



Local Climate Proof Fresh Groundwater Supply

'GO-FRESH' in de Zuidwestelijke Delta: Zijn er kansen?

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Deltares, The Netherlands


freshsalt.deltares.nl
zoetzout.deltares.nl



Geohydrological Opportunities
for FRESH Water Supply



Sense of Urgency



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Grondwater in de toekomst

Wat komt er allemaal op ons af?

- Grondwaterwinning
- Ontwikkeling energiegebruik/productie en brijnlozing
- Bodemdaling
- Klimaatverandering
- Ontwikkeling ruimtegebruik
- Politiek, Beleid & Waterbeheer

Directe invloed door de mens op het grondwater is belangrijker dan klimaateffect

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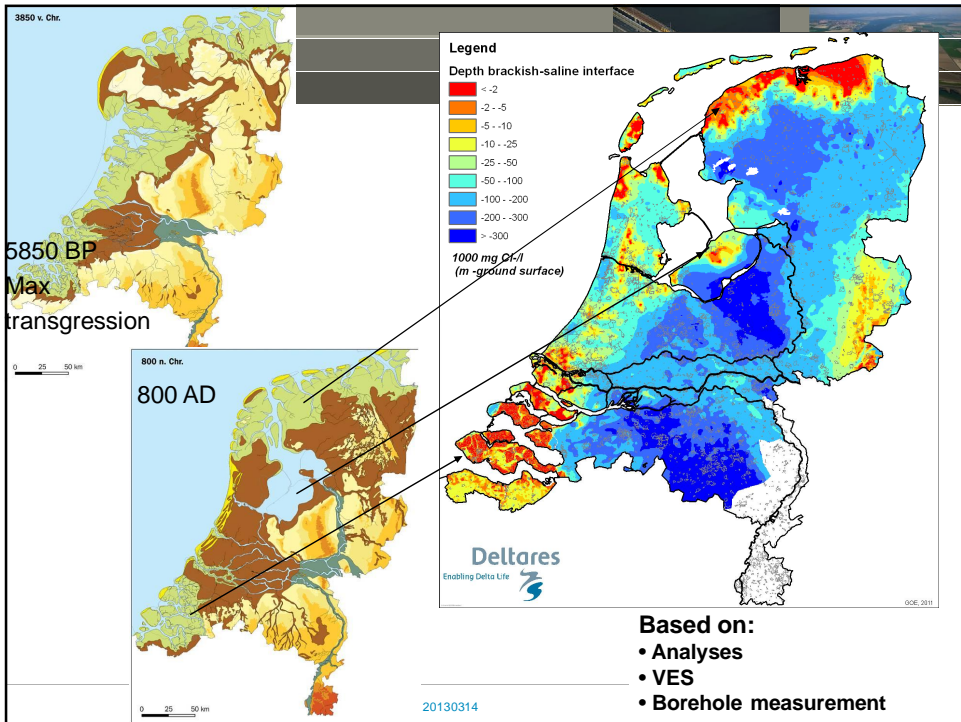
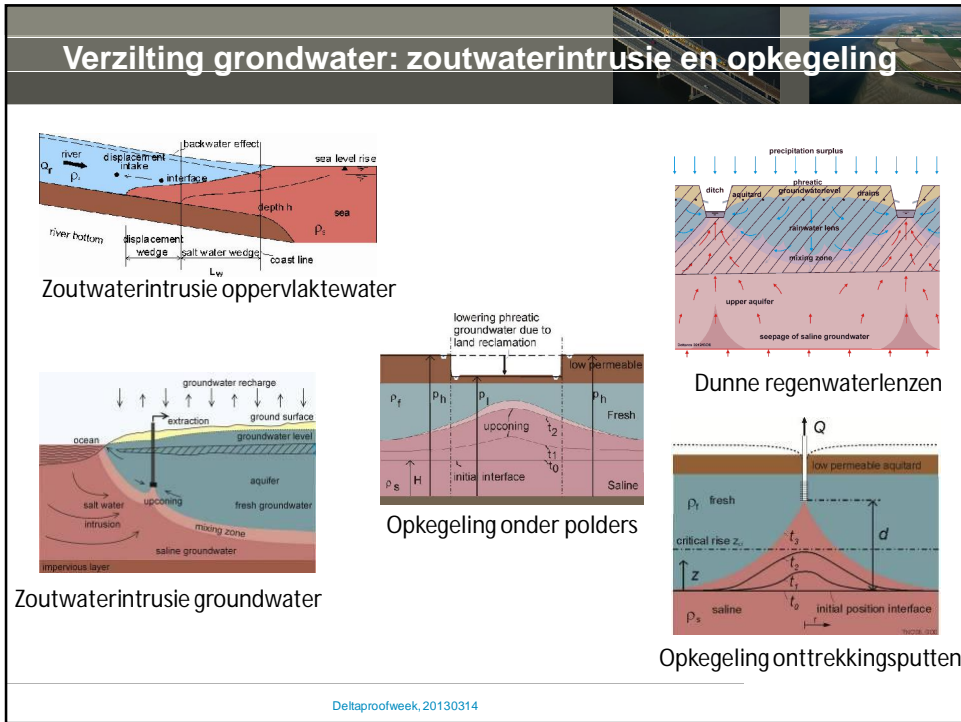
Het grondwatersysteem in Nederland: Nu en Toekomst

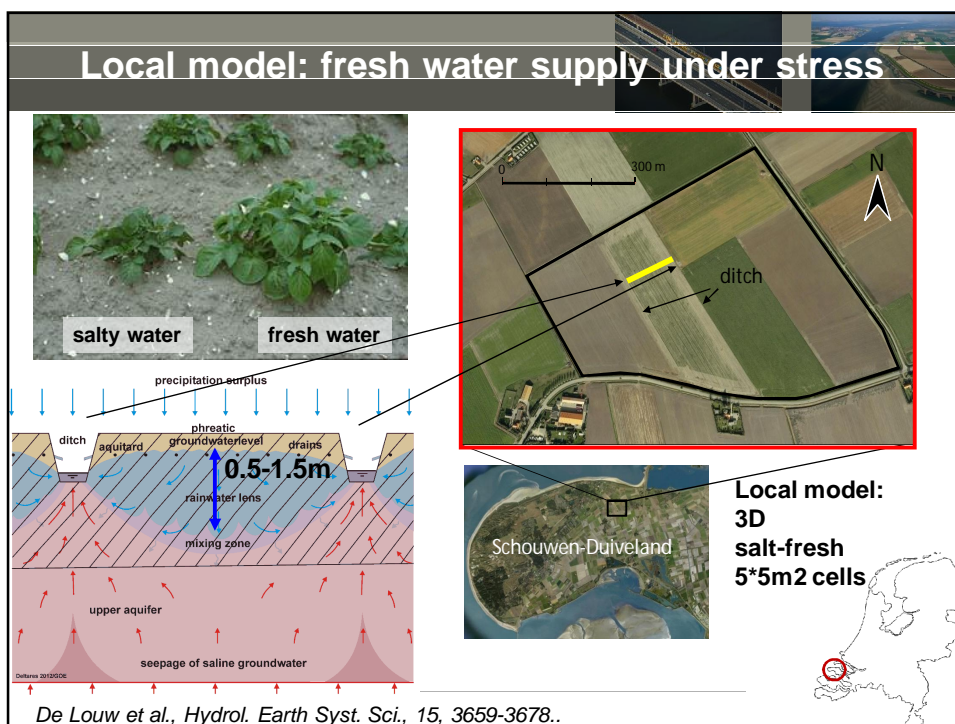
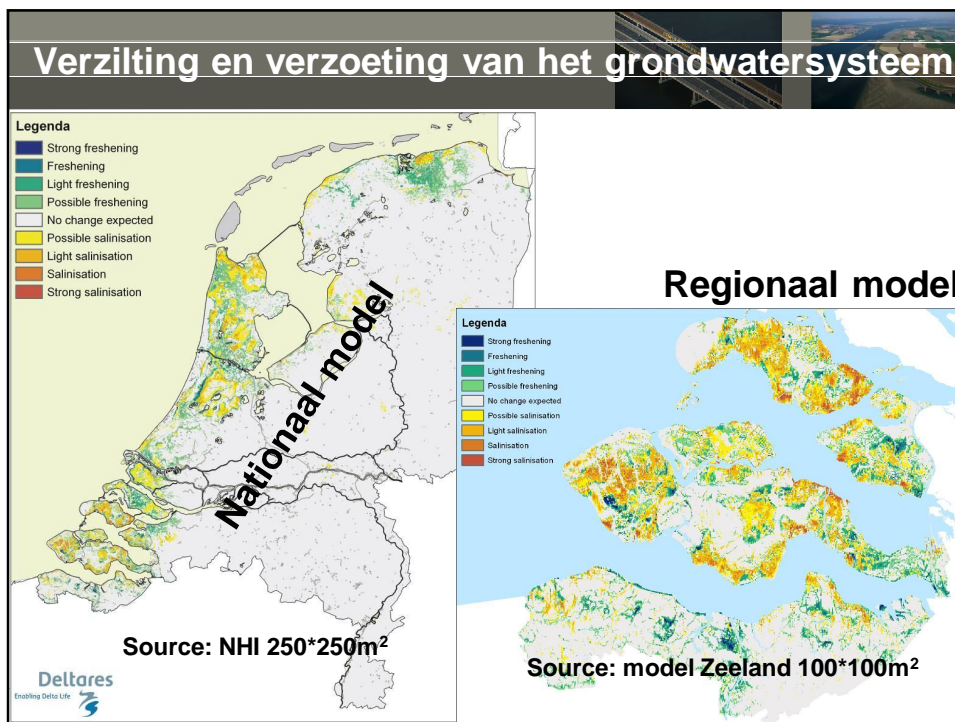
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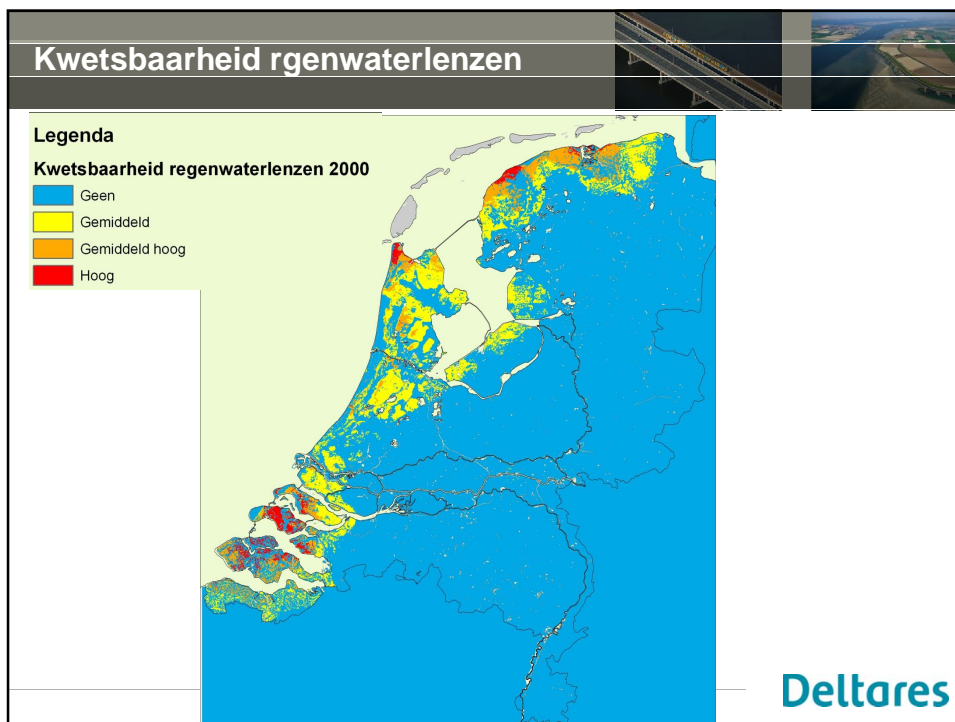
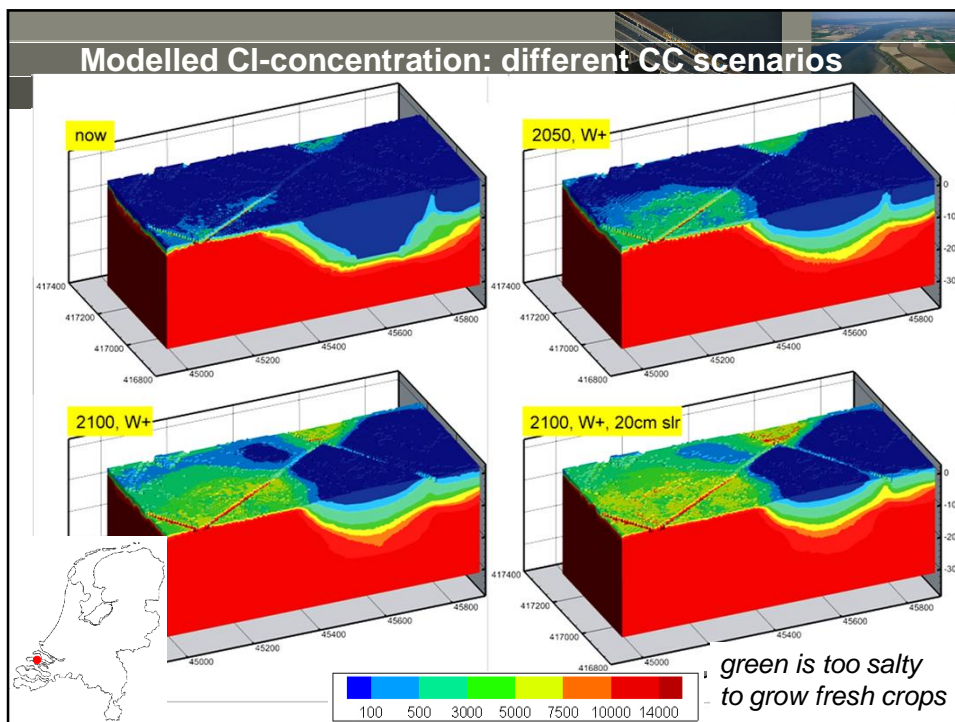
Toekomst

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TNO, GOE'07







Urgentiegevoel agrariers: interviews Zeeland



Zeeland, voorjaar 2011:
> 1.000 euro per ha voor water per tankwagen!

"Droogte: alle producten van slechtere kwaliteit. Wateroverlast: minder product, wel hoge kwaliteit"



"Lokale droogte nadeling; prijzen gaan niet omhoog. In droge jaren 20-30% minder opbrengst."



"onttrekkingscapaciteit grondwater te klein"



"Wat ik nu nog wil hebben? Veel zoet water!"

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Basis concept

GO-FRESH

Geohydrological Opportunities FRESH water supply

Vele lokale zoetwater maatregelen kunnen voorzien in de regionale zoetwatervoorziening

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Oplossing zoetwatervoorziening




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Lokale oplossing zoetwatervoorziening



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klimaat en globale verandering



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klimaat en globale verandering





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lokale oplossing
zoetwatervoorziening

klimate en globale verandering



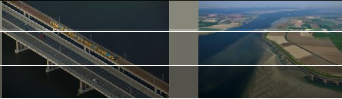
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Hoe gaan we dit probleem
aanpakken?

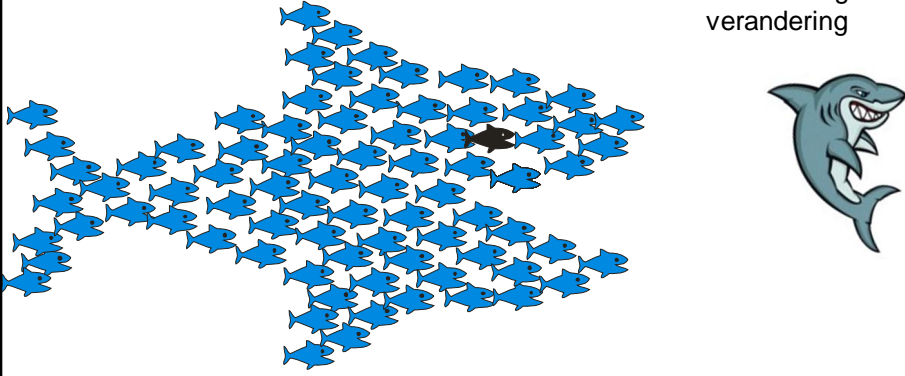
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**Vele lokale oplossing
zoetwatervoorziening**

klimaat en globale
verandering



Vele lokale zoetwater maatregelen kunnen
voorzien in de regionale zoetwatervoorziening

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Activiteiten

1. maak van casestudies succesvolle showcases
2. communicatie met stakeholders
3. sociaal-economische haalbaarheid
4. opschalen lokale showcases naar een regionale strategie
(voor o.a. Deltaprogramma)
5. samen werken!



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Combineren (grond)water projecten in de Proeftuin Zeeland

🐟 GO-FRESH, Kennis voor Klimaat

🐟 De Waterhouderij

🐟 Climate Proof Areas


🐟 Het Kustlaboratorium

🐟 De Kreek teRUG

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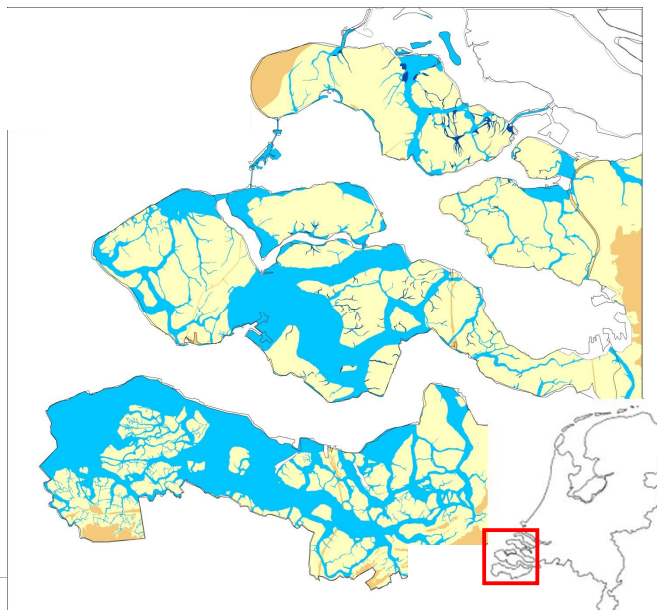
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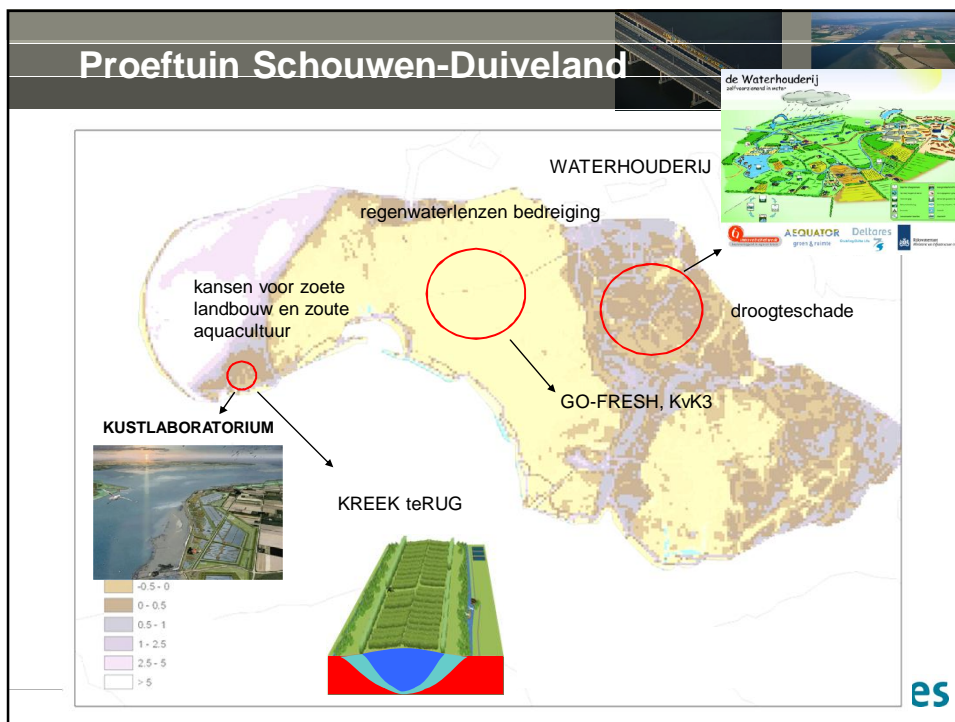
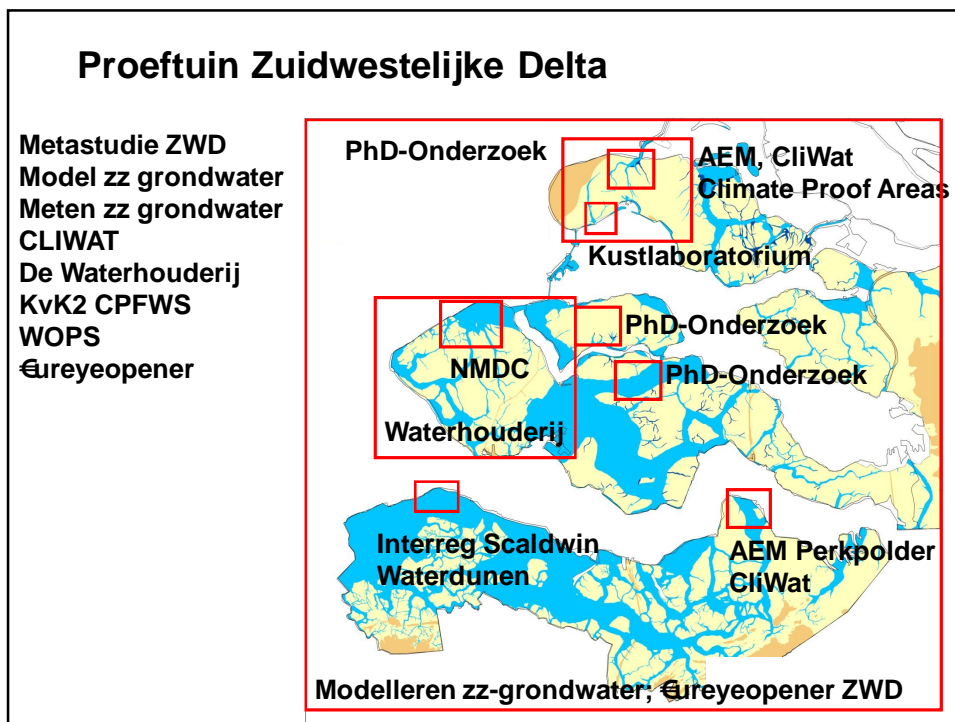
Kansen voor opschaling showcases (bijv. Zeeland)

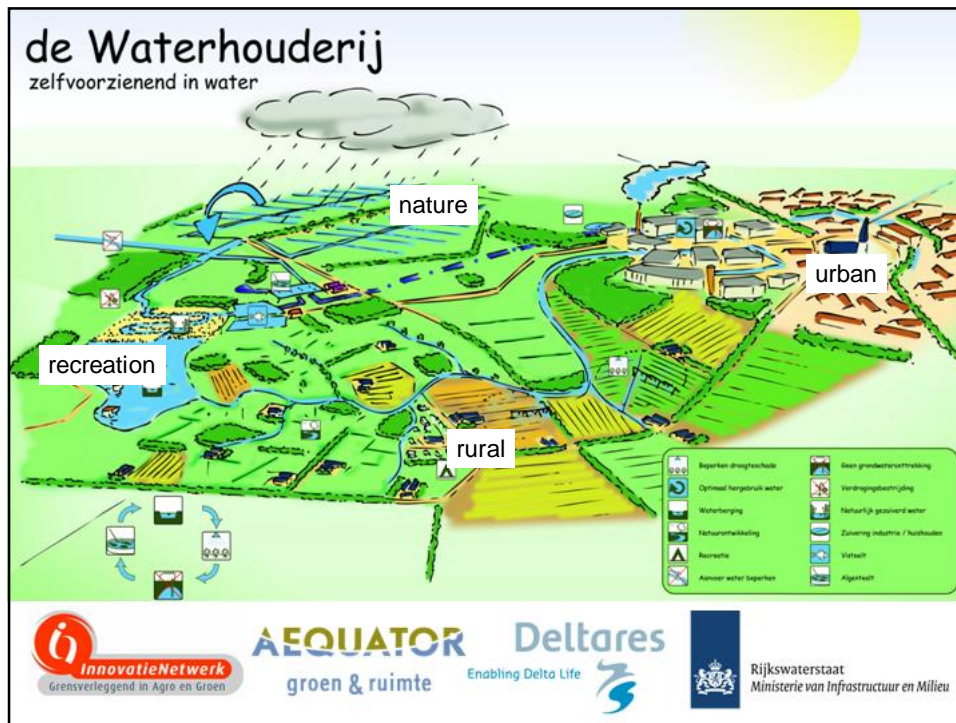
 **Polders**
GO-FRESH
Dunne regenwaterlenzen

 **Kreekrug**
GO-FRESH
Kreekrugmaatregelen

 **Duinen**





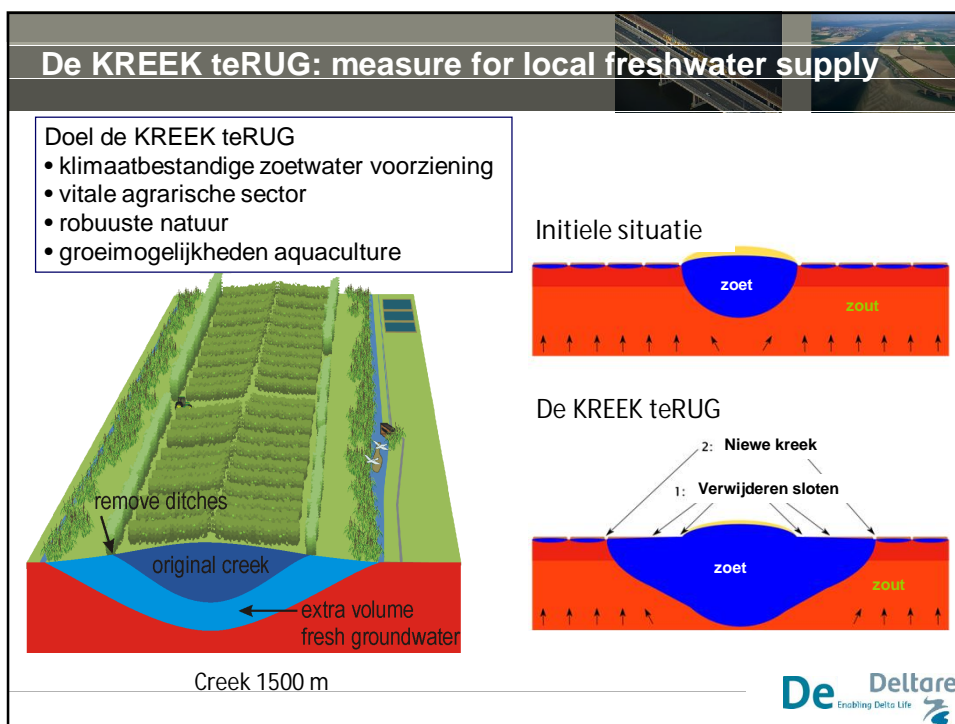
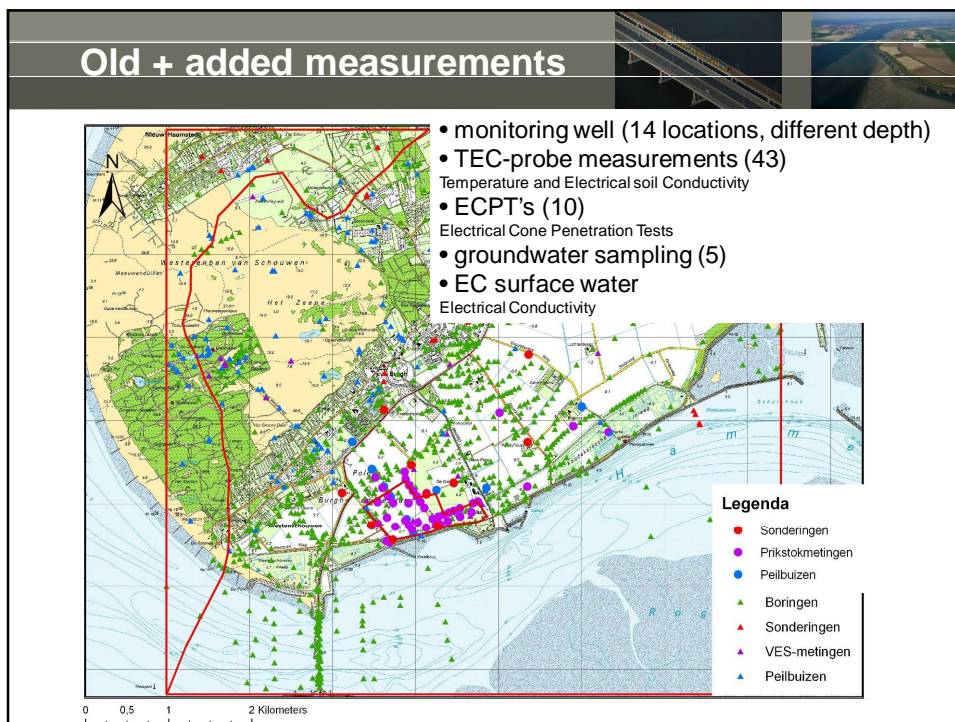


Het Kustlaboratorium


- Het Zeeuwse Landschap (NGO)
- Dutch Dream Fund Lottery
- 45 ha, on island Schouwen-Duiveland

Pilot project for:

1. aquaculture
2. nature development
3. landscape experience




Valorisatie maatregelen lokale zoetwatervoorziening



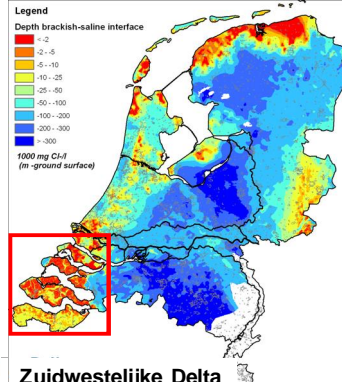
Onderzoeken in hoeverre lokale maatregelen de zoetwater beschikbaarheid voor landbouw in de ZWD kunnen vergroten:






1. Bergen water in kreekkruggen: infiltratie & winning (ASR)
2. Optimaliseren zoetwatervoorraden dunne regenwaterlenzen


'Local oplossingen met regionaal effect'









Geohydrological Opportunities for FRESH Water Supply












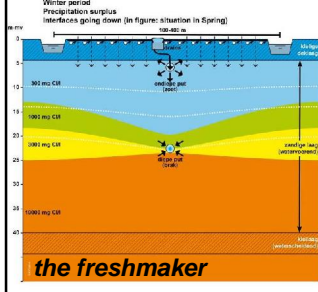



3 Pilotstudies showcases GO-FRESH




Toename zoetwatervoorraad in kreekrug door injectie zoet water en onttrekking zout grondwater




the freshmaker

Toename zoetwatervoorraad in kreekrug door infiltratie oppervlaktewater

'Gewone' situatie

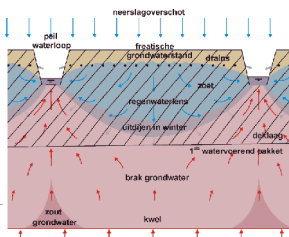


Verhoging grondwaterstand



Daling van het zoet-zout grensvlak

Vergroten/behouden zoetwatervoorraad dunne regenwaterlenzen door slimme diepe drainage



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Installatie The Freshmaker, Zuid-Beveland










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Installatie peilgestuurde drainage en infiltratiesysteem

Serooskerke, Walcheren







CVES



Installatie monitoringssysteem



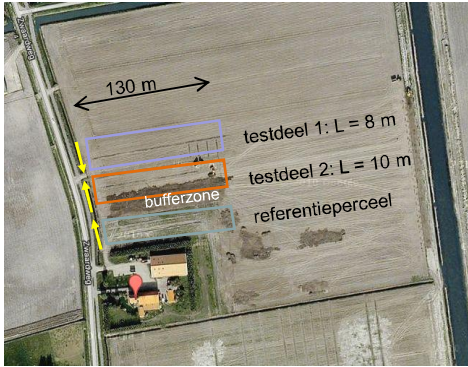
Serooskerke

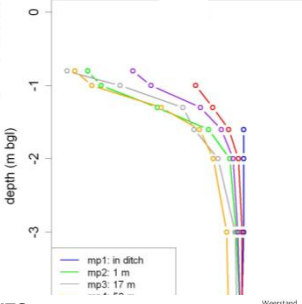
Walcheren

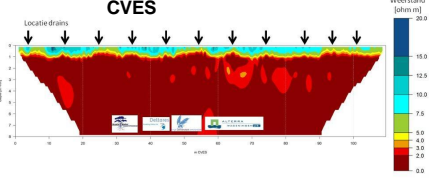


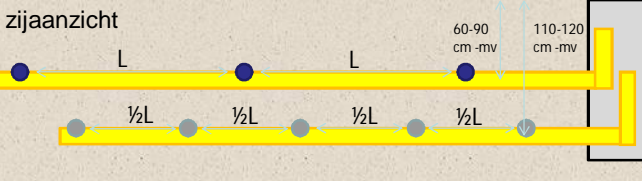


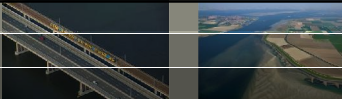

Kerkwerve, Schouwen-Duiveland





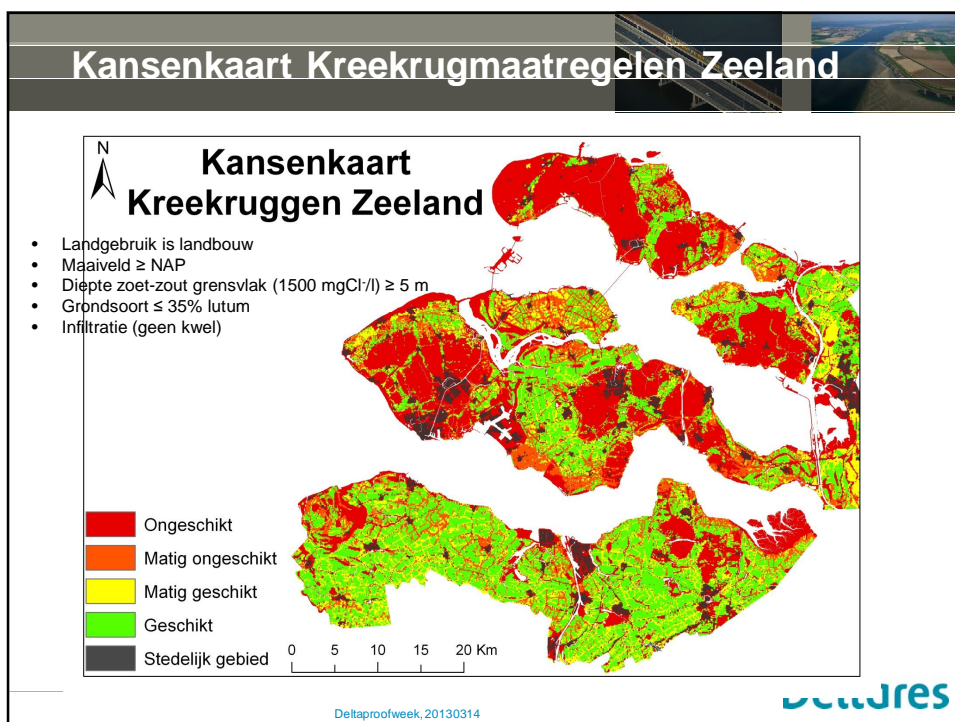


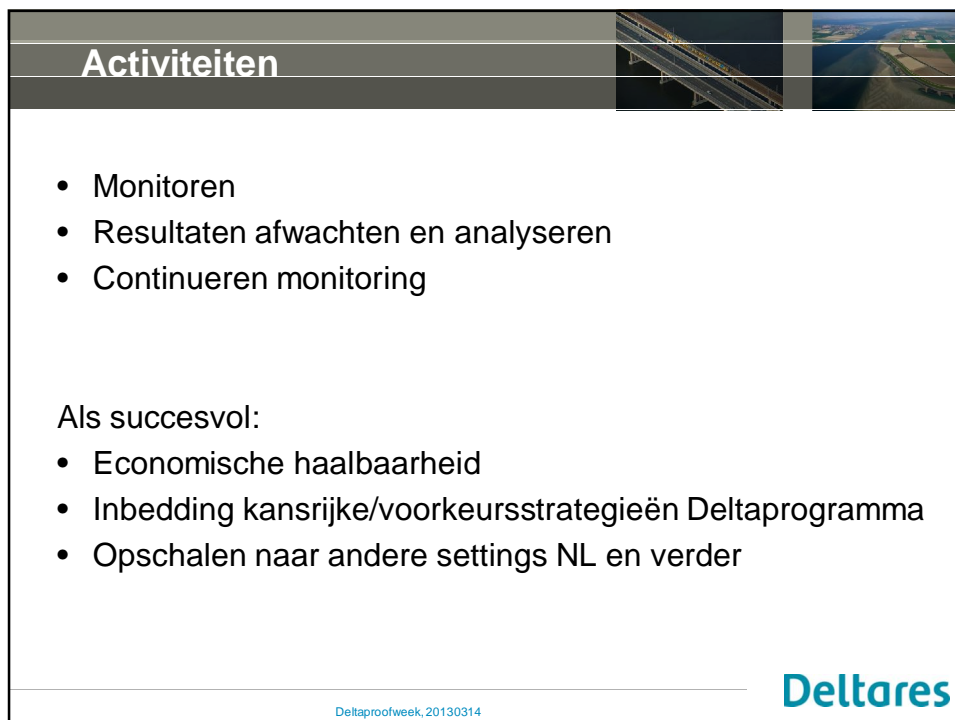
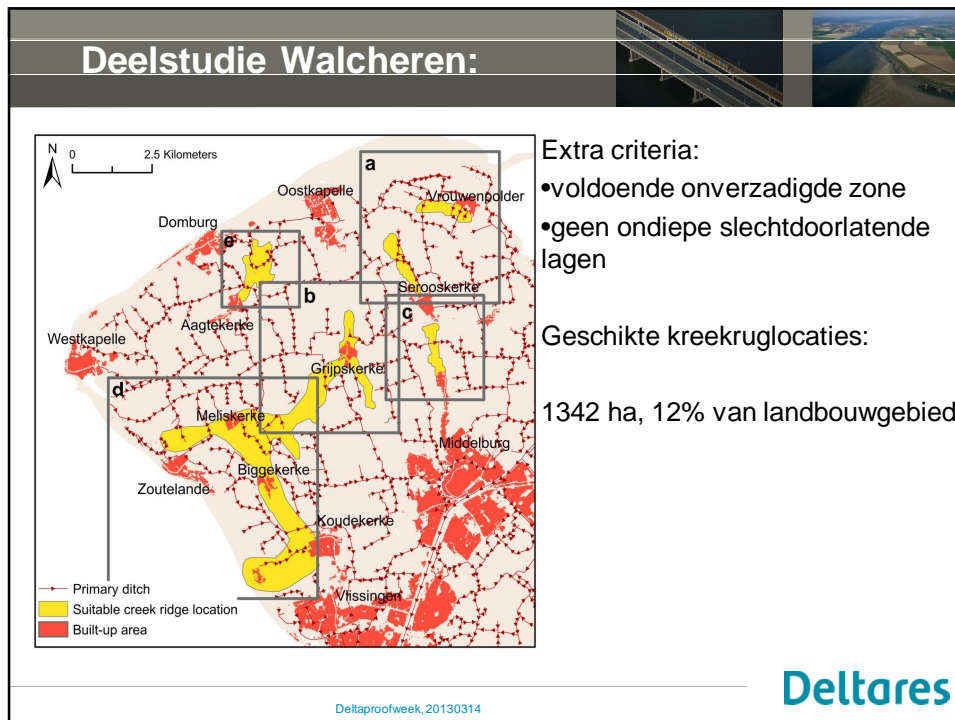


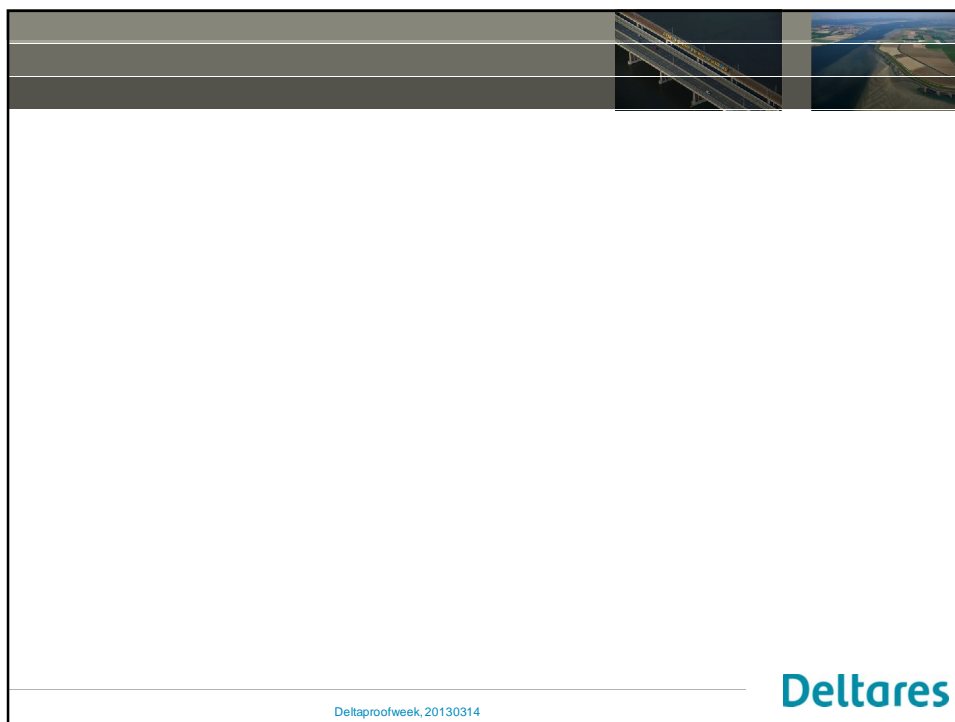
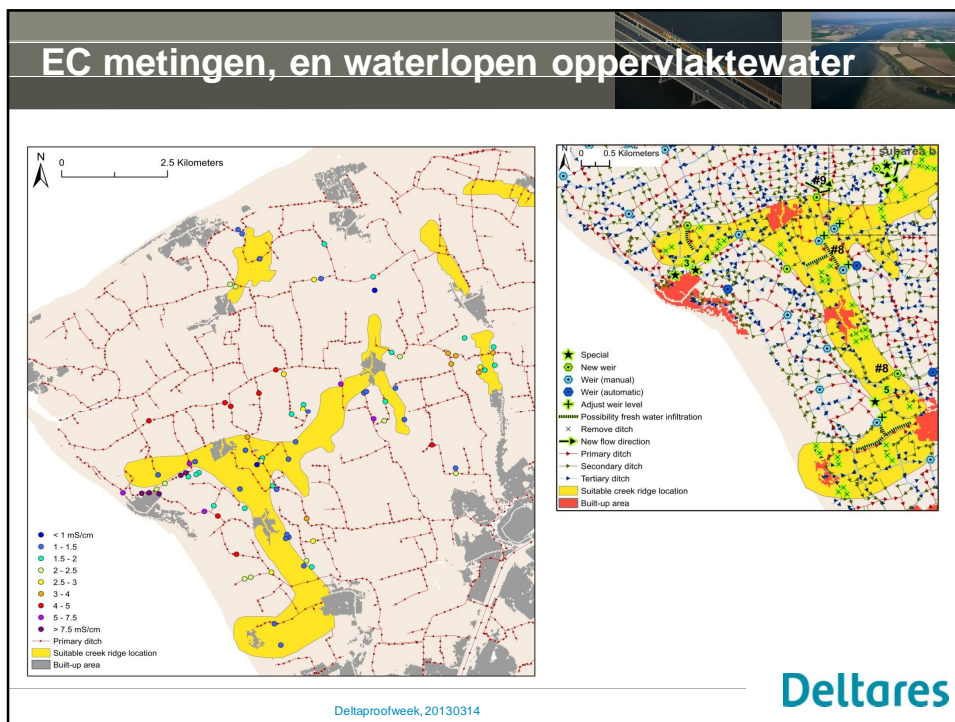


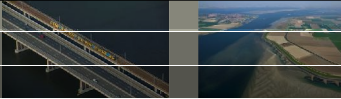
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So: what can we do?

- Delta Program: Adaptive water strategies
- Research programs, e.g. Knowledge for Climate, EU Horizon2020
- Topsector Water, working together: e.g. Living with Salt
- International showcases, Dutch Dialogues

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Delta Program and National Water Plan

Two main goals for water management of our national government:

- To protect The Netherlands from flooding
- To make Fresh Water Supply Climate Change Risk

Assessing the effects of:

- Changing water management (lake, line again, lake higher water level)
- Droughts
- Land subsidence
- Sea level rise and change precipitation pattern
- Coming years: nutrient emissions and pesticide leaching, etc.
- Adaptive and mitigative strategies

Tools: Deltamodel and Netherlands Hydrological modeling Instrument

To implement Delta Program (2015-2050):
>10 billion euro per year

