

**The Conference of Environmental  
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# **Treatment of storm water from agricultural catchment in pilot scale constructed wetland**

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Constructed wetlands as a wastewater treatment system

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Study site in Zalenieki county, Latvia

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Nutrient, TSS, BOD and COD removal in a study site

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Possibilities to adapt the treatment method to improve water quality from various sources




01

Introduction



# Constructed wetlands in Latvia

- ✓ Implemented to improve water quality from various pollution sources
  - ✓ Water quality parameters as TN, NO<sub>3</sub>-N, NH<sub>4</sub>-N, TP, PO<sub>4</sub>-P and TSS monitored since year 2014.
  - ✓ The research expanded on BOD and COD concentrations since year 2019.
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# A horizontal subsurface flow constructed wetland



# Schematic drawing of the storm water treatment system at the Mezaciruli farm

## Storage basin

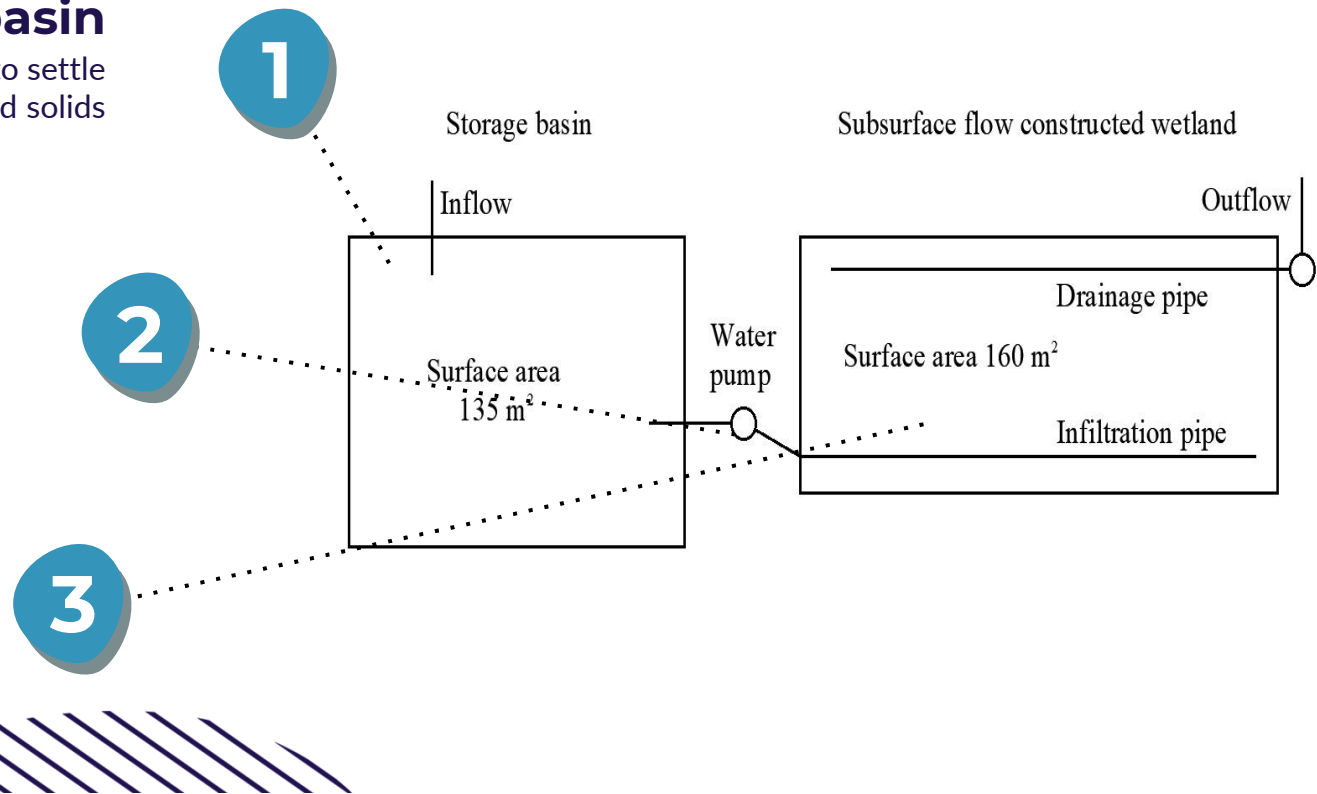
Made as an open basin to settle suspended solids

## Water pump

Provides periodical water release to the constructed wetland

## Constructed wetland

Filter bed filled with layers of coarse sand and gravel. Common reeds planted from above.







A storm water treatment system with horizontal subsurface slow constructed wetland at the Mezaciruli farm.

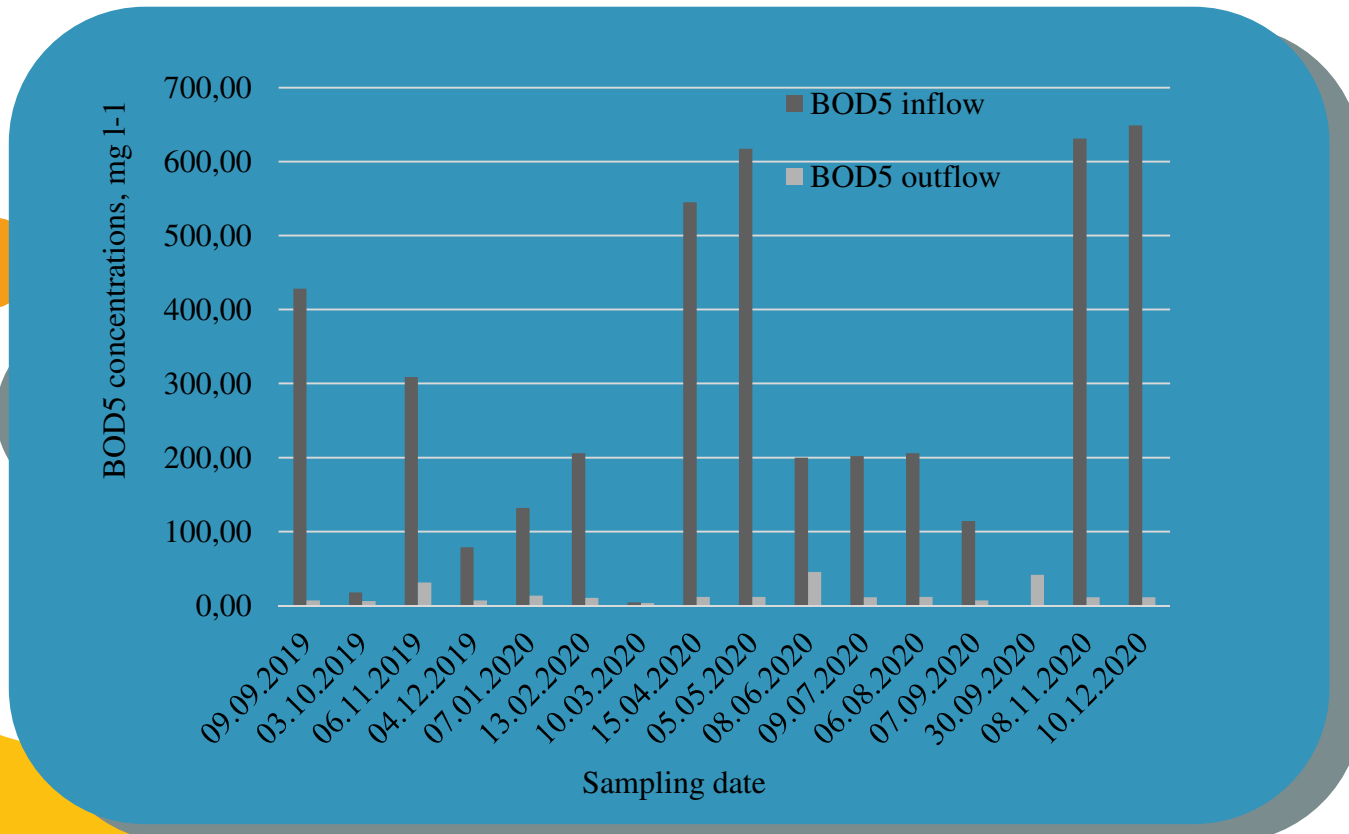
# Nutrient reduction

03

Results

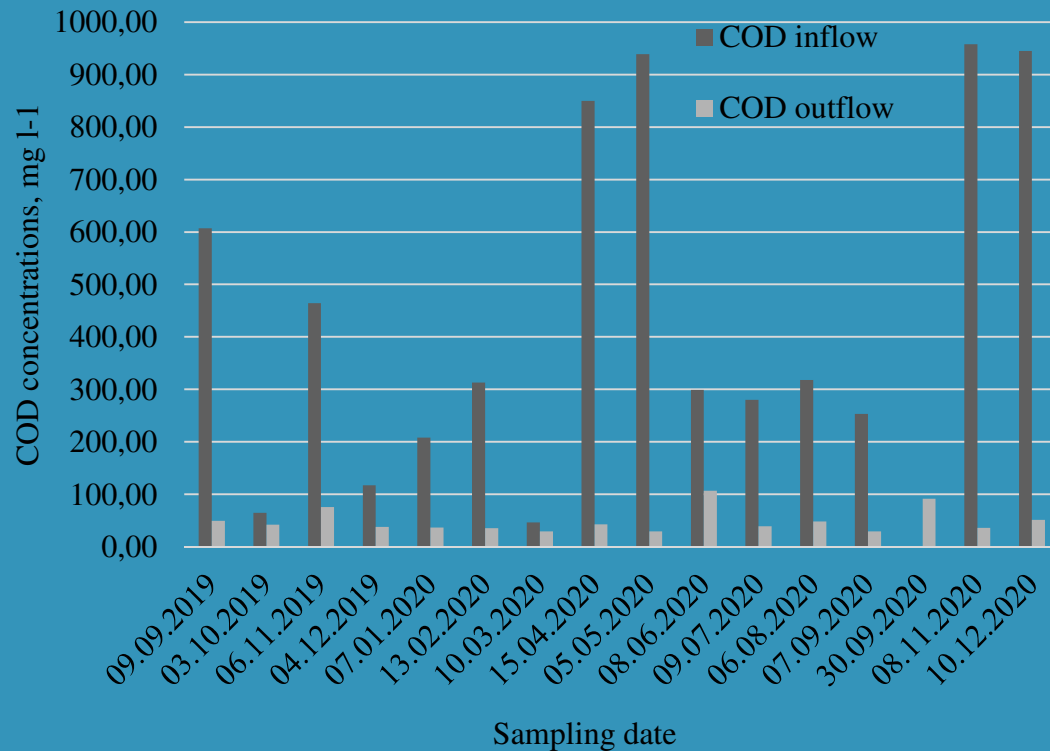
Water quality parameters	Average concentrations at the inflow	Average concentrations at the outflow	Reduction, %
NH <sub>4</sub> -N	7.19	2.30	<b>-68</b>
NO <sub>3</sub> -N	2.94	2.43	<b>-17</b>
TN	15.21	6.82	<b>-55</b>
PO <sub>4</sub> -P	5.66	1.22	<b>-78</b>
TP	6.90	1.39	<b>-80</b>
TSS	93.82	39.89	<b>-57</b>

# The concentrations ( $\text{mg l}^{-1}$ ) of $\text{BOD}_5$ at the inflow and outflow

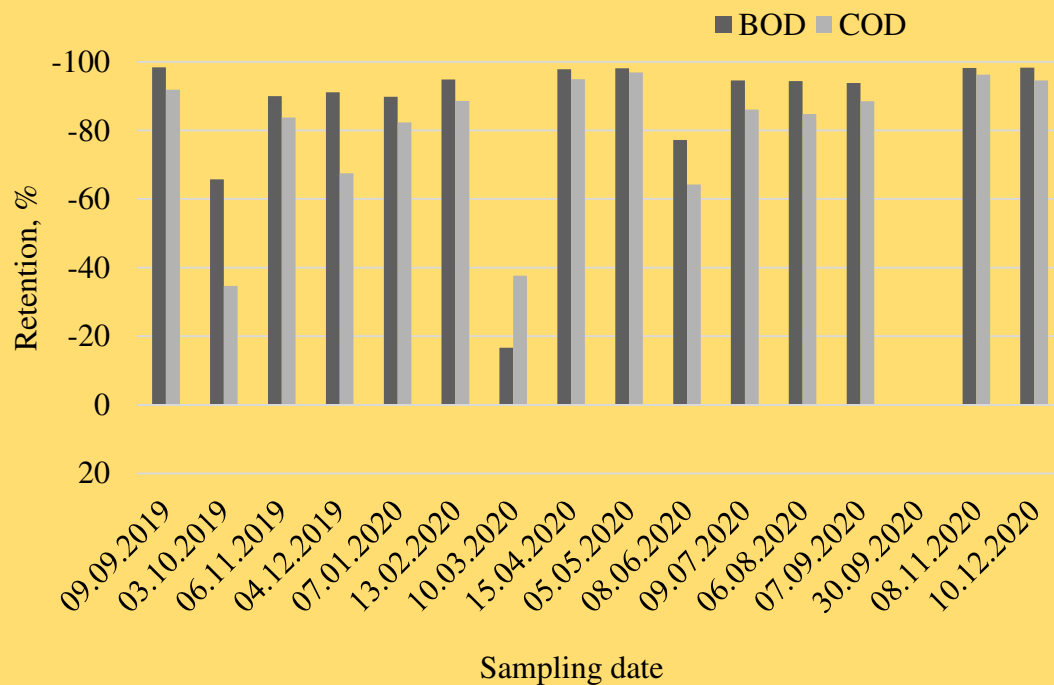




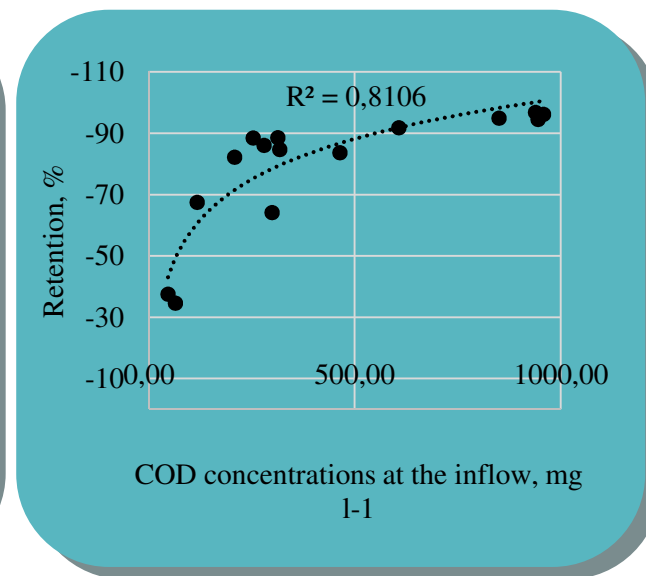
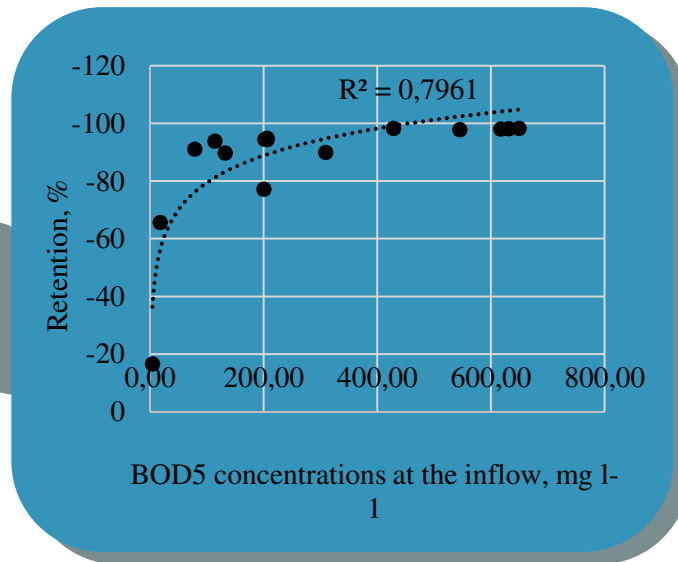
# The concentrations (mg l<sup>-1</sup>) of COD at the inflow and outflow



# The retention (%) of BOD<sub>5</sub> and COD



# The correlation between retention, % and inflow concentrations, mg l<sup>-1</sup> for BOD<sub>5</sub> and COD



# Conclusions

04

Further research

**Future**

- The nitrogen compound concentrations in forms of  $\text{NO}_3\text{-N}$ ,  $\text{NH}_4\text{-N}$  and TN were decreased on average by 17%, 68% and 55%, respectively.
- $\text{PO}_4\text{-P}$  and TP concentrations were reduced during the treatment process with the average retention of 78 % and 80 %, respectively.
- Total suspended solids were reduced on average by 57 %.
- The concentrations of  $\text{BOD}_5$  and COD were reduced on average by 93% and 83%, respectively.
- Potential to adapt the monitored biological treatment method to improve water quality from various sources



# THANKS!



Do you have any questions?

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