

**Kim Gommans**

Joachim Rozemeijer

Vince Kaandorp

Stefan Jansen

Niels Mulder

Kevin Ouwerkerk



## **Towards Climate-Resilient Intensive Farming with Minimal Environmental Impact**

Preventing unnecessary losses of fresh water and nutrients at an arable farm in The Netherlands

An aerial photograph of a city, likely Amsterdam, showing a wide river, a bridge with a white arch, and various buildings and green spaces. The image is used as a background for the title slide.

# Deltares

Independent knowledge institute  
for water and the subsurface

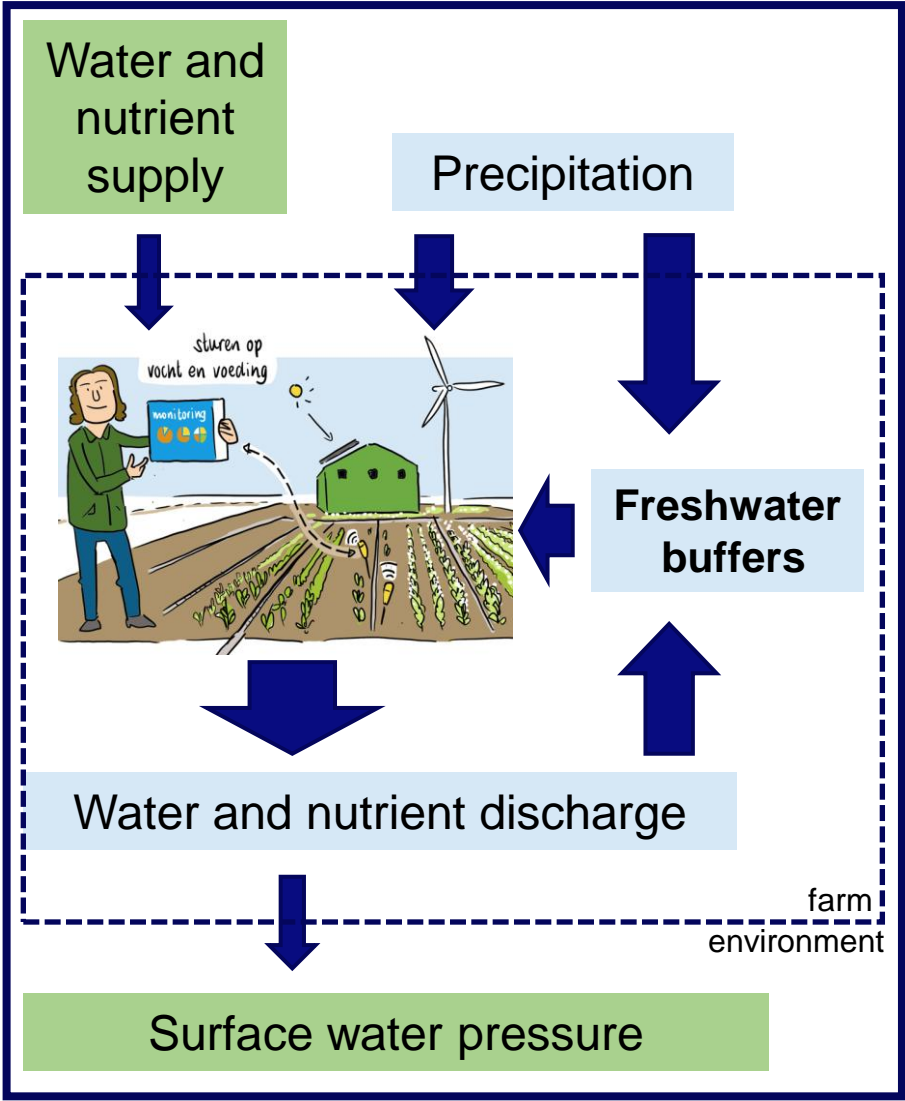
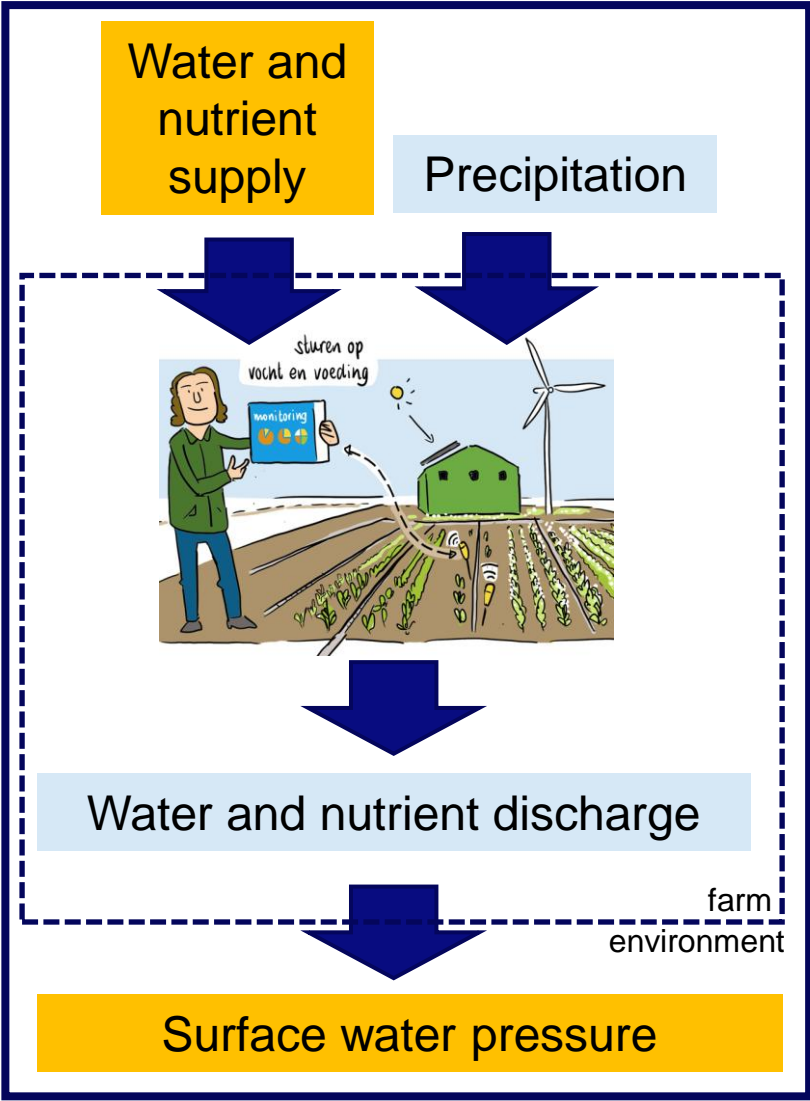


# ZOETWATER BOEREN

*Duurzaam agrarisch waterbeheer*

**'Freshwater farmers'**  
Sustainable agricultural water management

# Main project aim



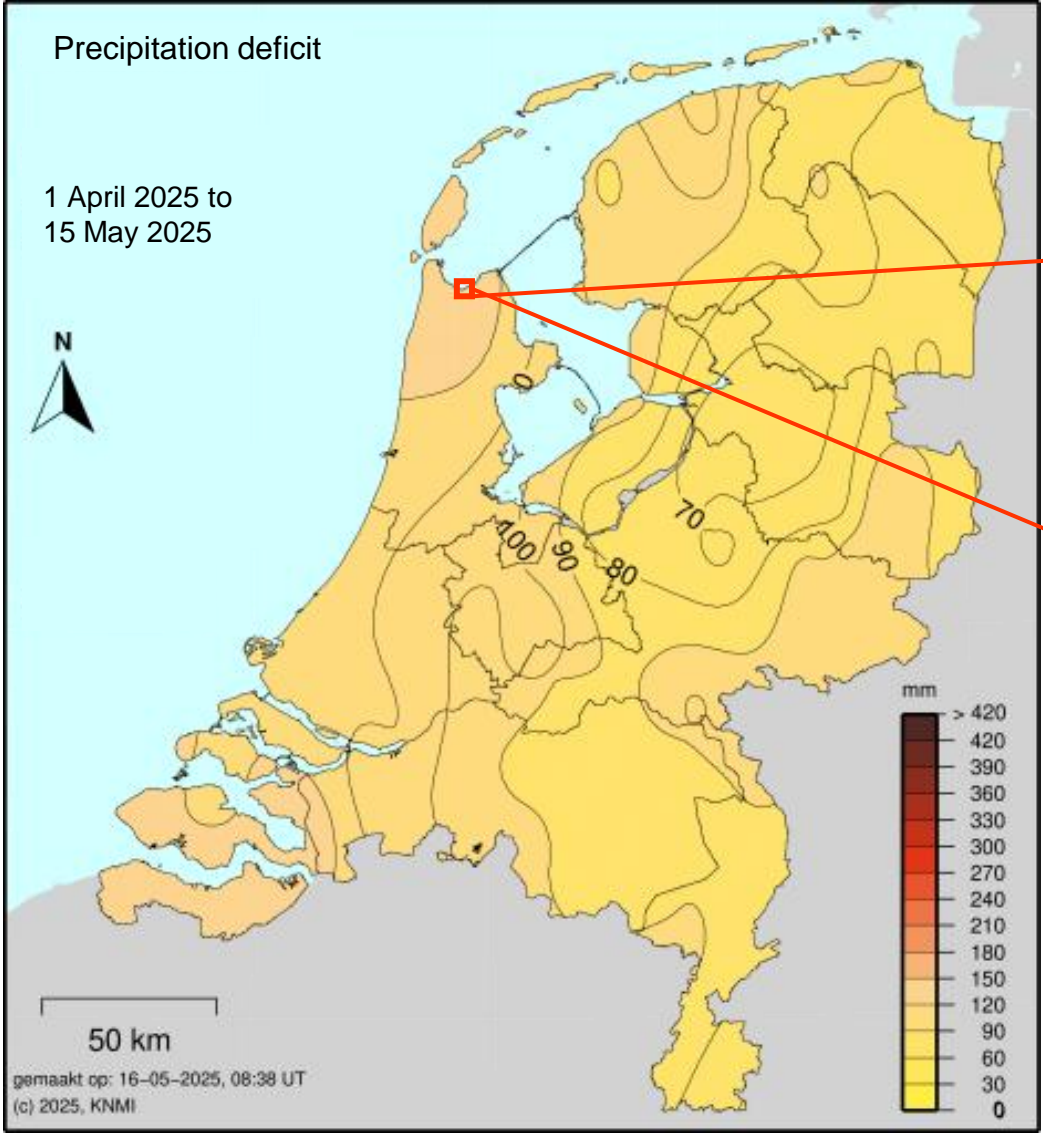
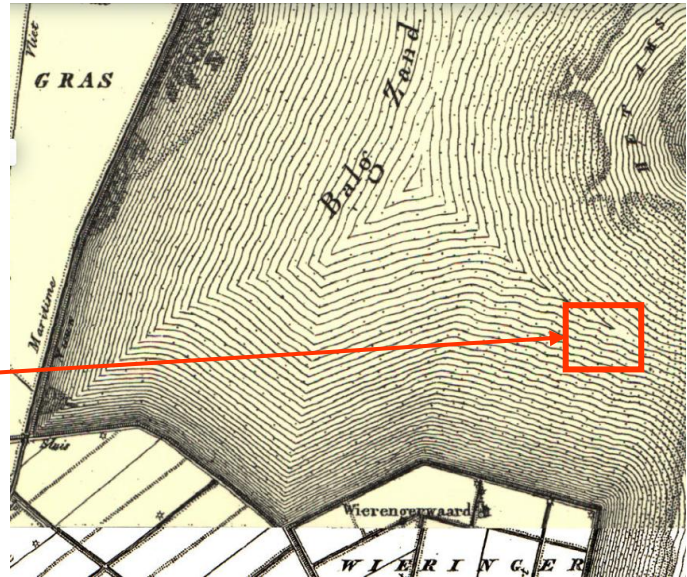
## Content

---

1. **Zooming in to the study area**
2. Water quality measurements
3. The future-proof water system
4. Catching nutrients
5. Conclusion

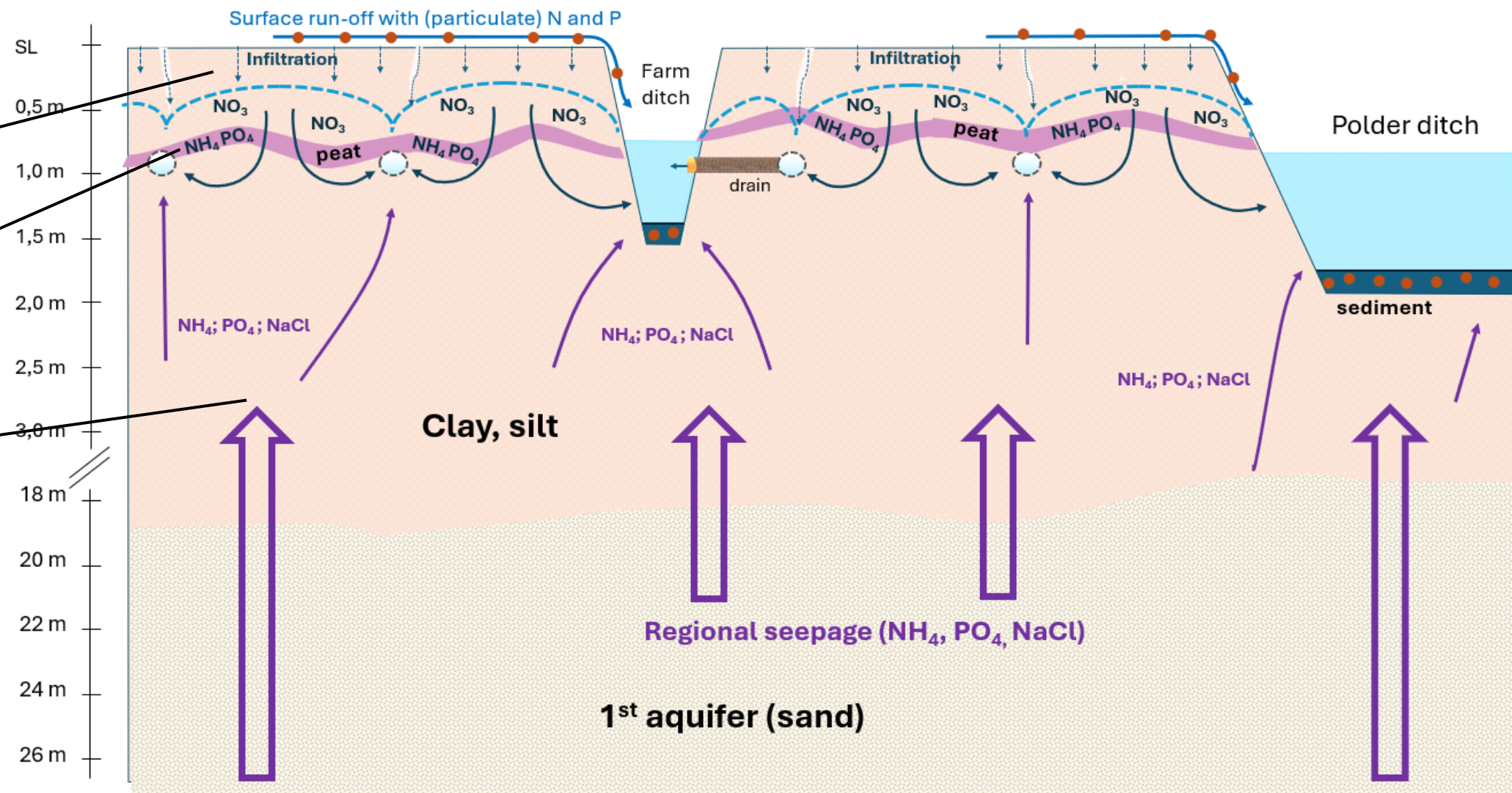
# Study area

1830



2025

# Study area - subsurface



Adapted from Schipper et al., 2022 (STOWA-report 2022-22)

# Hoeve Lotmeer

## Practical farm

- Orange rectangle = nutrient catcher
- Black circle = reservoir
- Red circles = coupled drains
  - Locations of drain samples

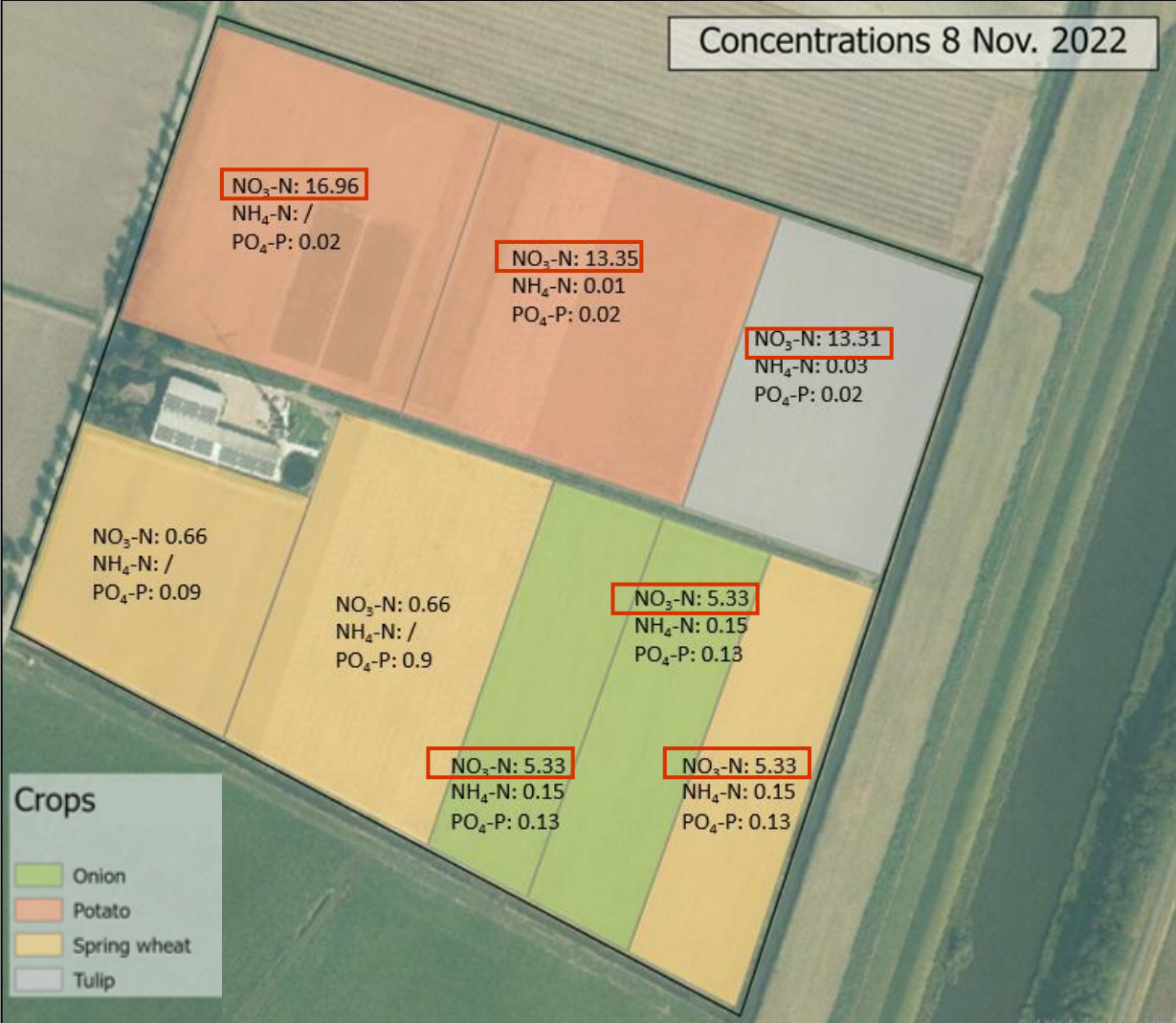


## Content

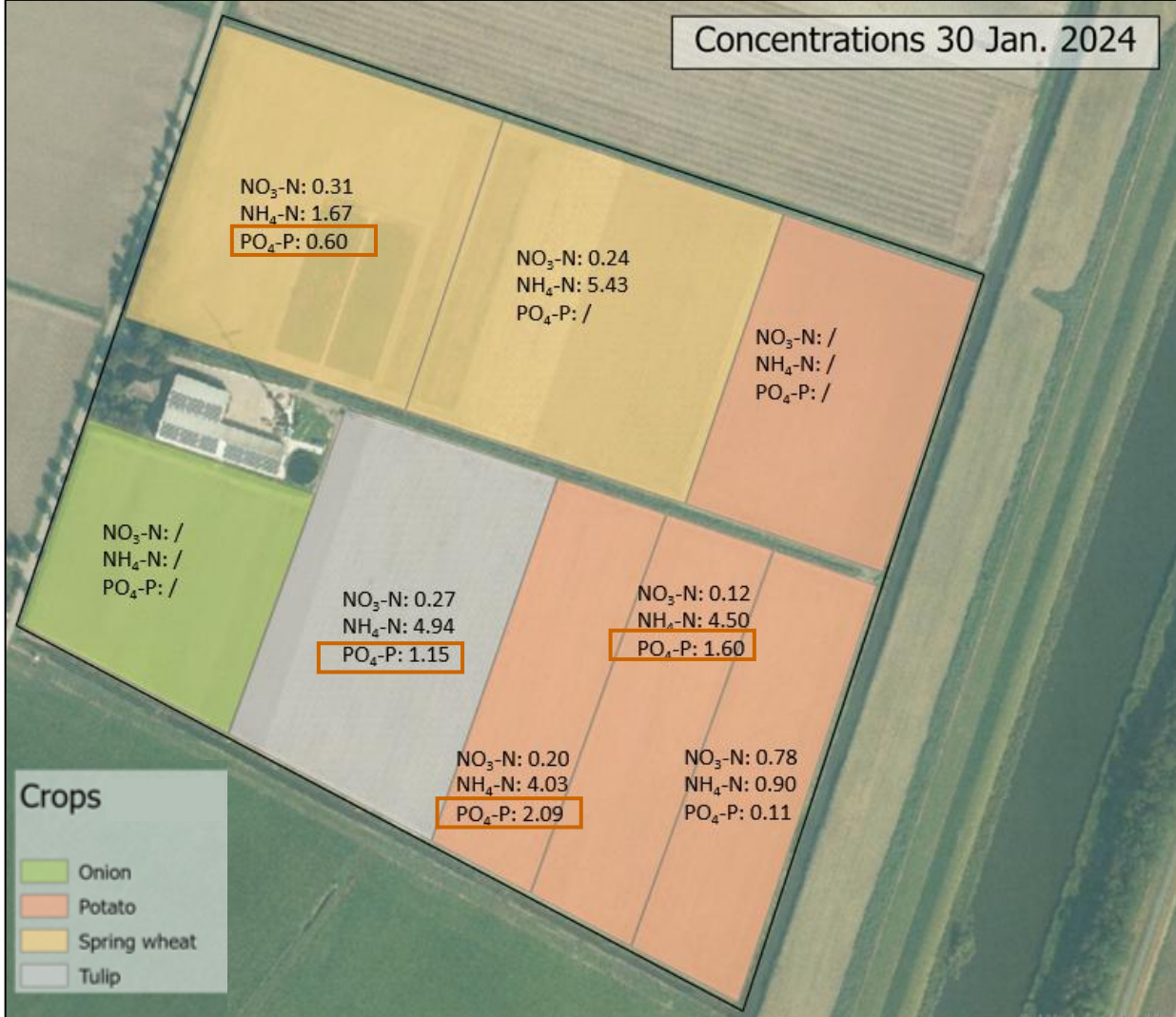
---

1. Zooming in to the study area
2. **Water quality measurements**
3. The future-proof water system
4. Catching nutrients
5. Conclusion

# Nutrient concentrations – Drain water

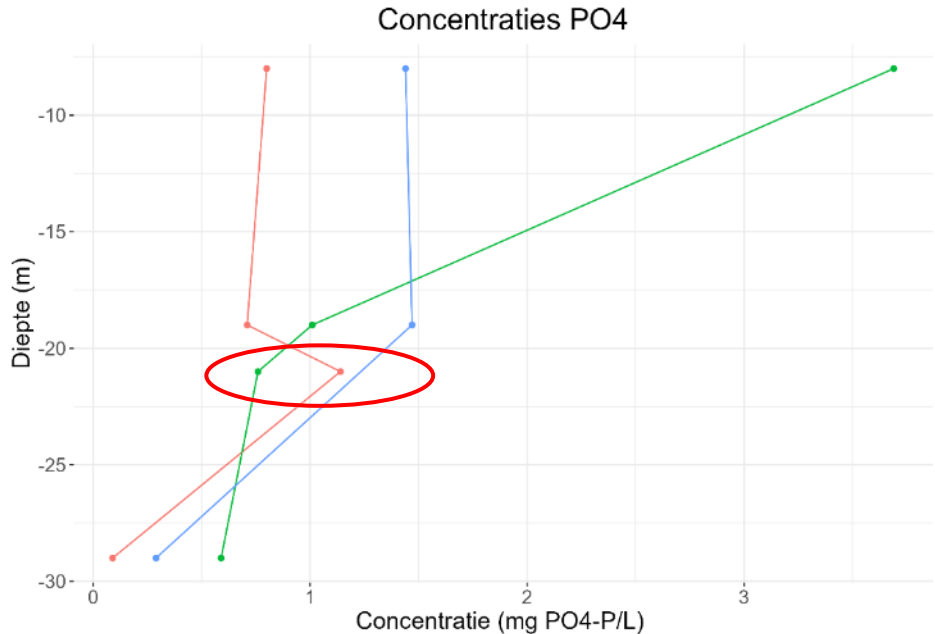
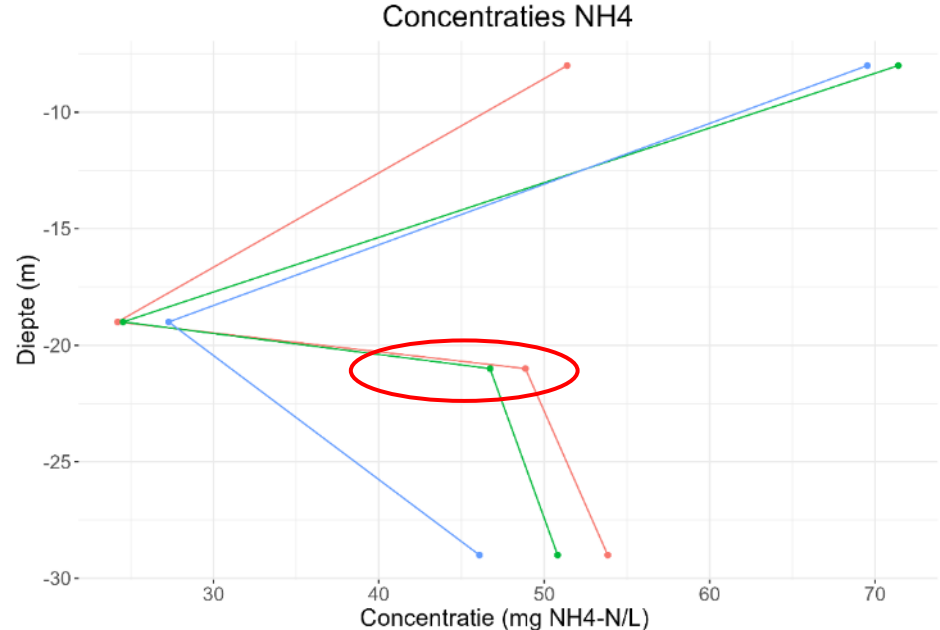
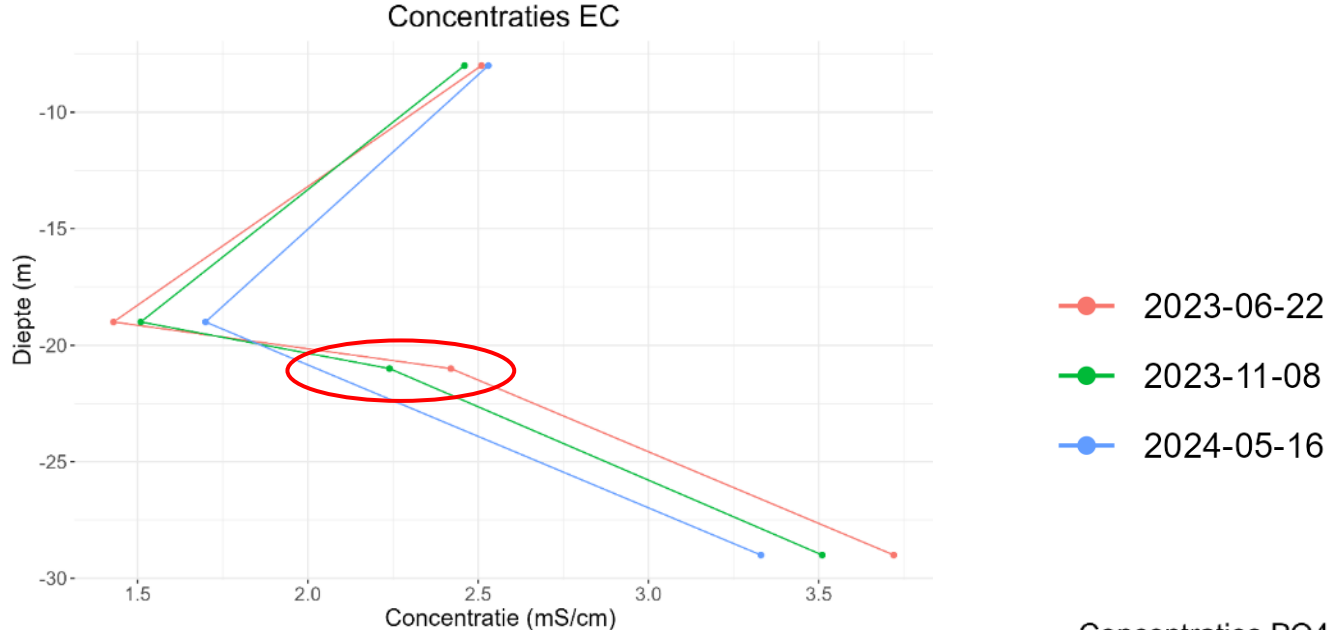


Just after a rainfall event; high NO3-N



After growing season; high P

# Nutrient concentrations – Groundwater

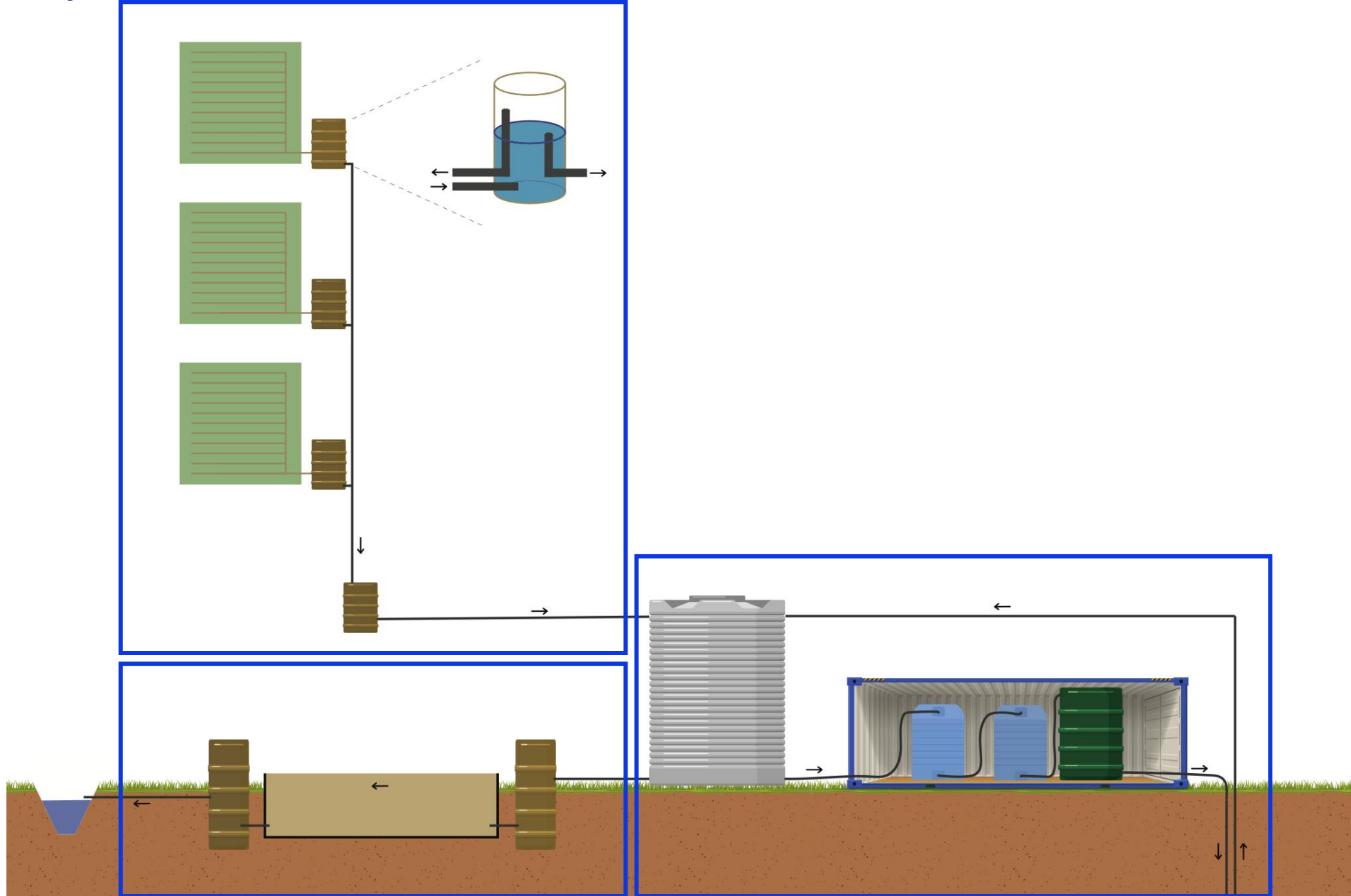


## Content

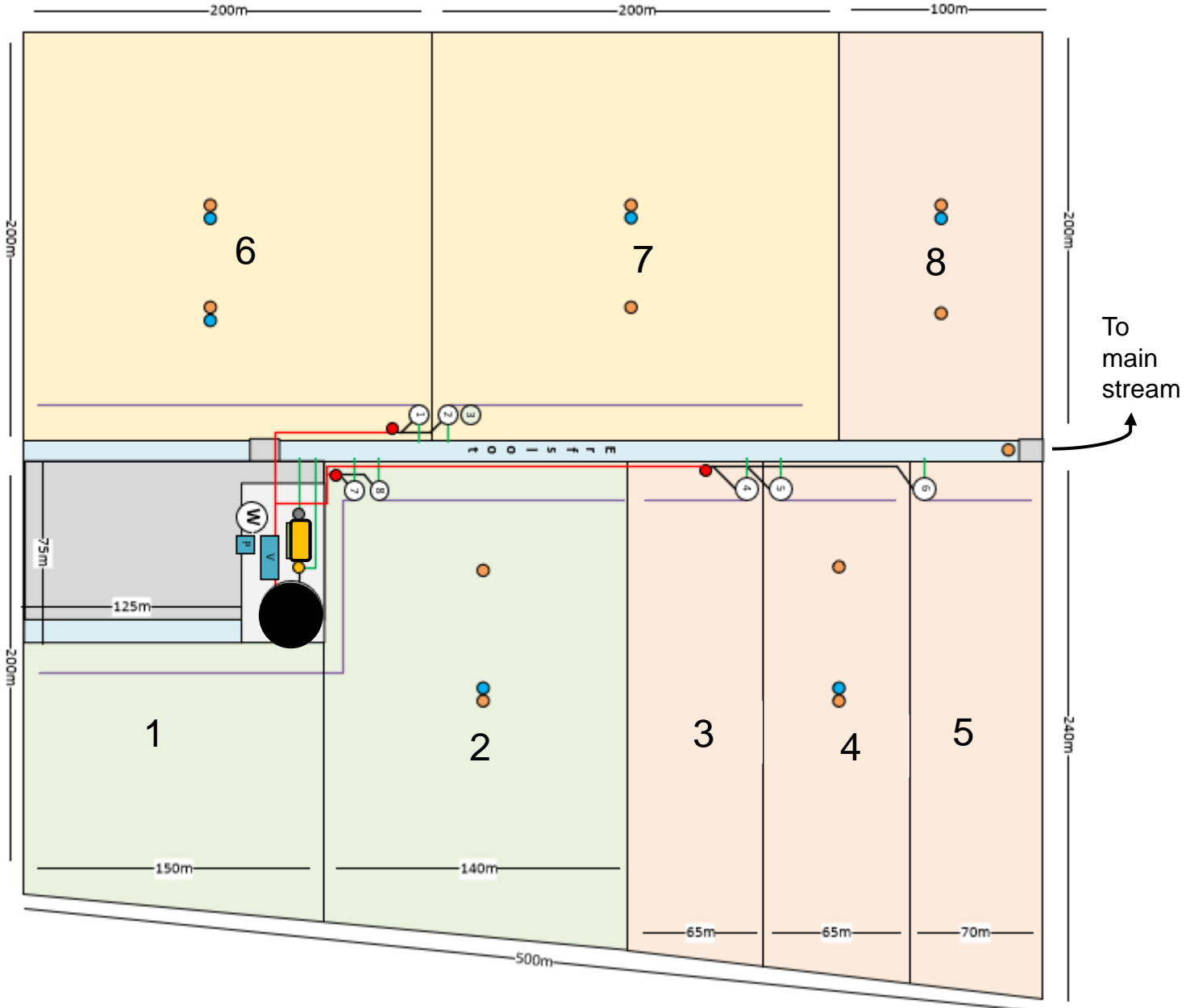
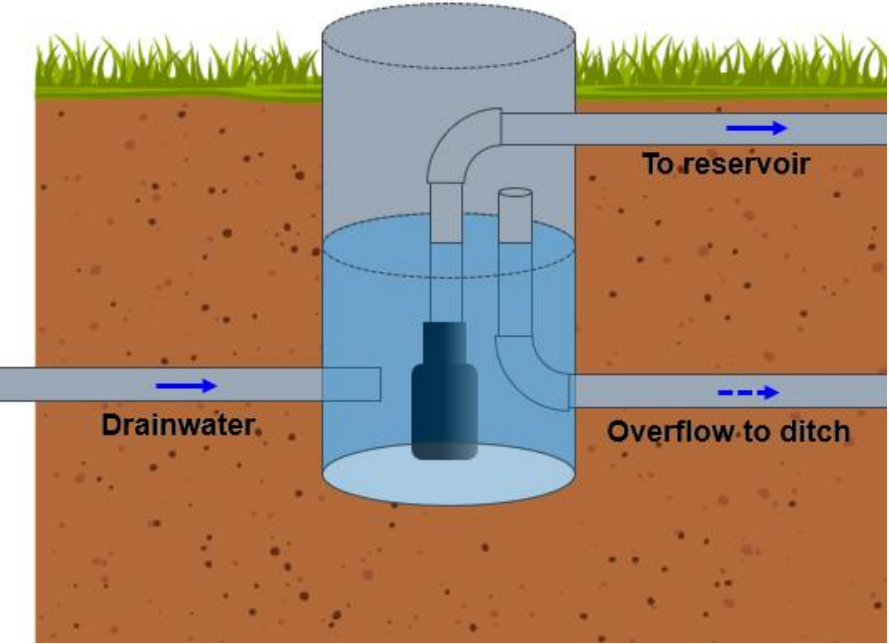
---

1. Zooming in to the study area
2. Water quality measurements
- 3. The future-proof water system**
4. Catching nutrients
5. Conclusion

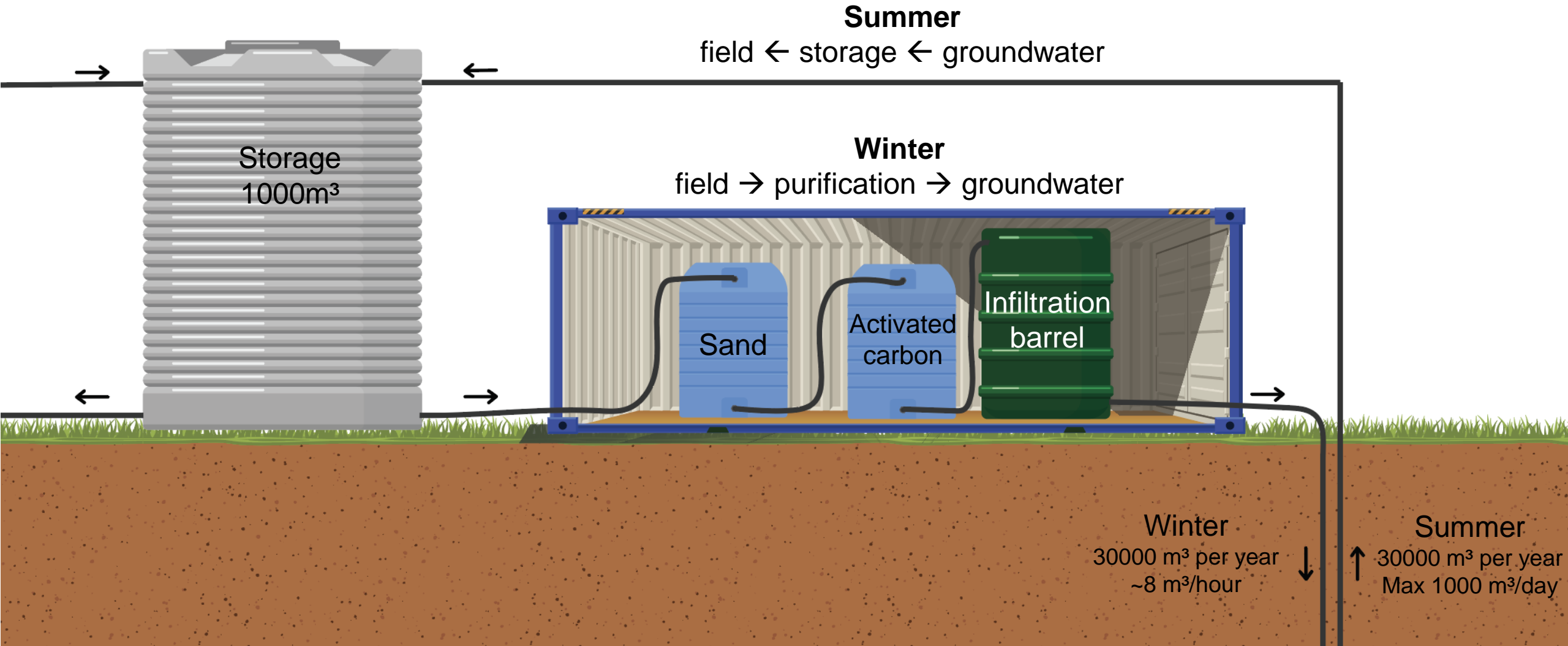
# Water system at Hoeve Lotmeer



# 'Harvesting' water



# Water purification

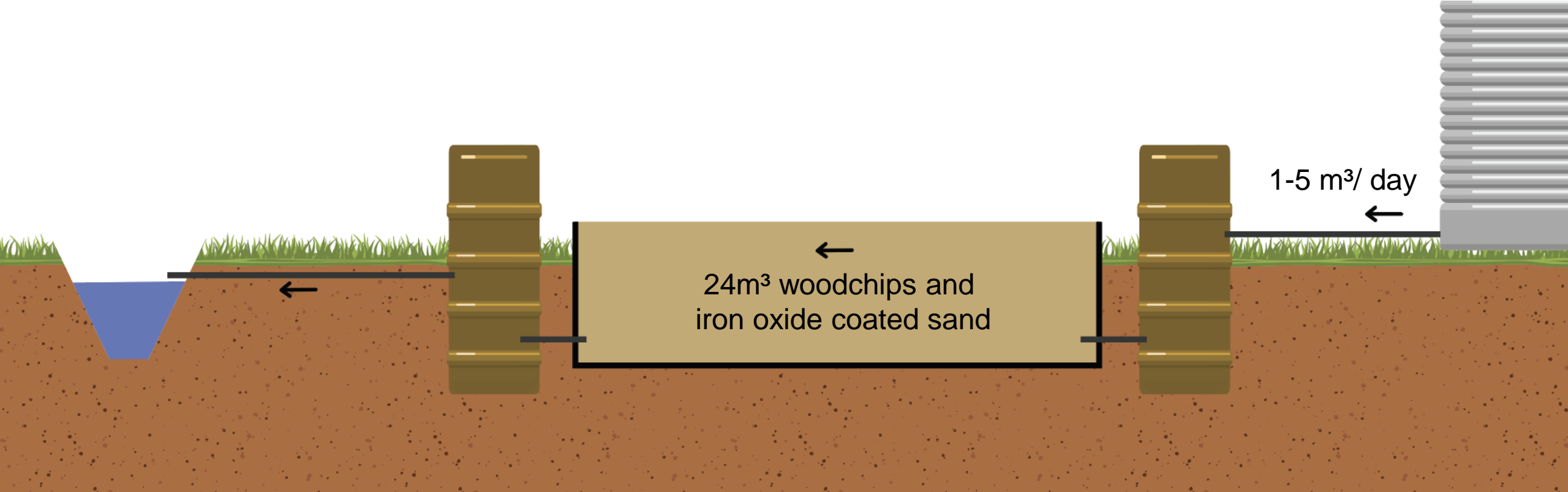


## Content

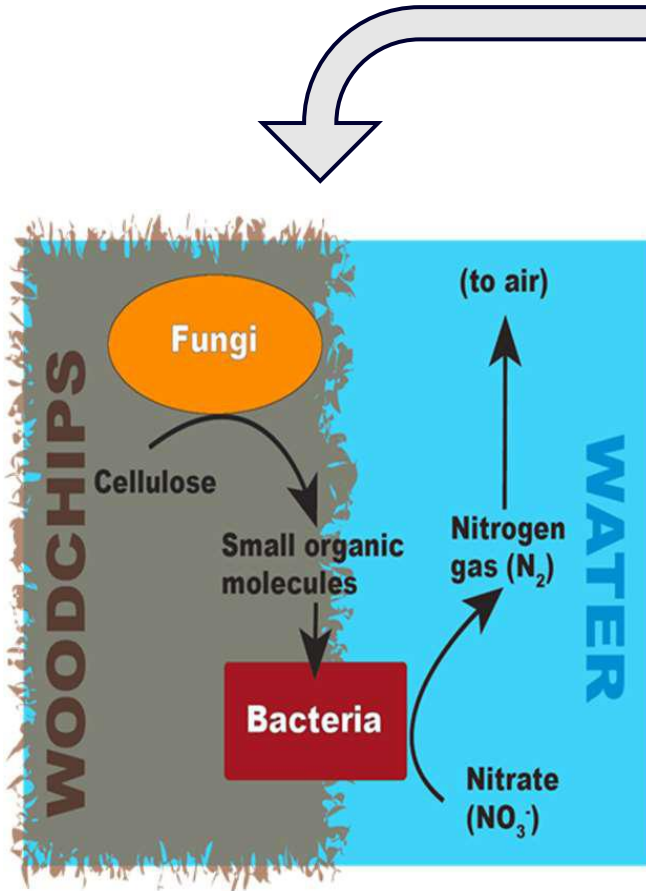
---

1. Zooming in to the study area
2. Water quality measurements
3. The future-proof water system
- 4. Catching nutrients**
5. Conclusion

# Nutrient Catcher



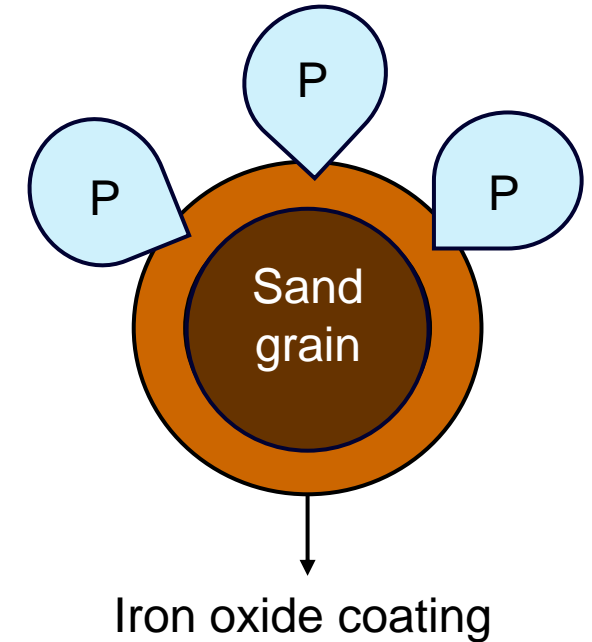
# The principle



University of Illinois



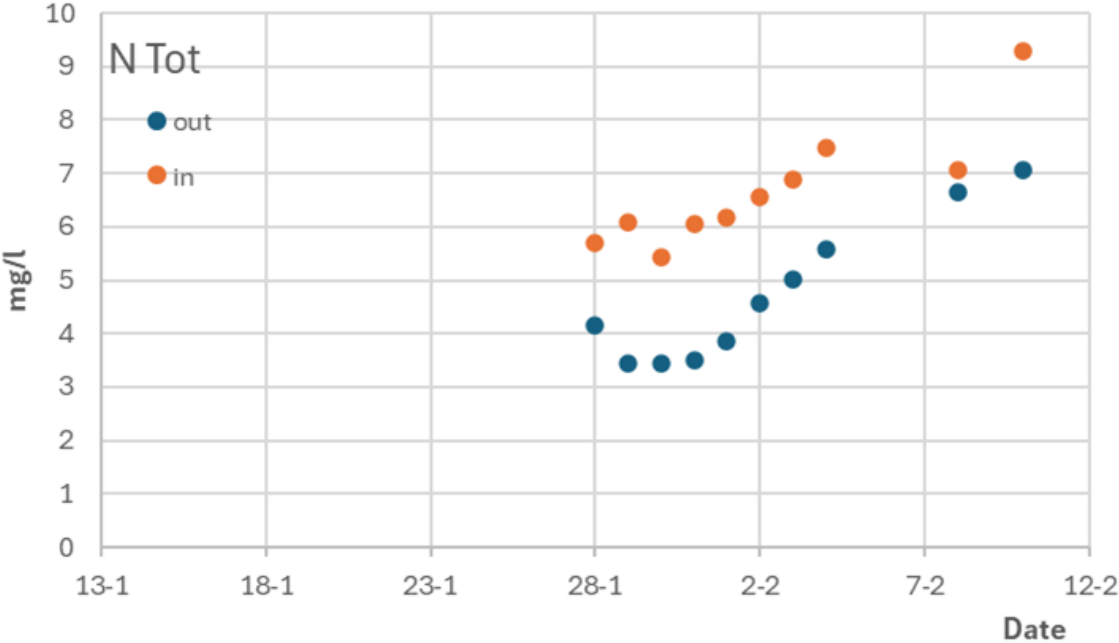
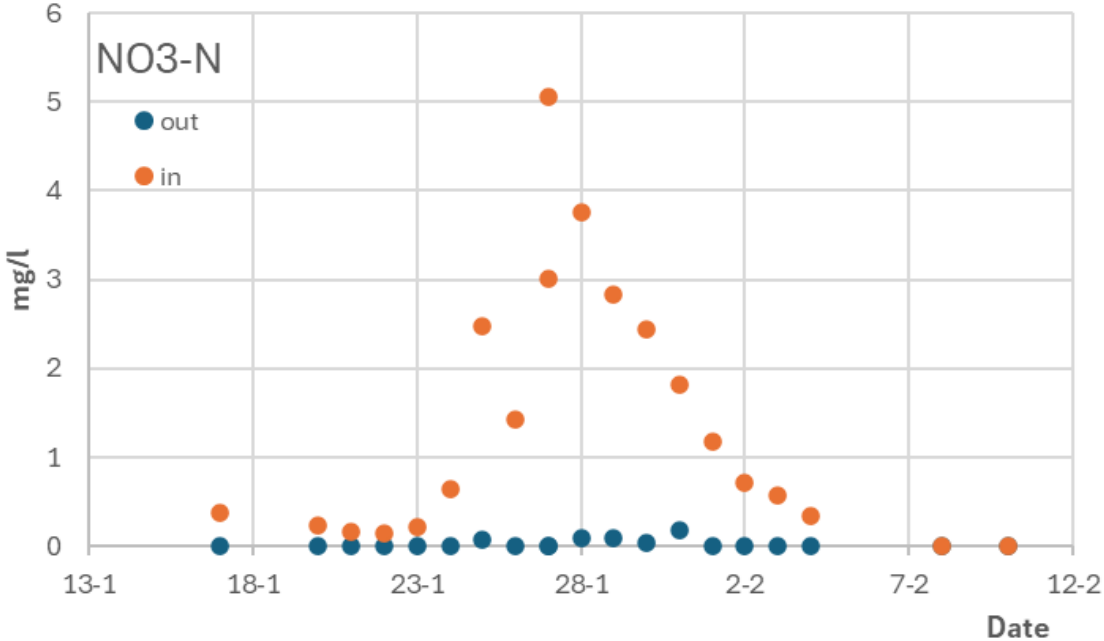
- Mixture of woodchips and iron coated sand
- **Woodchips:** denitrification of nitrate
  - **Iron oxide coated sand:** removal of phosphate + buffer redox potential (no sulfide formation)



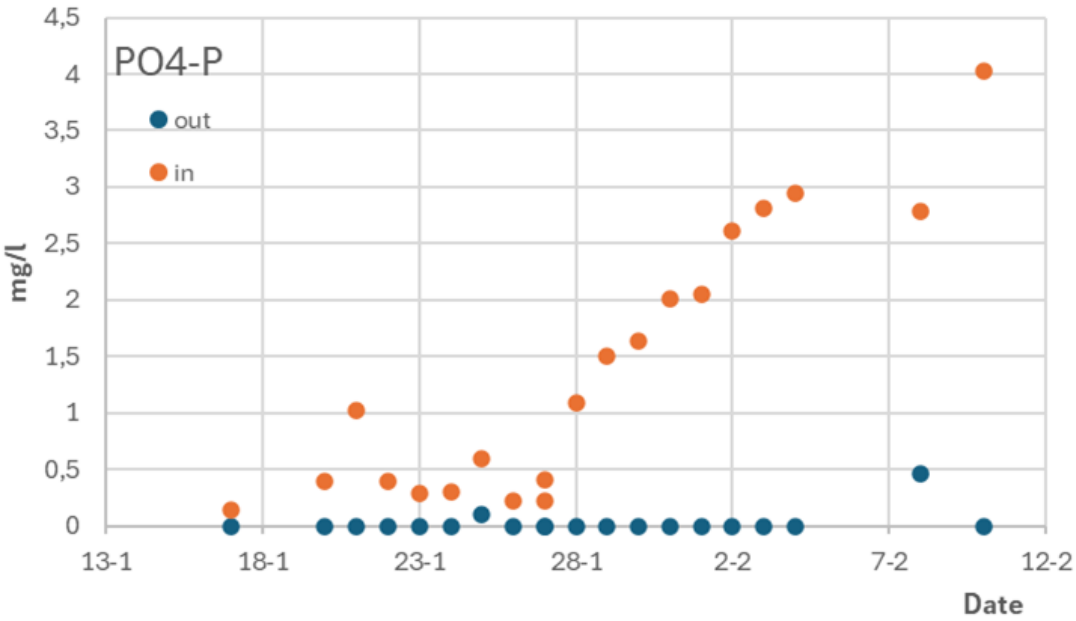
# First results (preliminary) - N



Deltares AQUALITY App



# First results (preliminary) - P



## Content

---

1. Zooming in to the study area
2. Water quality measurements
3. The future-proof water system
4. Catching nutrients
5. **Conclusion**

# Conclusions

- Freshwater buffer can be increased by storage in several parts of the system (drains, reservoir, subsurface)
- Different techniques can prevent deterioration of groundwater quality (during infiltration) and remove nutrients from leftover water
- Practical demonstration provides both scientific and practical understanding, making it easier to tackle problems/impracticalities



*Klaas: 'I don't mind if this drought continues, that way my neighbours can finally see why I'm taking these measures'*



# Thank you!

*Researchers? They are just here to play with me.. right?*



**Kim Gommans**

Kim.Gommans@deltares.nl

+31625305207



[www.deltares.nl](http://www.deltares.nl)



[info@deltares.nl](mailto:info@deltares.nl)



[linkedin.com  
/company  
/deltares](https://www.linkedin.com/company/deltares)



[@deltares](https://www.instagram.com/deltares)



[facebook.com  
/deltaresNL](https://www.facebook.com/deltaresNL)