River Cleaning Technologies in the Po River Basin

Sustainable rivers: bridging local and european initiatives
ROME, 21.5.24

river cleaning

INSPIRE
Innovative Solutions for Plastic Free European Rivers

Co-funded by
the European Union

EU
MISSIONS
RESTORE OUR OCEAN AND WATERS

A little reminder: why we should target riverine plastics

Rivers are accountable for most of the **1.8 million tons** of plastic litter that is discharged into our oceans every year, according to OECD Global Plastic Outlook 2022.
Around 50% of plastic litter is projected to sink once it arrives to the ocean, that's what makes it **expensive to recover** and nearly **impossible to recycle**.

Moreover, plastic pollution originates **not only environmental**, but **economic** and **social challenges** to tackle.

- **Quantifiable:** Cleanup costs + revenue loss for businesses + service costs of ecosystem loss + cost of mismanaged waste = c.a. **3.142 billion $**
- **Unquantifiable**: societal health costs of **diseases related to micro and nanoplastics**, partially originating from the degradation of litter in the environment.

And where?

Recent scientific literature provided other valuable insights that reinforced our trust in the approach we are pursuing.

No more than 20% of plastic litter **goes straight from the point of discharge to the sea**. Many items spend **years moving from spot to spot in the same river** basin, or even the same water stream.

For this specific reason, **targeting multiple plastic pollution access points** along the whole river is crucial to build a **lasting and widespread impact**.

We call this approach **hyperlocalization.**

Hyperlocalization as an enabler for impact and scalability
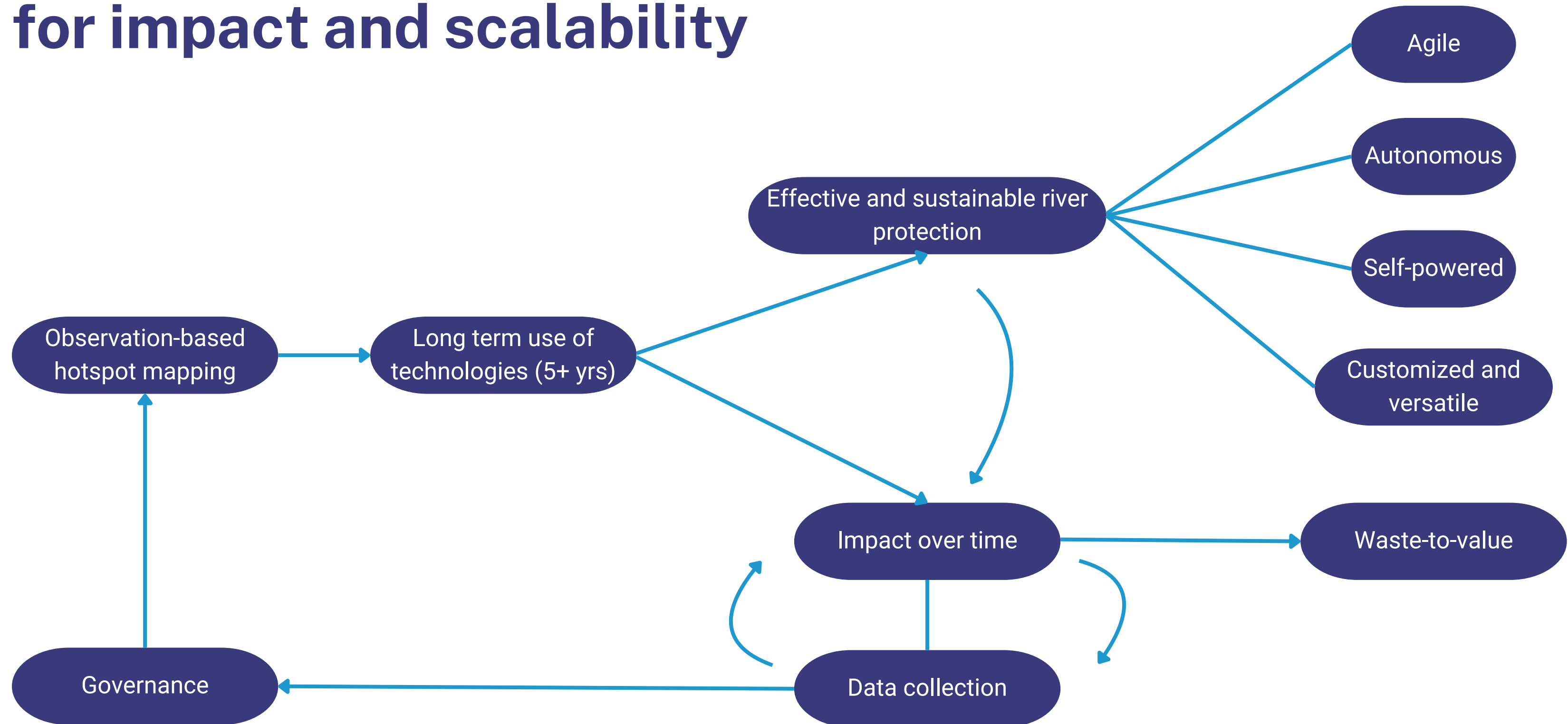
Our little magic trick

Modular marvel

Unleash the power of adaptability with our innovative modular design. Comprising interconnected modules, our system effortlessly conforms to diverse dimensions, ensuring a perfect fit for any environment. The freedom of water flow between modules not only minimizes impedance but guarantees year-round smooth and safe operations.

Turbulent technology

Revolutionize water management with our spinning turbine modules. Harnessing the natural current, each module functions as a turbine, actively sweeping incoming litter towards the collection cage. Say farewell to clogs as our system works tirelessly to keep waterways clear and pristine.

Smart automation at your fingertips

Experience the future of aquatic maintenance with our automated system. Equipped with cutting-edge sensors, it detects perilous conditions like storms, promptly lifting the system out of the water for safety. This intelligent automation extends to routine maintenance cycles, effortlessly removing any obstacles such as stuck branches. Embrace hassle-free water management with our state-of-the-art technology.

Remote mastery, hassle-free control

Take charge from anywhere with our system's advanced programming and remote-control capabilities. Easily integrate cameras and firmware for continuous checkups and remote maintenance operations. Bid farewell to on-site operations, as our system enables seamless management without the need for personnel. Stay in control effortlessly, anytime, anywhere.

The INSPIRE Project

- Scientists and researchers
- Enterpreneurs and startuppers
- Leaders of impact-driven associations and NPOs

26 partners from **15 countries** with a **common mindset**:
Find innovative solutions, **try** them out, **measure** results with data-driven KPIs, **optimize**, **replicate**, **scale** and **engage** new users.

In other words, "INSPIRE" people for the reduction of litter, macro and microplastics in European rivers and, ultimately, the ocean.

Particip. number	Particip. Acronym	Participant organization name	country	
1	VLIZ	VLAAMS INSTITUUT VOOR DE ZEE	BELGIUM	
2	VITO	VLAAMS INSTITUUT VOOR TECHNOLOGISCH ONDERZOEK	BELGIUM	
3	UM	UNIVERSITY OF MARIBOR	SLOVENIA	
4	CLERA	CLERA.ONE	SLOVENIA	
5	RC	MOLD	ITALY	
6	FF	FISHFLOW INNOVATIONS	NETHERLANDS	
7	CIIMAR	CENTRO INTERDISCIPLINAR DE INVESTIGACAO MARINHA E AMBIENTAL	PORTUGAL	
8	123	123 ZERO	SLOVENIA	
9	FRE	FRESENIUS UNIVERSITY	GERMANY	
10	WUR	WAGENINGEN UNIVERSITY & RESEARCH	NETHERLANDS	
11	BMI	BIO-MI	CROATIA	
12	MINDS	MINDS TECHNOLOGIES AND ENVIRONMENTAL SCIENCES PC	GREECE	
13	KTH	KTH ROYAL INSTITUTE OF TECHNOLOGY	SWEDEN	
14	GREIN	GRE-IN	GREECE	
15	CNR	CONSIGLIO NAZIONALE DELLE RICERCHE	ITALY	
16	EXIT	EXIT FOUNDATION	SERBIA	
17	UCA	UNIVERSITY OF CÁDIZ	SPAIN	
18	ANRI	ALCHEMIA NOVA RESEARCH & INNOVATION GEMEINNUTZIGE GmbH	AUSTRIA	
19	ARCHA	ARCHA	ITALY	
20	INFOR	INFORDATA	ITALY	
21	CIR	CIRCE BIOTECH	AUSTRIA	
22	RCU	RIVER CLEAN UP	BELGIUM	
23	WnW	WASTE & WATER	FRANCE	
24	RWA	ROMANIAN WATER ASSOCIATION	ROMANIA	
25	AIT	ASIAN INSTITUTE OF TECHNOLOGY	THAILAND	
26	NOR	NORIA	NETHERLANDS	

What is INSPIRE?
Vision and mission framework

INSPIRE is a 4-year project funded under the call HORIZON-MISS-2022-OCEAN-01.
The project will contribute to the drastic **reduction of litter, macro and microplastics in European rivers**.
It contributes to the Mission "**Restore our Ocean and Waters by 2030**".

PREVENT AND ELIMINATE POLLUTION OF OUR OCEANS, SEAS AND WATERS

- Reduce by at least 50% plastic litter
- Reduce by at least 30% microplastics
- Reduce by at least 50% nutrient losses, chemical pesticides

Demo case studies setup

- **20 technologies**
- **6 use cases** on 6 rivers across Europe:

  Scheldt in Belgium
  Rhine in the Netherlands
  Po in Italy
  Douro in Portugal
  Kamniška Bistrica in Slovenia
  Danube in Romania

- **1 Master Plan** at the end of the project

Objectives of INSPIRE
Main outputs and concepts

INSPIRE aims at creating a **Master Plan** which will be modular and serve as the guideline for the **uptake** of **site-tailored combinations** of **solutions** and **approaches**.
This will lead to:
- **Models** for Europe to have a rich **overview of the needs of each river**, its scale of urgency in tackling pollution and how that should be carried out.
- A **database** of Technologies & Actions that **maps all the possible technologies** for litter collection and prevention.
- A **decision-making tool** to **identify the most appropriate INSPIRE solution** (technologies and actions) for tackling pollution in the targeted rivers.
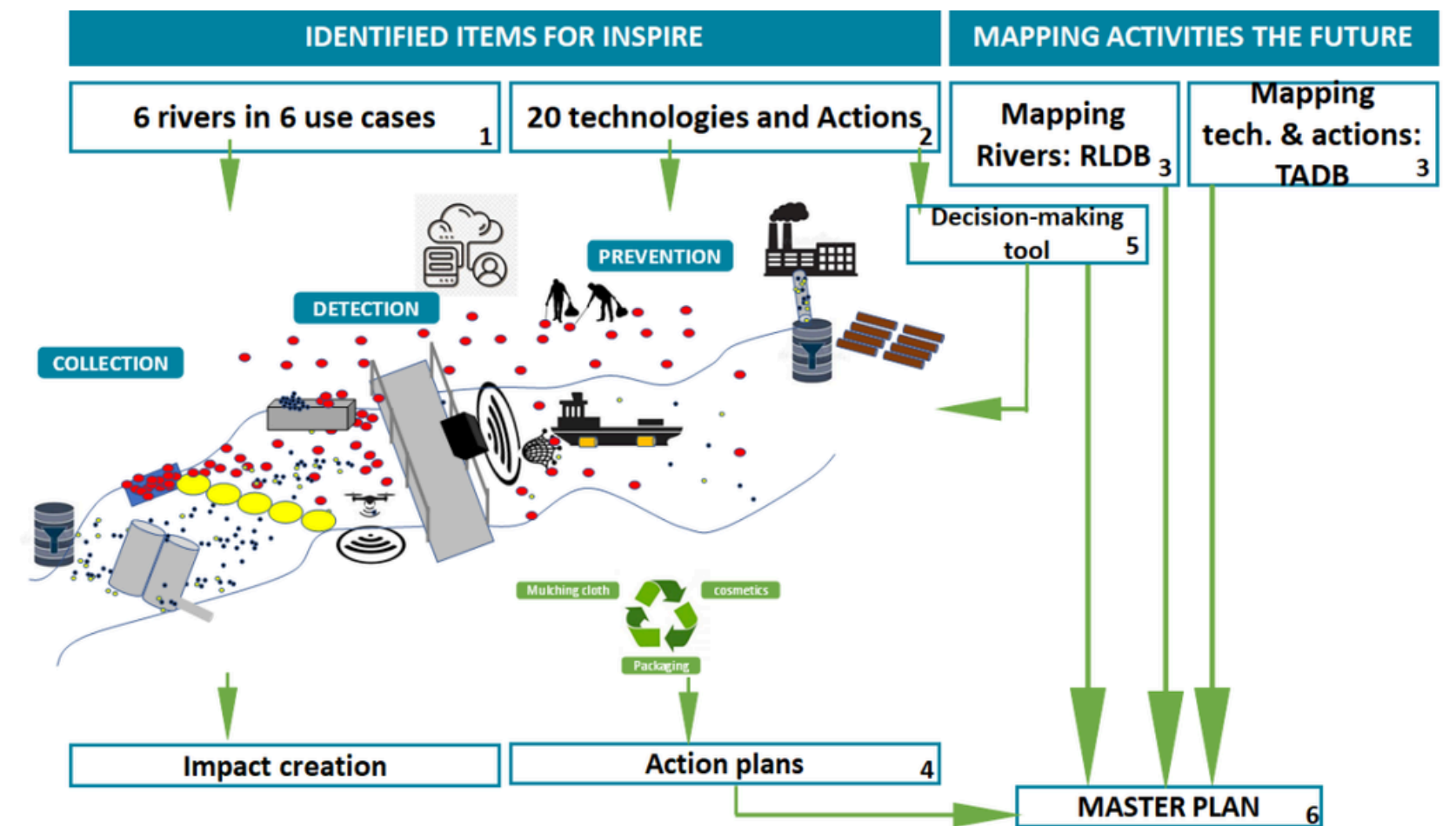
INSPIRE in Italy
The Po River case study

DETECTION

Monitoring and **detection** of plastics and litter using bridge-mounted **RGB cameras with multispectral systems (VNIR)** and **AI-mounted CCTV** systems

COLLECTION

Hybrid system of **River Cleaning barriers** (modular, self-powered, automatic) and **Clean Trash collection cage** with AI-powered litter identification

DISSEMINATION

Extraction of **results, engagement** and **communication** with local communities, schools, etc.

All partners

Po di Donzella, Santa Giulia Bridge

Many **challenges:**

- Large river, large pool of stakeholders: need for **planning in advance to allow engagement and buffering time**.
- Impressive amount of wooden chunks and trees flowing down: **need for safety options**.
- The bridge opens: **need for local cooperation with operators.**
- Retrieving the litter from the catchment system: **need to deal with accessibility.**

A site to shine - key takeaways

The **golden rules** of success on rivers, **preparation** and **adaptability**:

- Onboarding authorities in a partecipative way leads to **solid bottom-up solutions**.
- **Flexible design** in our riverine technologies make them easier and safe to apply, and most importantly, safe and trustworthy to be replicated.
- The integration with **data collection-based** activities enhances value.

Food for thought - it's your turn!

You have to convince someone to clean their local river.

How much money is it worth?
And why?