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Environmental Impact Assessment (EIA) of effluents from Constructed Wetlands on water quality of receiving watercourses

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Problem statement

In Flanders Belgium

- Intensive animal farming
- Manure Surplus
- Contamination and eutrophication

Manure processing

- Obligation!

Strict limits

- Nitrates Directive
- Water Framework Directive

AIM

- EIA methodology to evaluate effluents from CW treating animal manure

Materials and Methods

- **Study area**: CW Langemark, Belgium.
  - Capacity 5.000-7.500 m^3 of pig manure per year.
- **Physico-chemical variables under study:** Total P, Total N, Cl^-, SO_4^{2-}
- **Impact assessment methodology**
  - Increase on variables' concentration downstream compared with upstream water quality.

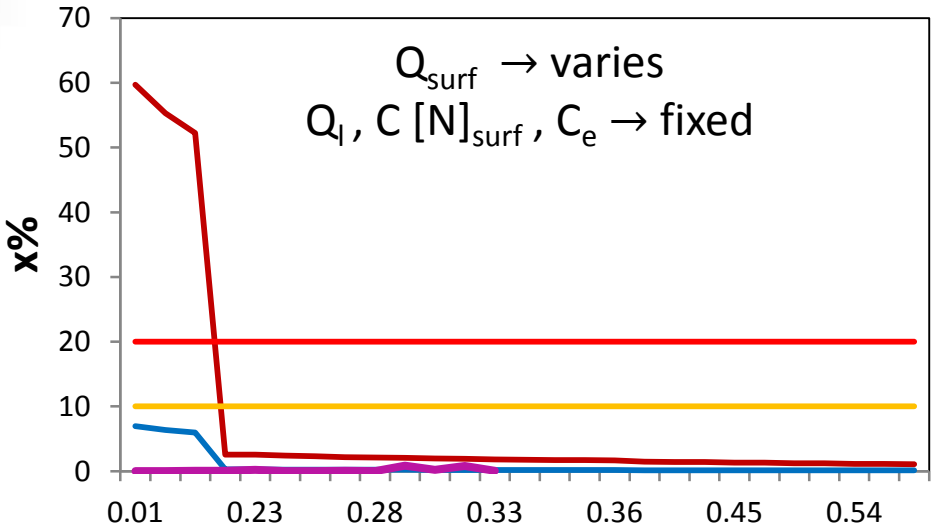
Water quality upstream vs. environmental quality standard

Total concentration rise of discharges vs. environmental quality standard

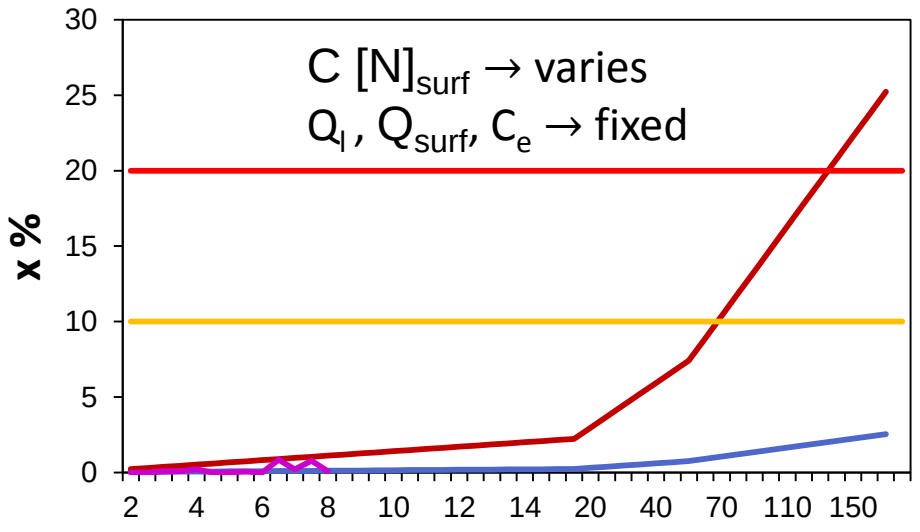
	1 % < X < 10%	10 % < X < 20%	X > 20%
Y < 50%	Limited impact	Limited impact	Relevant impact
50% < Y < 75%	Limited Impact	Relevant impact	Significant impact
Y > 75%	Relevant impact	Significant impact	Significant impact

Table 1: Impact assessment framework

Results and Discussion



Impact with varying flow of the receiving waterway



Impact with varying N conc. in discharge effluent

- Average Case Scenario
- Worst Case Scenario
- Real Case Scenario
- x = 10% Total conc. rise vs. environmental quality standard
- x = 20% Total conc. rise vs. environmental quality standard

Discharged effluent

- Waterway quality profile
- Physico-chemical composition

Surface flow

- Evaporation
- Evapotranspiration
- Droughts
- Flooding

Conclusions

- Real case impact assessment determines the CW efficiency and the effluent impacts on the receiving watercourse.
- A standardized methodology for impact assessment could suggest allowable limits based on scientific evaluation, practical data and arguments. Less restrictions to livestock practices.
- Appropriate threshold values based on individual design and location of the CWs.

Thanks for your attention!

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