



OPTAIN

OPTimal strategies to retAIN and re-use water and nutrients in small agricultural catchments across different soil-climatic regions in Europe

Čechtický stream catchment - Czechia

30/04/2024

Veronika Čápková



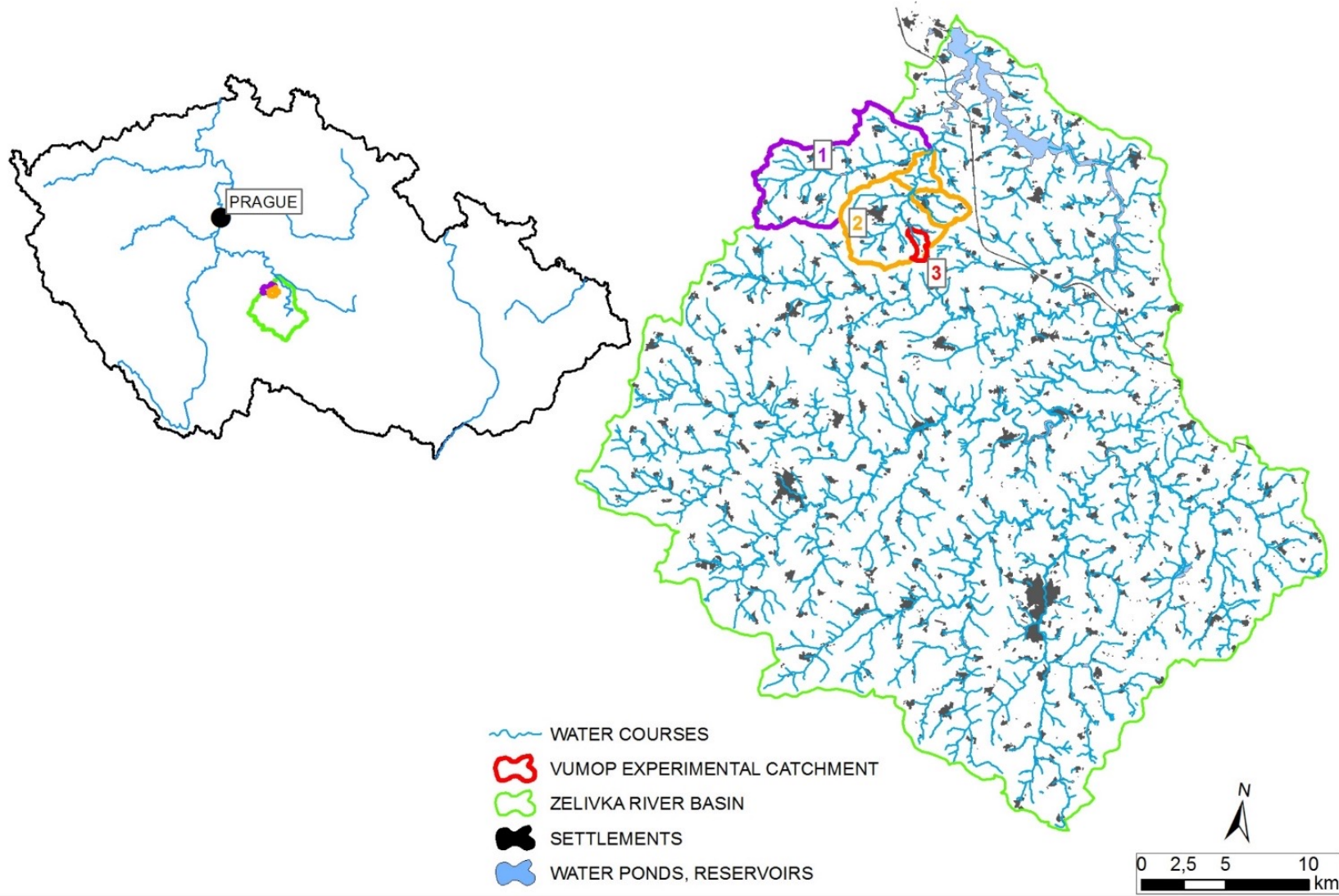
This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 862756.



**Research Institute for Soil
and Water Conservation**

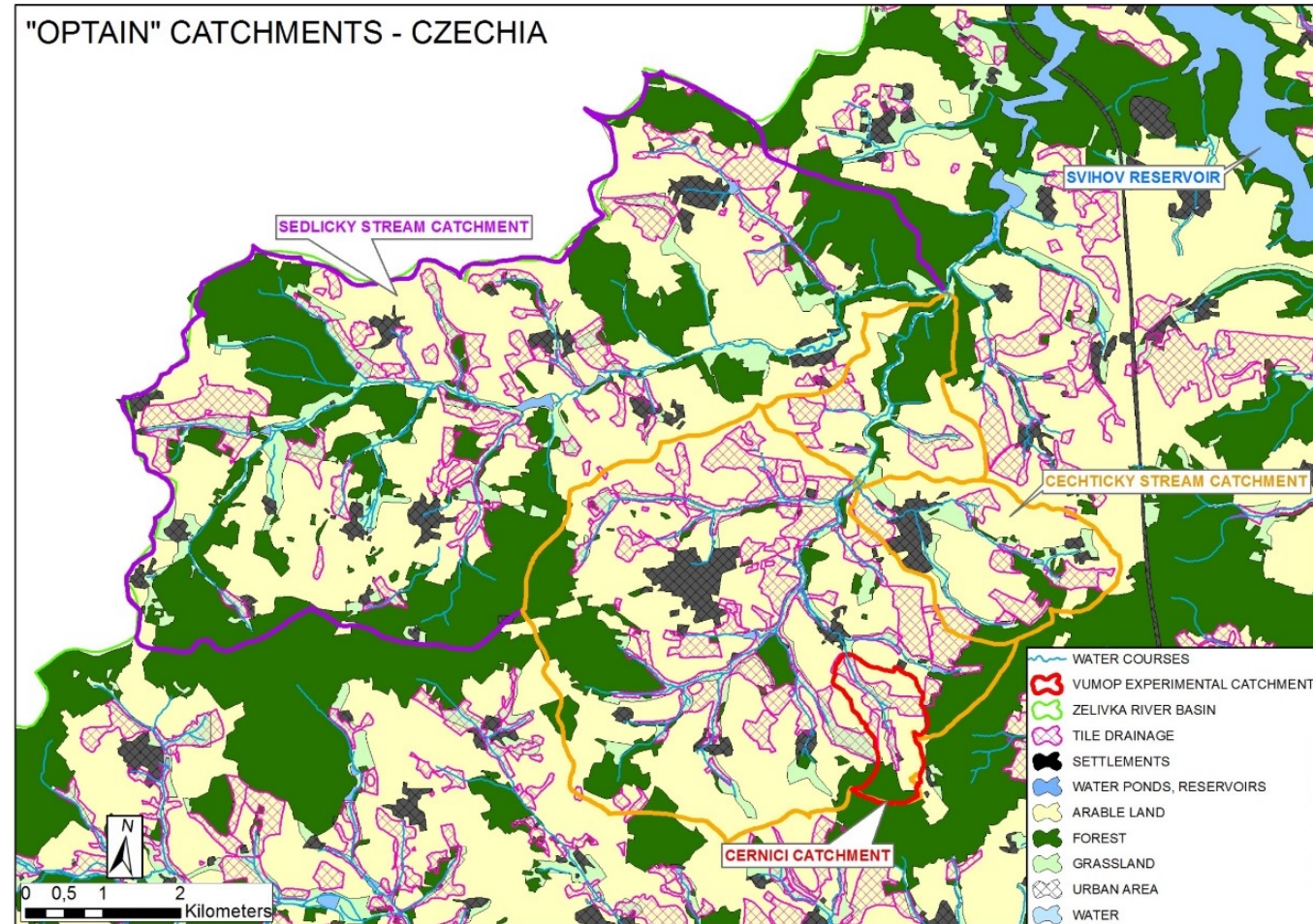
Čečtický stream catchment – Czechia

"OPTAIN" CATCHMENTS - CZECHIA



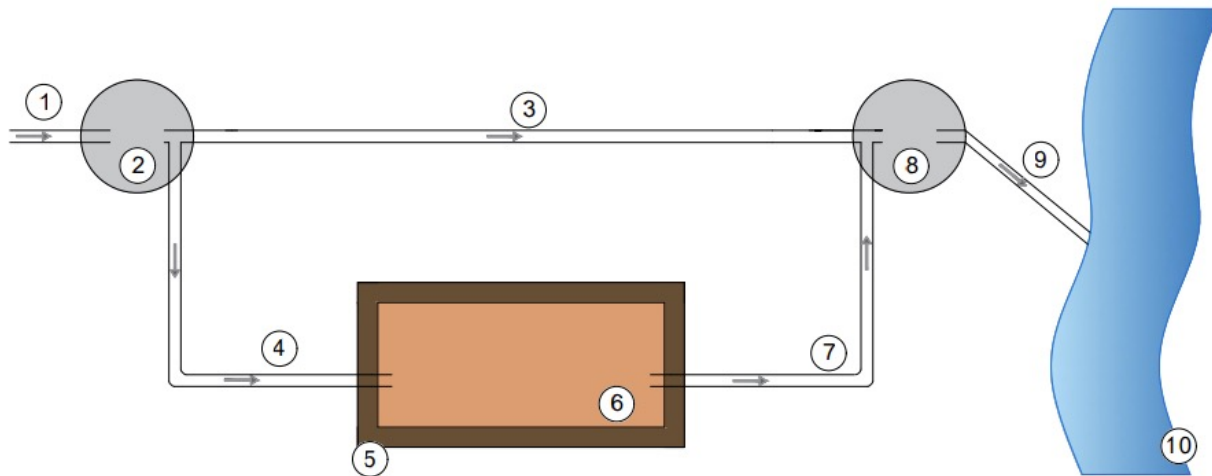
Čechtický stream catchment - Czechia

- Total annual rainfall – 666 mm
- Total precipitation during the vegetation period ranges 350 – 450 mm, winter months 250 – 300 mm
- Agro-climatic zone – sub-humid – mean average temperature 7,9°C
- Main crops – winter cereals, potatoes, rape seed, maize
- Large proportion of agricultural lands has been tile drained
- Water quality is threatened by **non-point source (agricultural) pollution**, in particular by increased leaching of nitrate nitrogen and pesticides and their metabolites
- Land ownership – company, communal/village
- Land use rights – leased, individual



Example of NSWRM - Drainage biofilter

- biofilters or “bioreactors” connected to agricultural tile drains are relatively inexpensive and space-saving measures with considerable potential to improve the quality of drainage water
- its basic function is to allow the passage of drainage water, contaminated with nutrients and pesticides, through a container with pollutant-reducing agents
- usually located at the bottom of agricultural drainage structures on the drains or in connection with drainage outlets
- ideally, the biofilter is located on a site that is no longer part of the cultivated land or is under permanent grassland



1 - Inflow of drainage water; 2 - Drainage manhole with flow controlling structure;
3 - Bypass of excessive discharge; 4 - Inflow to biofilter; 5 - Bed of biofilter;
6 - Fill of bioreactor; 7 - Outflow of treated water; 8 - Drainage manhole;
9 - Drainage outlet; 10 - Recipient



Filling/substrates

Intended/tested

Biochar

White peat

Woodchip

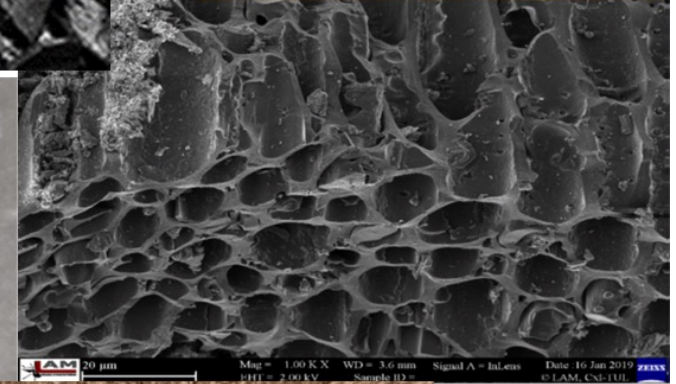
Vermiculite

Lignite

Polymer nanofibres

Fine gravel

Plants



Cost-benefit analysis

Pros

- slowing of the drainage runoff will be noticeable especially during normal and lower discharges
- high efficiency for pesticides and nutrients removal from drainage waters
- relatively small and cheap measure
- does not require frequent and costly maintenance
- none or only small uptake of agricultural land

Cons

- difficult to obtain subsidies for construction
- often different owner and user of the land concerned
- reduced efficiency during significant rainfall-runoff events

Drainage biofilter - conclusions

- suitable measure to reduce water pollution from non – point agricultural sources
- easy-to-apply measures
- the effects of the measures are fully in line with the objectives of the OPTAIN project



Thank you for your attention

