

LIFE PHOENIX project:

a new project for the management of water pollution from short-chain PFAS in Veneto Region (Italy)

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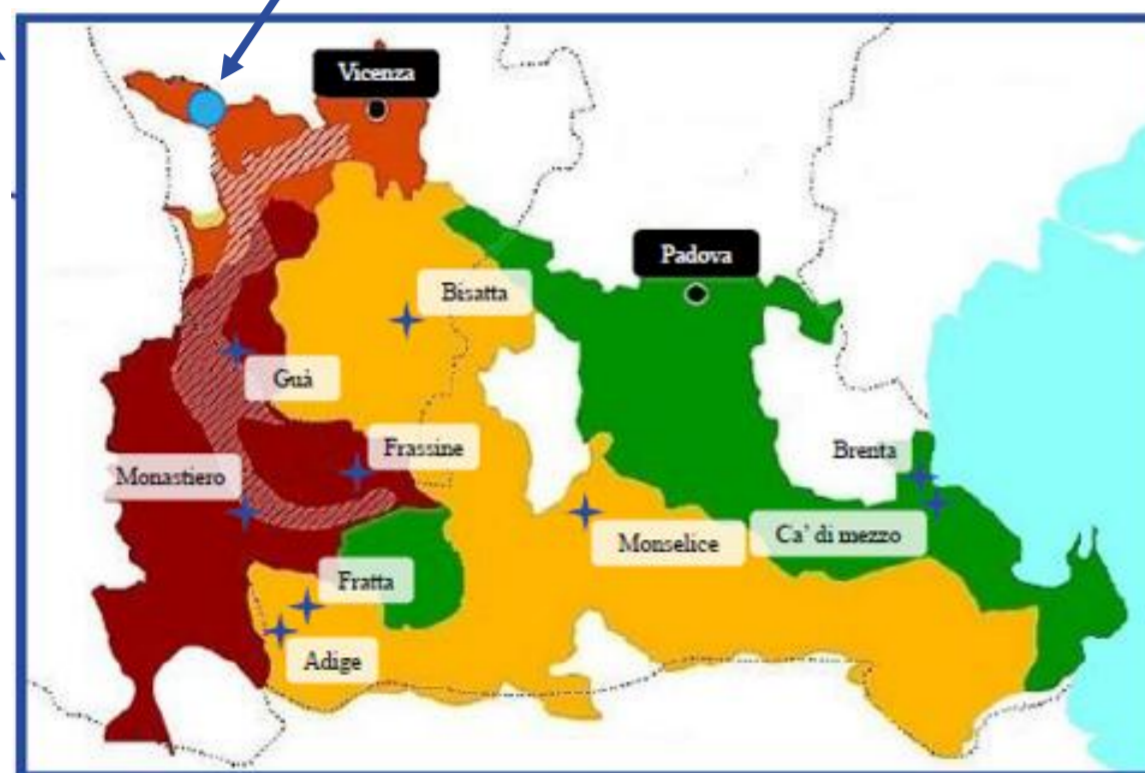
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Background

Veneto Region, Northern Italy

- Area of max exposure
- Zone of independent capture
- Area of precaution (irrigation)
- Under investigation
- Contamination plume
- Source (fluorochemical plant)
- Provincial borders



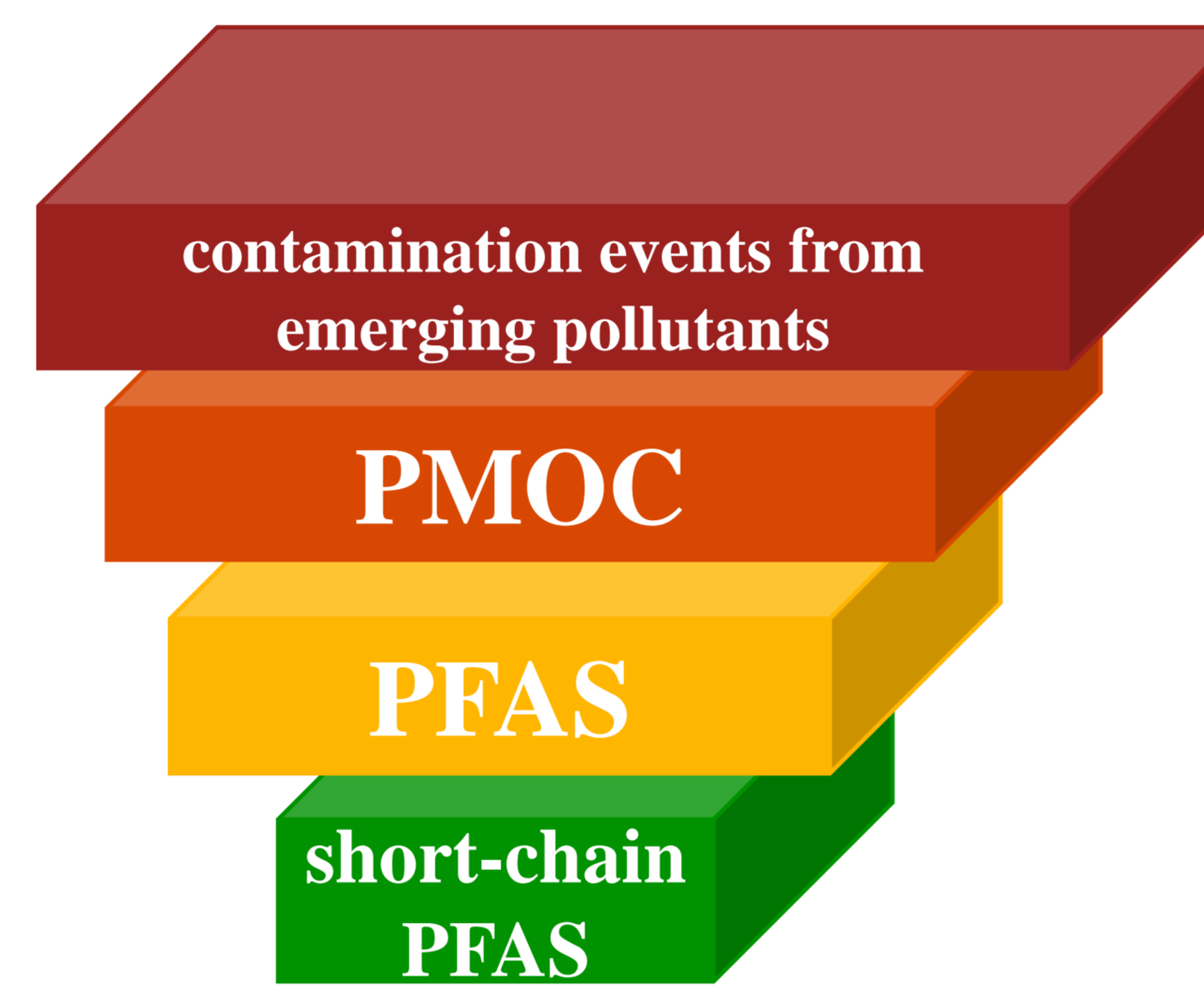
A significant episode of PFAS pollution of surface, ground- and drinking water has been discovered in 2013

2013 PFOA (ARPAV, 2018)

- 700 µg/L in the groundwater
- 3,4 µg/L in the surface waters
- 7,9 µg/L in the source waters of the Vicenza province

Regional Authorities faced up with the emergency and put in place mitigation actions effective for long-chain PFAS

Aims of LIFE PHOENIX Project

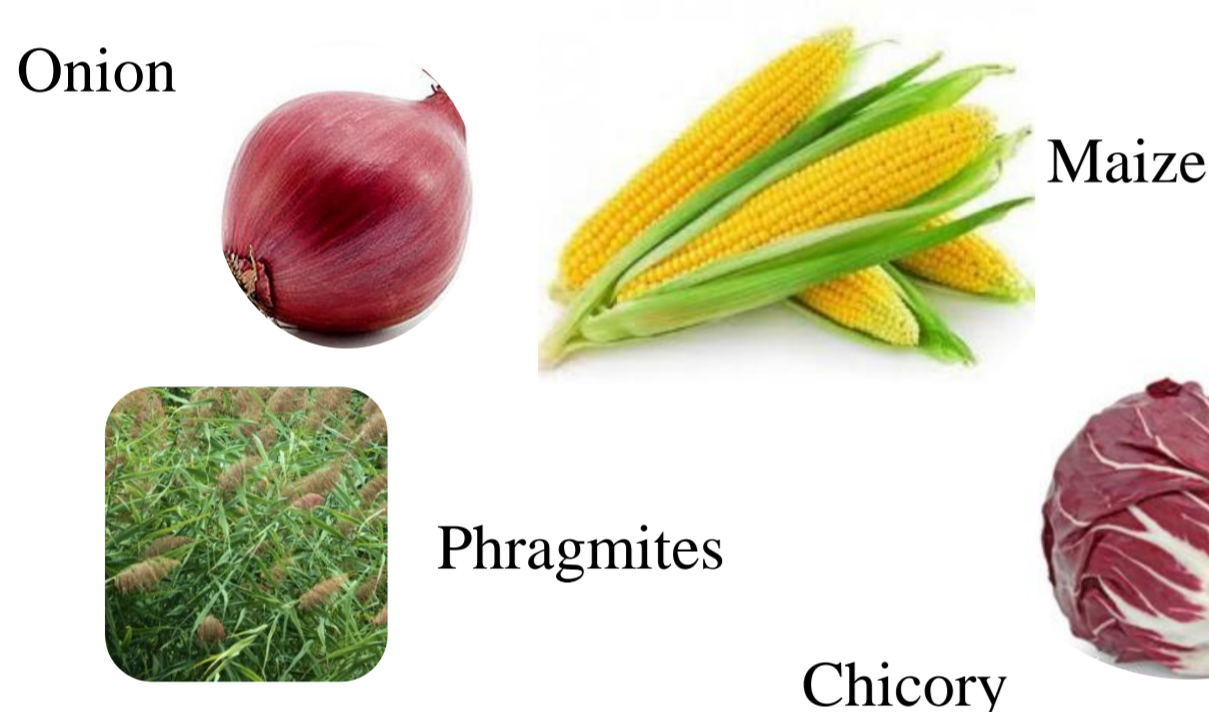


- Propose an approach that helps to avoid or at least to reduce public spending on damages caused by contamination from **emerging pollutants** (environment and human health)
- Promote the **transferability and reproducibility** of the approach to different geographical area
- Demonstrate how a **new interinstitutional governance system** with an holistic approach can manage risks related to the diffusion of PMOC in/from water
- Supported by innovative **forecast tools** and **mitigation actions**
- Specific investigation on **short-chain PFAS** (C₄-C₆) environmental fate, including agriculture impacts

Field Monitoring

The monitoring activity started in Spring 2018 and will last in March 2020

Biotic matrices



Samples were collected in July and in October

Plants



• **Animals**

Abiotic matrices

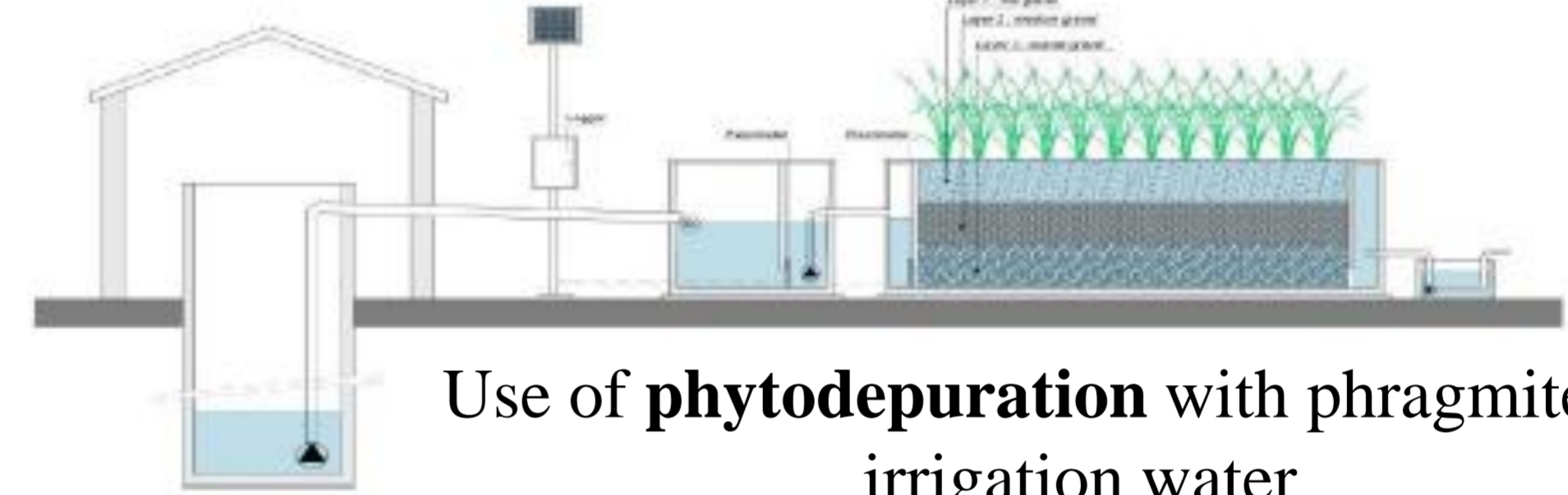
- **Water**
Samples collected once a month
- **Soil**
Samples collected in July and in October near the collected plants

Specific poster on this activity is shown in the poster 6.04P.11

Mitigation Strategies

Sustainable technological and natural solutions for mitigation of PFAS concentration in water

Wetland system



Use of **phytodepuration** with phragmites for irrigation water



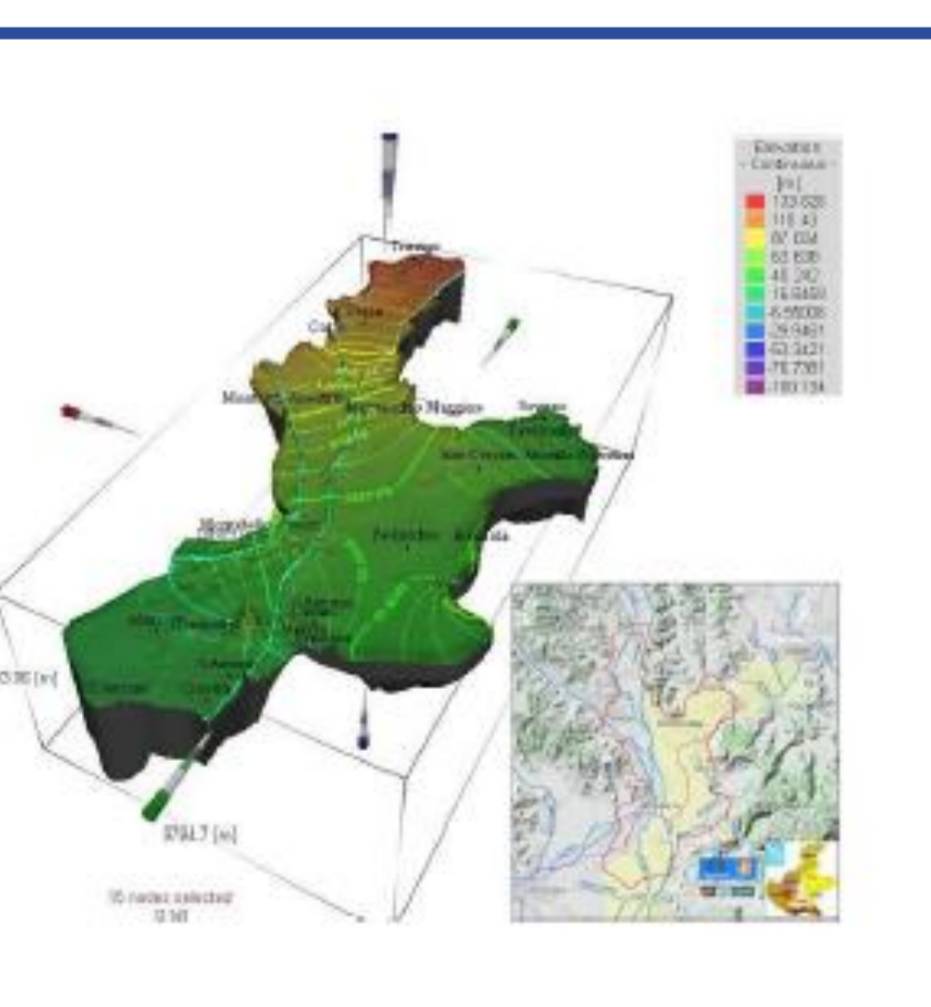
Physical-chemical pilot-plant



Use of **ion exchange resins** for drinking water. This technology is based on *in-situ* regeneration that represents a cheaper alternative to the off-site regeneration of carbon filters

Integrated Forecast Tools

Tools for the estimation of contaminant distribution



Numerical model

Validated to understand flow and transport in groundwater → understand qualitative and quantitative processes, predict the processes, evaluate the interaction between PMOC and the different environmental matrices

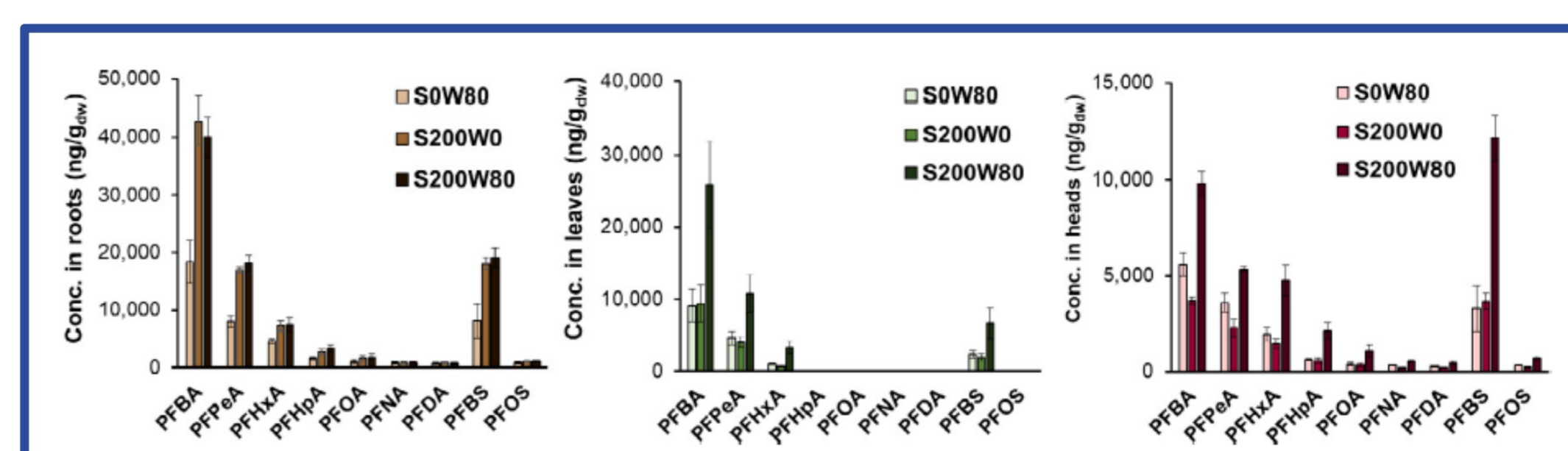
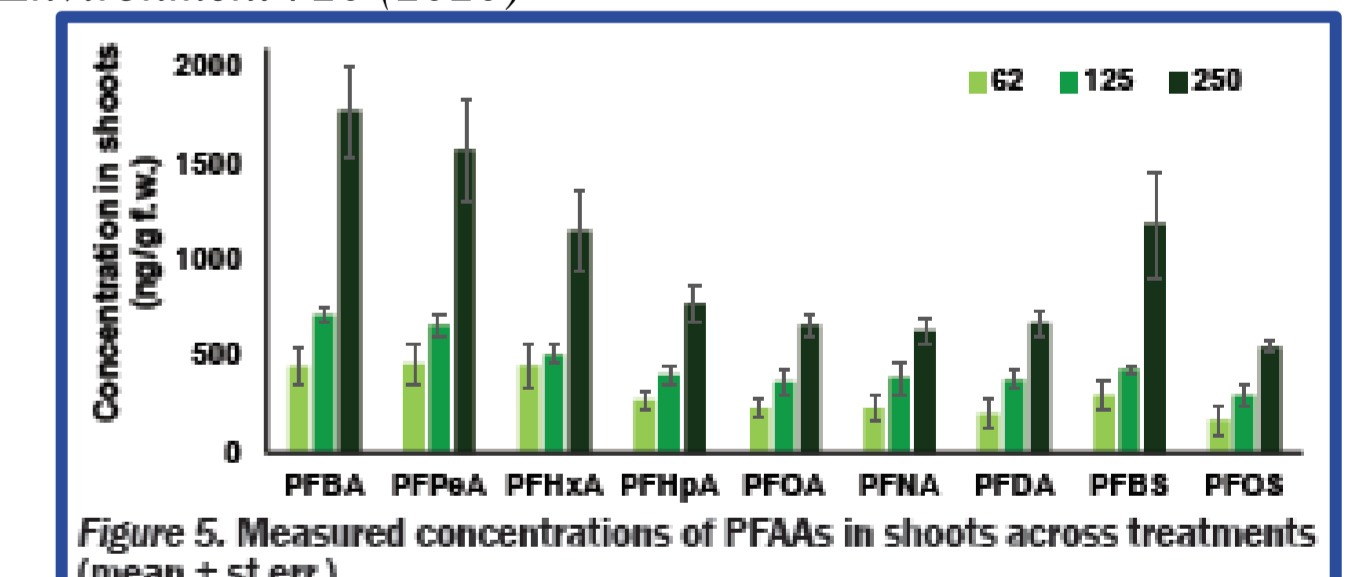
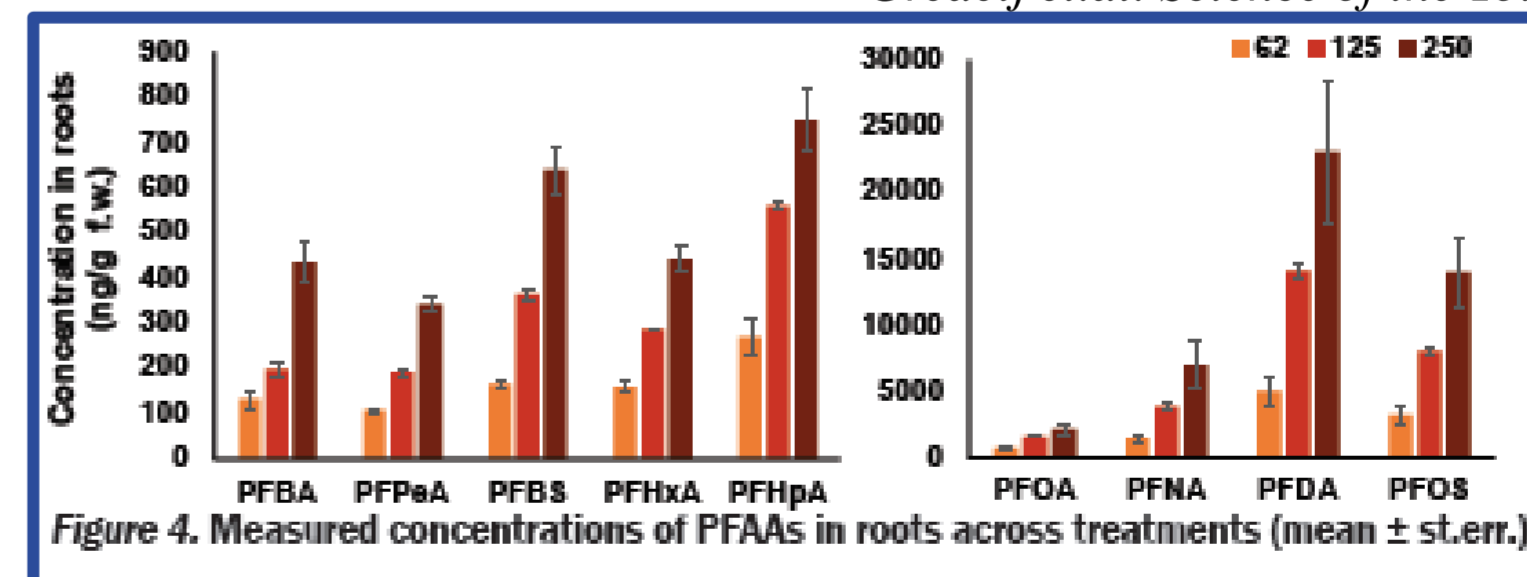
Early warning

Biological systems to identify environmental stress by means the assessing of health status of biomarkers, especially in *lumbricidae*

Uptake and translocation of perfluoroalkyl acids (PFAAs) in red chicory

1) Hydroponic culture

Gredelj et al. Science of the Total Environment 720 (2020)



2) Cultivation in contaminated soil
 Gredelj et al. Science of the Total Environment 708 (2020)

Management Actions

Permanent Regional Commission

Settled to define the decision-making strategy and implement emergencies and policy measures

Panel of experts

Settled to define tasks, plans, roles and responsibilities, methods, priority to manage the pollution events

Procedures and Guidelines

Drafted in support to local authorities and institutions for effective and immediate mitigation action

Data warehouse

An informative and statistic system of data developed to facilitate the data-sharing and retrieval of useful information