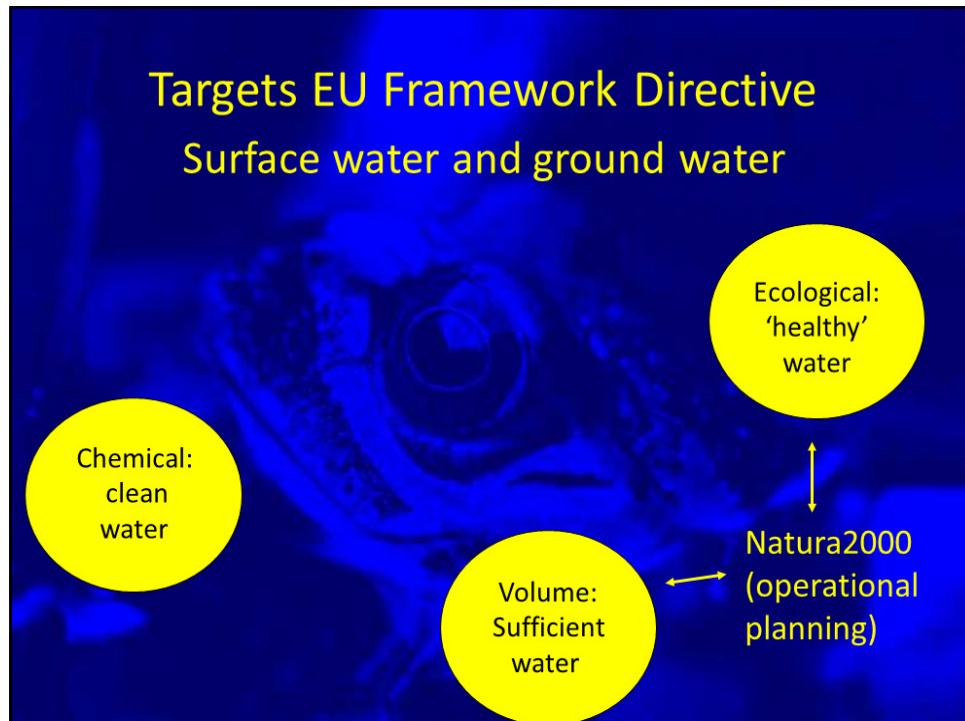


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- Problem with water
- Action 1
- Action 2
- Action 3
- Results
- Impact of results





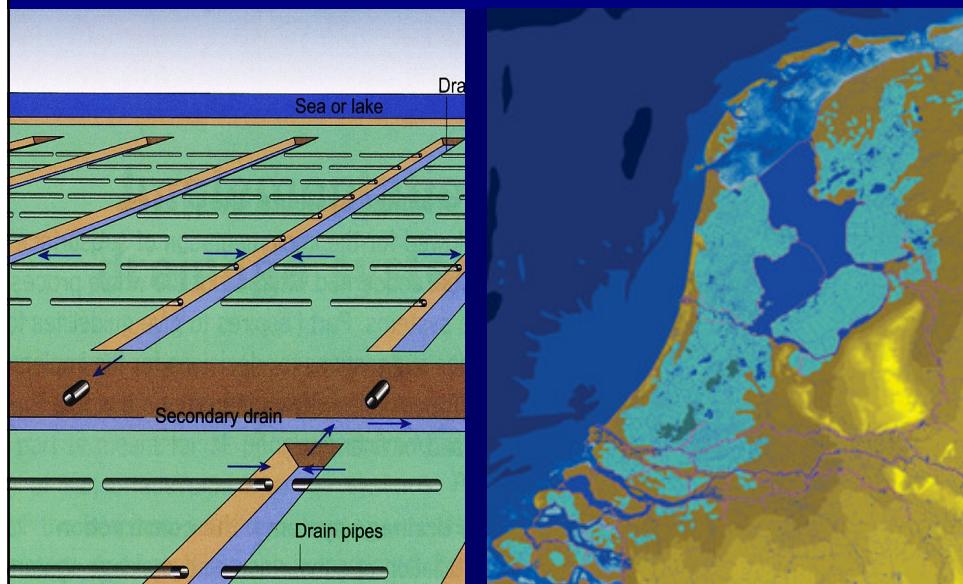
**stowa**  **ALTERRA**  
WAGENINGEN UR  **Project part financed by the European Union**  **Ministry of Transport, Public Works and Water Management**

 **Problem**

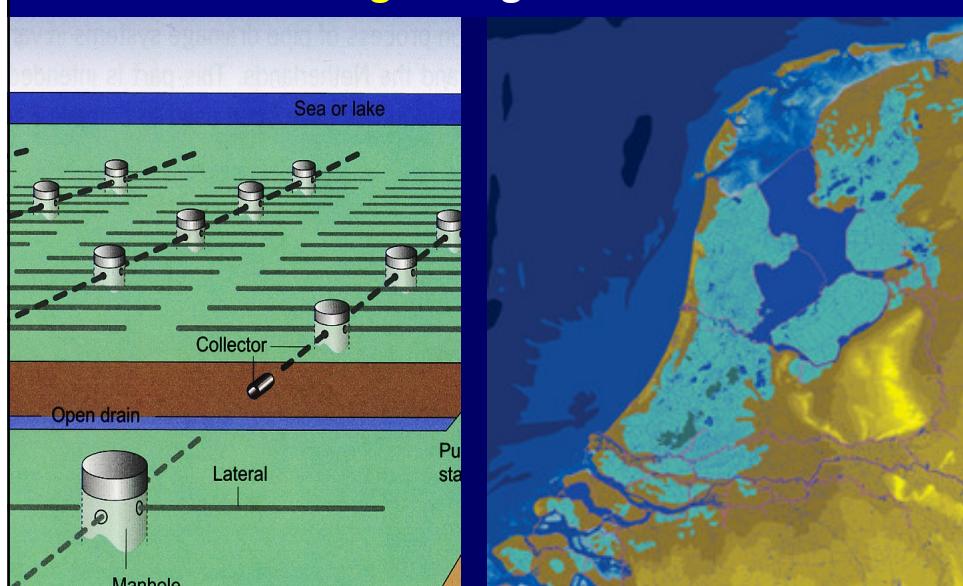
- \* **Land drainage systems of farmers:**  
very effective yet inflexible & too intense
- \* **Negative impacts:**
  - water *quantity*: too dry in summer
  - water *quality*: salinization
  - water *quality* : leaching nutrients & pesticides
- \* **Climate Change:** impacts getting worse

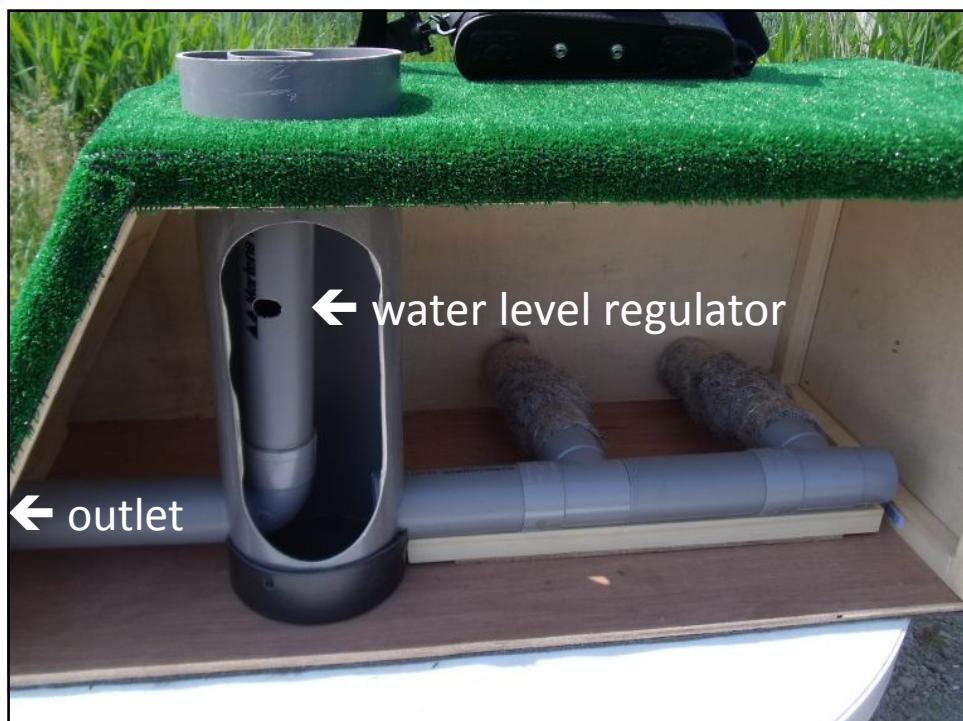
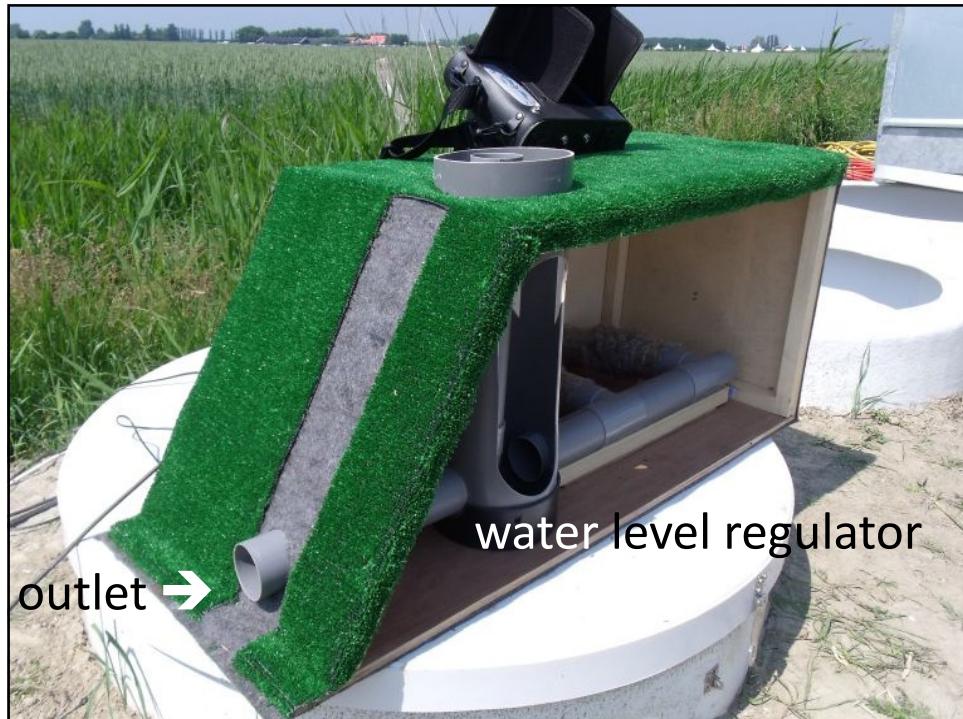
## Land Drainage: Proven Technology

### Conventional Drainage of agricultural lands



## Action 1: Introduction of Controlled Drainage of agricultural lands





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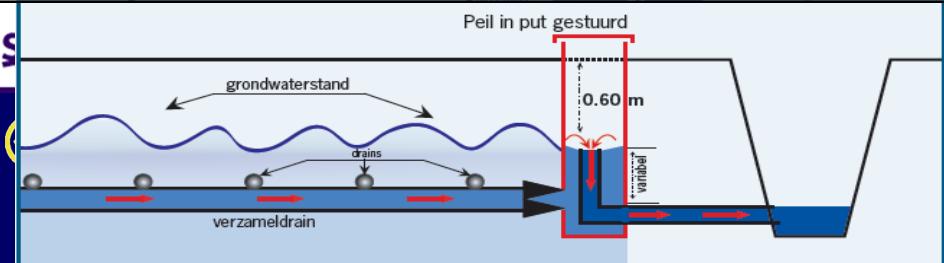
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**Drainage: iets voor u?**

U kunt als groep agrarisch ondernemers, bijvoorbeeld uw studieclub, of andere belangstellenden een excursie aanvragen naar het bedrijf van Vermeer. Dit biedt u de gelegenheid dit drainagesysteem te bekijken, u hierover te laten voorlichten over de (on)mogelijkheden ervan en erover te discussiëren. U kunt zich hiervoor opgeven bij [Abco.debuck@wur.nl](mailto:Abco.debuck@wur.nl) of [rene.vermeer@hetnet.nl](mailto:rene.vermeer@hetnet.nl).



Foto van een verzamelpunt met regelbaar peil



Peil in put gestuurd

grondwaterstand

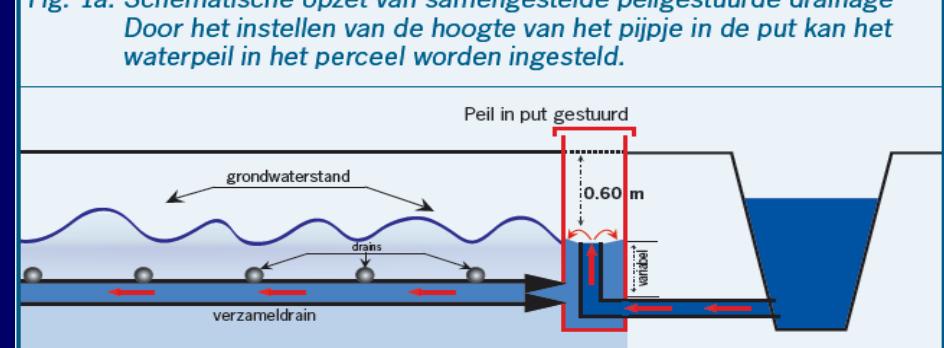
drains

verzameldrain

0.60 m

waterpeil

**Fig. 1a. Schematische opzet van samengestelde peilgestuurde drainage**  
Door het instellen van de hoogte van het pijpje in de put kan het waterpeil in het perceel worden ingesteld.



Peil in put gestuurd

grondwaterstand

drains

verzameldrain

0.60 m

waterpeil

**Fig. 1b. Bij een hoog slootwaterpeil (of door het inpompen van water) kan het systeem worden gebruikt om water in het perceel te laten.**



## Action 1

### Introduction of 'controlled drainage'

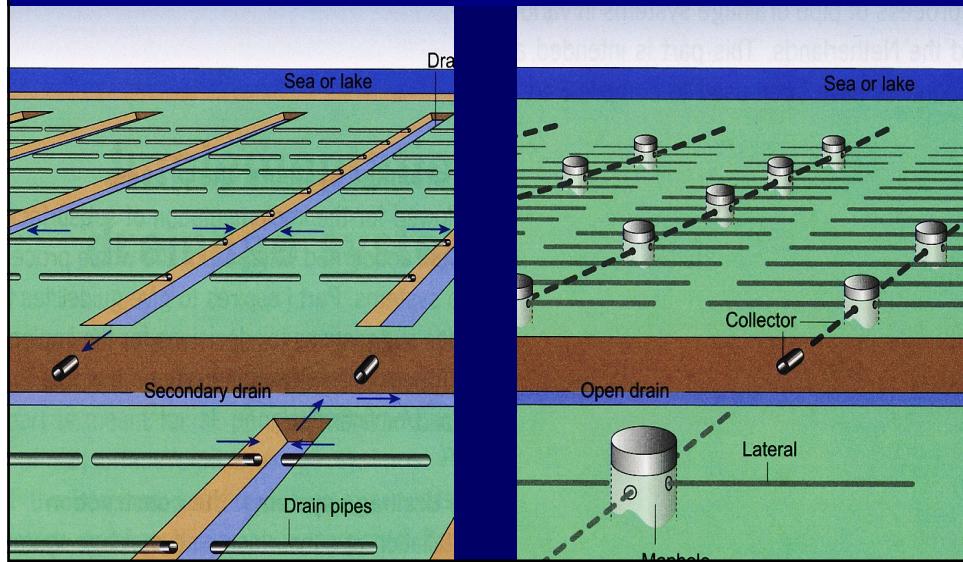
#### Claims:

- 1 water tables are up: water conservation
- 2 higher crop yields (subsurface irrigation)
- 3 incidental groundwater storage: security
- 4 improved use of nutrients: leaching is down
- 5 salinization is down (climate change)

→ farmers: local water managers

# Land Drainage: Proven Technology

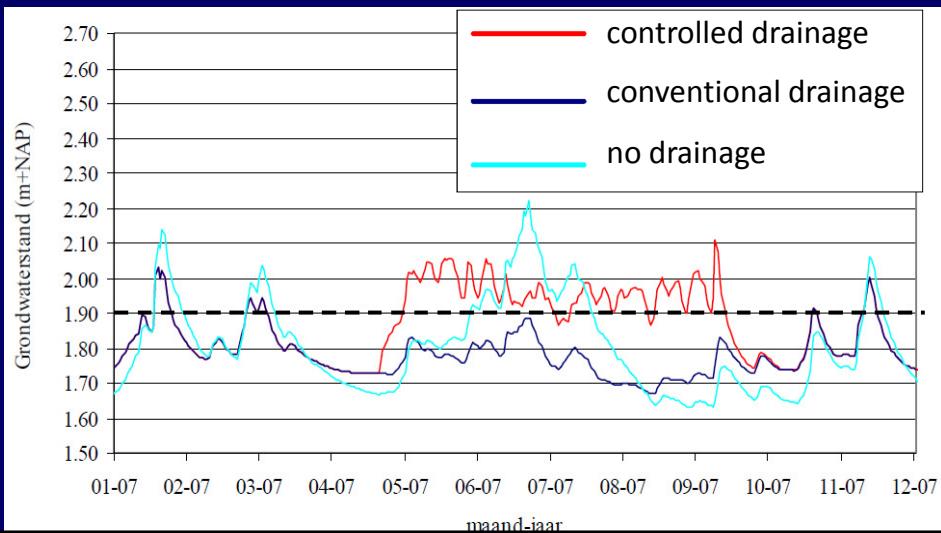
## Conventional Drainage    Controlled Drainage

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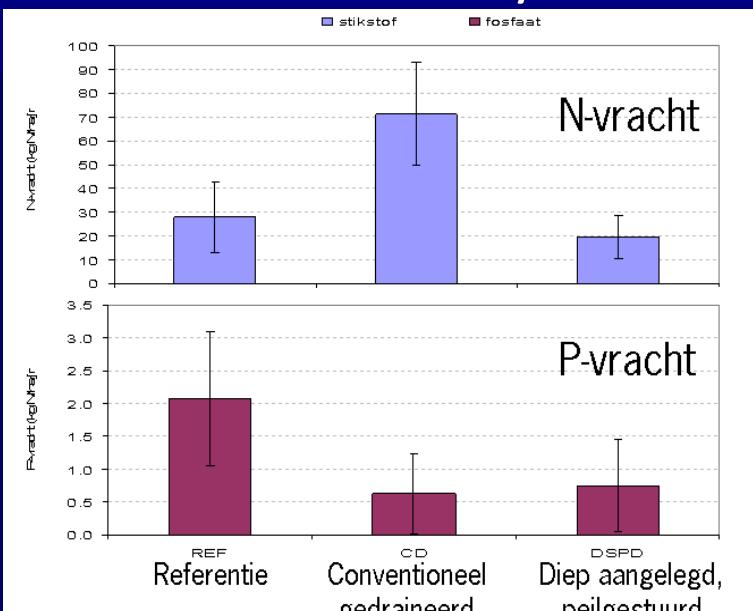
### Action 2

- \* model study to verify claims
- \* identify 'pros' & 'cons'
- \* better control groundwater table
- \* better control leaching nutrients, pesticides

## Ground Water Table Control



## Drain Water Quality Control



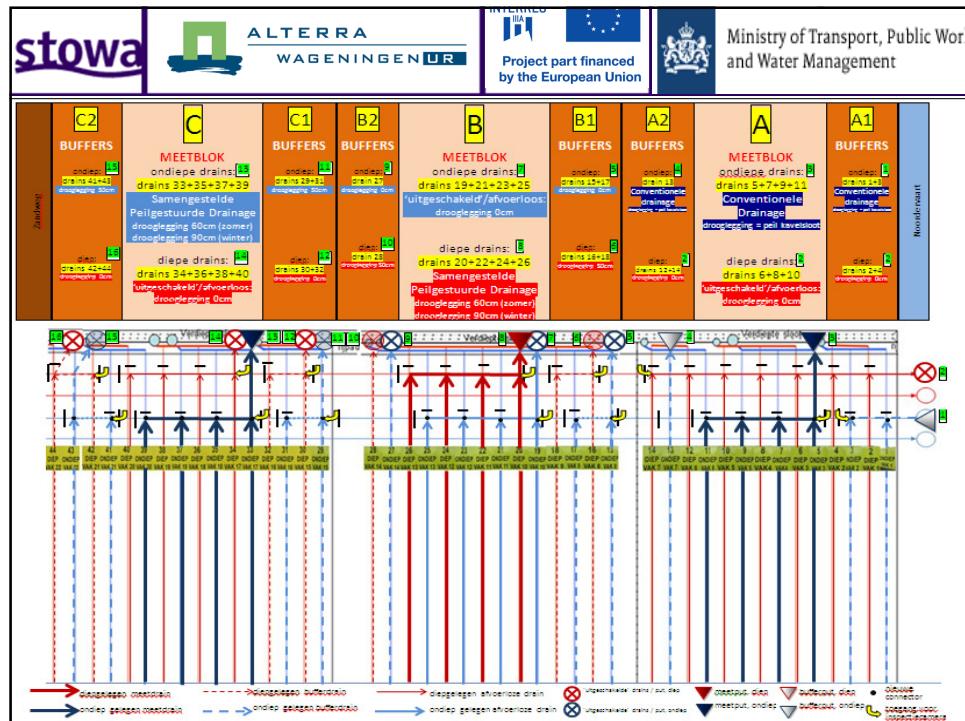


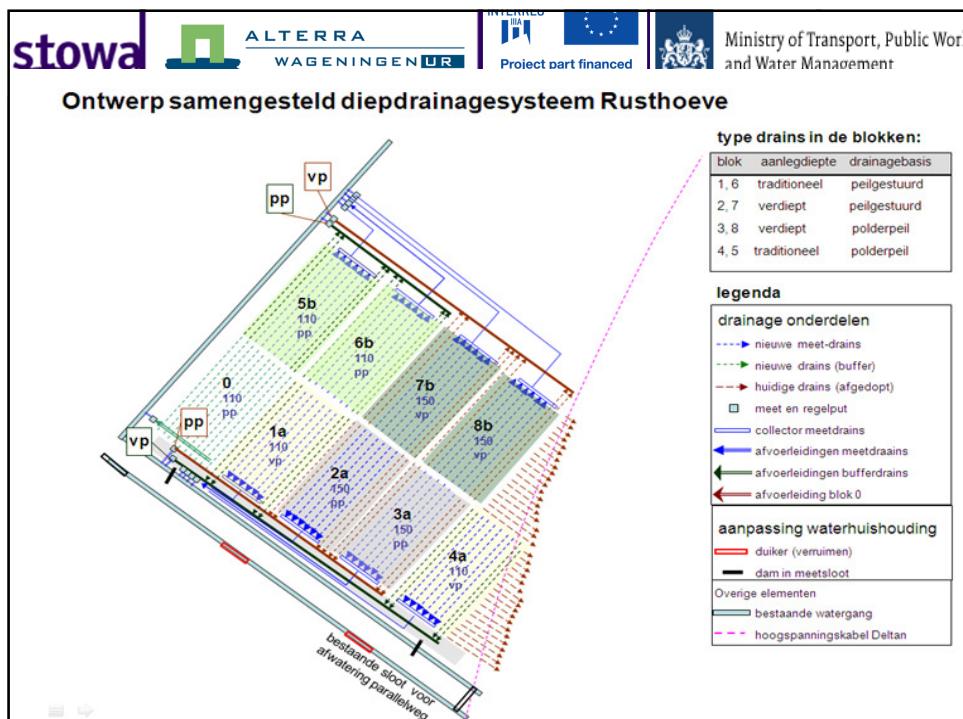


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**④ Action 3**  
**Field verification of forecasted impact(s) of new drainage design:**

- \* 2 locations: scientific monitoring
- \* 5 locations: operational monitoring
- \* 25 locations: farmers' experiences
- \* field demonstrations
- \* meetings with stakeholders, farmers, scientists, contractors (certification)







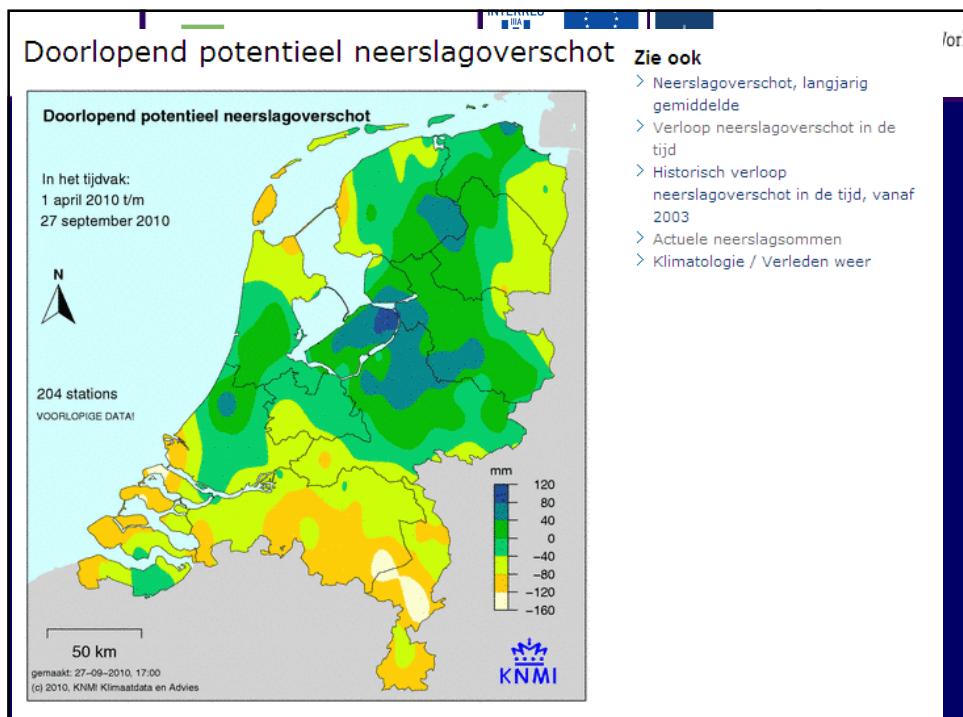




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## Results

- 1 Farmers: subsurface irrigation!
- 2 Policy Makers: average ground-water levels in summer are up!
- 3 Flexible groundwater storage
- 4 Impact on water quality (N, P)?  
(European Framework Directive)

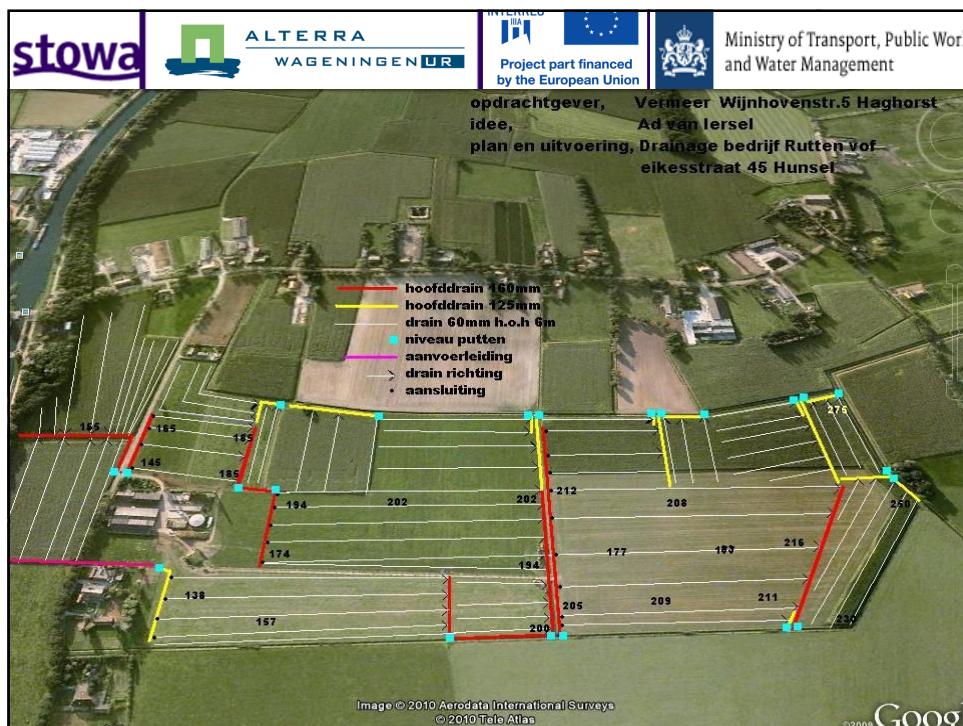




## ➔ Impact of results

- \* Nationwide management of water scarcity, -quality
- \* Management coastal salinity
- \* New awareness of farmers







## ⇒ Conclusions – the Future

- \* Farmers very positive: I decide!
- \* Policy makers: important tool for water management
- \* spreading rapidly over NL
- \* automation (weather forecast)
- \* good option for many Deltas



Thank You!