

The Catchment Communities Project

What?

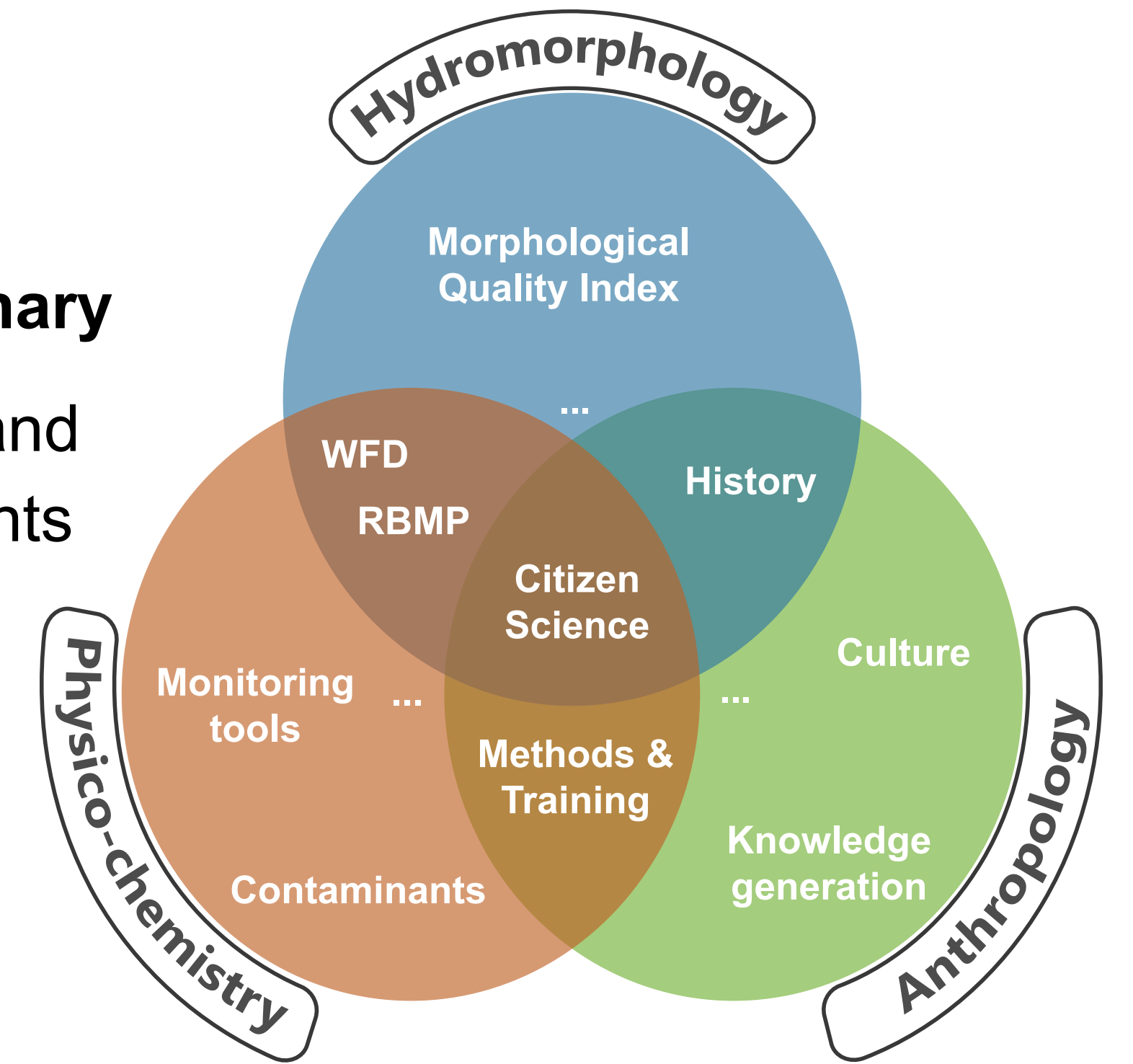
- Development of a **scalable** framework for a National Citizen Science (CS) monitoring programme of water quality
- **Co-creation** of scientific knowledge by involving communities

Why?

- There is a need for additional data collection to support existing monitoring and reach the **Water Framework Directive** goals
- CS gives access to higher spatial and temporal **resolution**
- But also leads to increased community empowerment and **water literacy**

Who?

- The approach is **interdisciplinary**
- Combining physico-chemical and hydromorphological assessments
- With an anthropological point of view on CS practices and **water knowledge**



Objectives of the Chemistry Section

- Identification of **gaps** in the implementation of Citizen Science water quality monitoring
 - The study of chemical contaminants is a prominent gap
 - Existence of a variety of tools but lack of uniformity
- Development of a framework for the **scalable** implementation of water quality monitoring tools
- Advancement of citizen **engagement** and **involvement**
- Management and standardisation of **data** for interoperability and accessibility

Development of a Scalable Kit

- In the context of the framework, work has started on the improvement of the CS-Hydro kit for **scalability**

- A first objective is to improve the **sustainability** by rethinking the approach:

Investigation of SPE in filter sampling bags:

- Reduced carbon footprint of shipping
- Reduced amount of single-use plastic
- Simplified protocols
- Improved cost efficiency of the kit

Preliminary tests:

- Study of uptake kinetics from standard solutions of caffeine as a proof of concept.
- Two formats of SPE were compared: extraction disks vs dispersed sorbent
 - Using dispersed sorbent shows **rapid uptake kinetics** with high recoveries (~80%) in a time frame suitable for CS (< 15 min)
 - More method development needed to reduce variability of the method (average RSD of 9.8%)

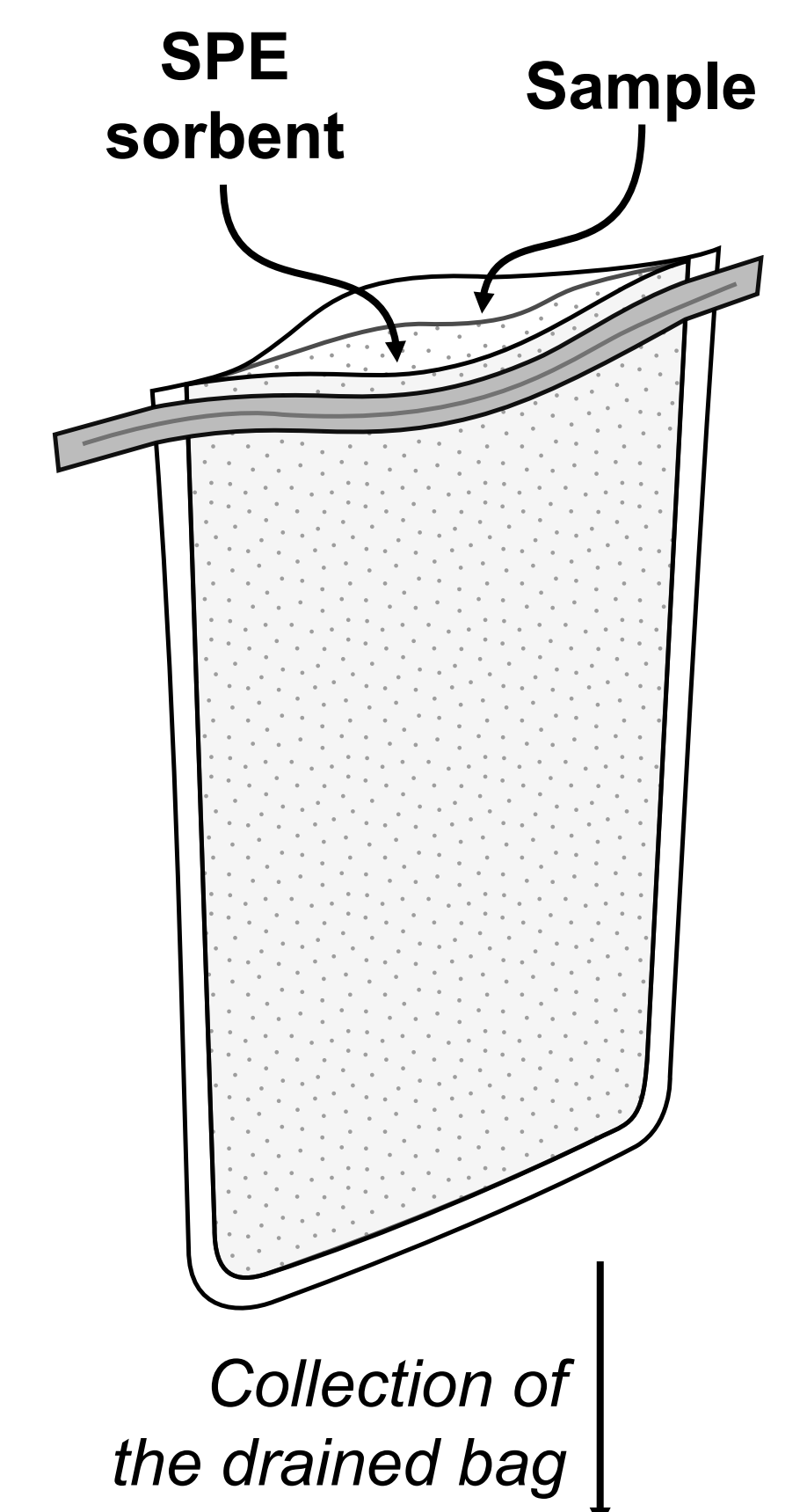


Figure 2 – Principle of the prototype

CSHydro – Prototyping of a “field-SPE” Kit

Developed in the context of the DCU Water Institute **Water4All-Stardust** project that aims to address emerging contaminants in global water systems

Goals

- Bring laboratory techniques to the field to allow **advanced chemical detection** by citizen scientists

Method

- Creation of a Solid Phase Extraction (SPE) kit to be sent out to volunteers
- Deployment of the kit in Denmark and in Ireland for a national **water blitz** event



Figure 1 – Components of the CSHydro kit (L) and field trial (R)

Results

- Successful improvement in metrology and data collection
- Allowed the assessment of the impact of hydroclimatic events on pesticides presence in waterbodies
- Useful screening tool to inform targeted analysis

Perspectives and Future Plans

- Investigate **user friendly** and CS-compatible ways to retain the dispersed sorbent
- Explore other types of sorbent to address different contaminants
- Conduct field trials and implementation during small scale events
- Analyse the **life cycle** of the newly developed kit

