

Under the High Patronage of His Majesty King Mohammed VI



XIX WORLD WATER CONGRESS  
International Water Resources Association (IWRA)  
Marrakech, Morocco | 1-5 December 2025

Kingdom of Morocco



Ministry of  
Equipment and Water

# WEFEF 2.0: A Planning Tool for Integrated Water-Energy-Food-Ecosystem Management

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(BIOAZUL)

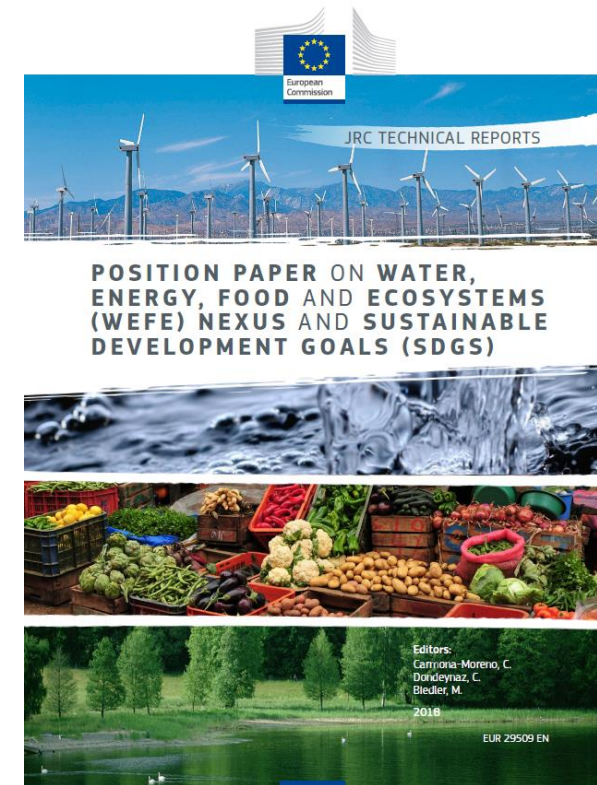
Marrakech, 2<sup>nd</sup> of December, 2025

# REFLECTIONS ON WEFE NEXUS (FROM JRC REPORT)



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- WEFE Nexus integrates management and governance across the multiple sectors of food, energy, water, and ecosystems.
- Realisation of the **interconnectedness** between Water, Energy, Food Security, and Ecosystems.
- Nexus originally addressed the energy-water-food security (WEF) Nexus, but **ecosystems** are increasingly recognised as important for sustainability.
- A step beyond single sector planning towards a more **holistic** approach to planning.
- Strong and binding **coordination mechanism** (Nexus Policy Dialogues).



# BONEX Mission



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- Extensive literature focuses on the theoretical nexus concept, but tools to support its implementation in governance and practice are still in early phases of development
- BONEX aims to provide **practical and adapted tools**, examine concrete and context-adapted technological innovations, enhance policies and governance and facilitate WEFe Nexus practical implementation that balances the social, economic, and ecological trade-offs.



# BONEX – WEFEE Bridging Framework



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- WEFEEF has been developed to collaboratively identify and assess interventions that solve WEFEE nexus problems and develop implementation pathways
- Practical tool for planners to integrate WEFEE dimensions in the analysis and select interventions
- Target group: Policymakers, governmental agencies, businesses, NGOs, and research institutes
- Participatory approach: legitimate and transparent decision-making process
- Interview templates, surveys, protocol for data collection protocol, etc.
- Different pathways for implementation, adaptability
- Available at: <https://handbook.bonex-prima.eu/>

Water-Energy-Food-Ecosystems Framework 2.0

Export as PDF

Welcome

INTRODUCTION

1. Introduction

1.1 Purpose of the WEFEEF 2.0

1.2 Structure of the WEFEEF 2.0

1.3 Guidance to use the handbook

1.4 Getting familiar with the WEFEE Nexus approach

2. First phase: Initiation

3. Second phase: Diagnosis

4. Third Phase: Identifying interventions

5. Fourth Phase: Assessment phase

6. Fifth phase: Implementation pathway

7. Definitions

8. References and additional documents

1. Introduction

As the **world's population grows** and **environmental challenges become more complex**, it becomes increasingly important to understand and manage the **interdependencies of natural resources**, in particular where resource use in one area can have unintended consequences in another. Some examples include:

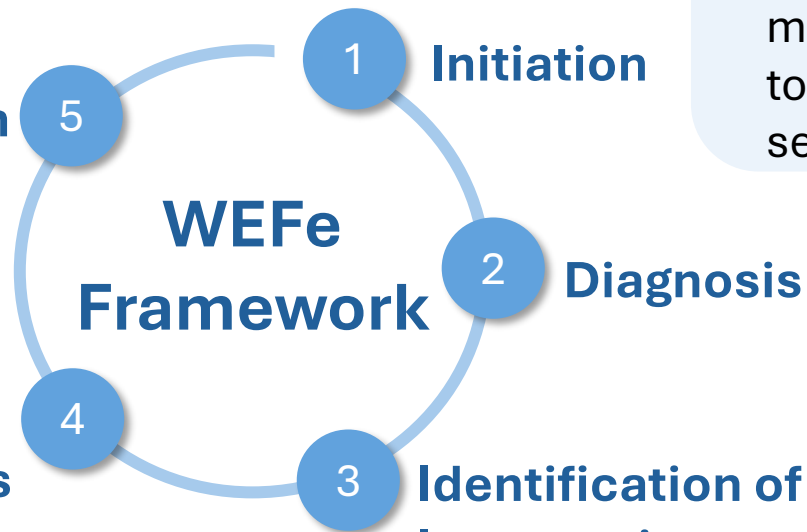
**Intensive agricultural practices** secure food production but have led to the depletion of water resources and degrading ecosystems in many parts of the world.



# BONEX – WEF E Bridging Framework

- Defining actions, responsibilities, key actors and resources to implement

## Designing Implementation Pathways



- Define boundaries
- Analysing stakeholders
- Evaluating non-monetary values tied to ecosystem services

- Identifying WEF e nexus challenges
- Participatory system mapping

- Assessing potential performance
- Identifying barriers and facilitators

- Identifying interventions based on i) regional experts, OR ii) analysts, OR iii) co-creation with stakeholders



# Demonstration projects in BONEX



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# BONEX Demonstration in Spain: RICHWATER DSS

- Calculation of fertiliser dosage based on nutrient analyses in reclaimed water
- Iteration – optimisation algorithm which can be adapted to different optimisation functions (e.g. costs, EC)
- Fertilisers savings: Reclaimed water supply N, P, K, Ca, Mg, Fe, Zn, etc. -> 68–79% reduction.
- Avoid over-fertilisation of crops: minimise eutrophication risks
- Lower dependency from chemical fertilisers: lower CO2 emissions
- Increased sustainability of agriculture



# BONEX Demonstration in Spain: RICHWATER DSS

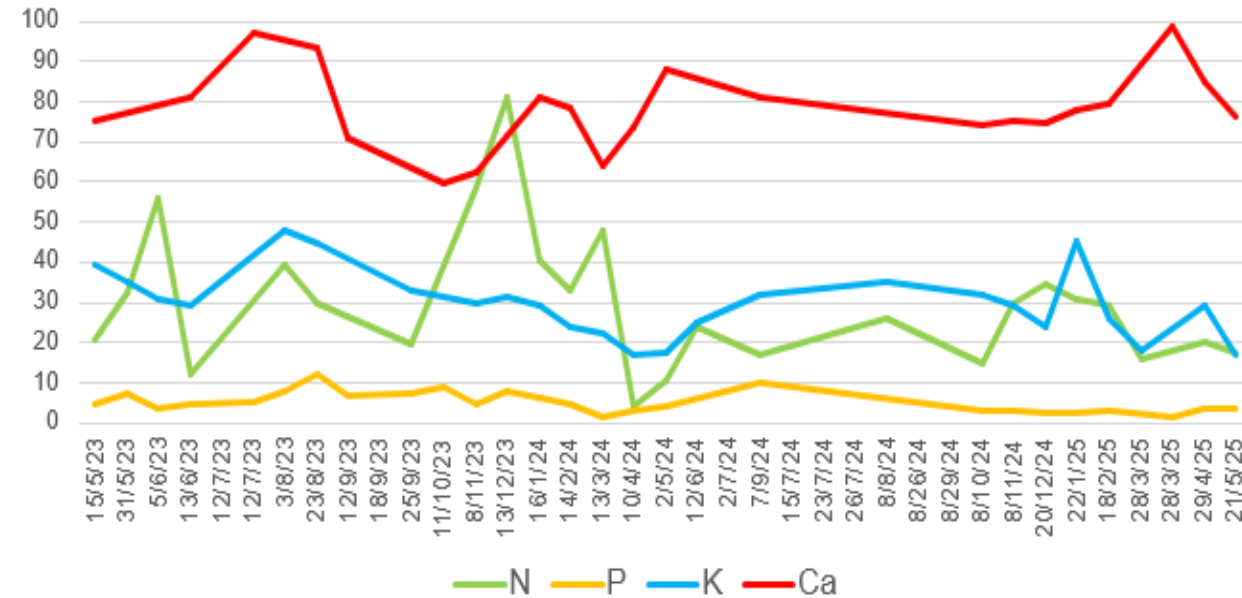


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- 70% of chemical fertilisers replaced
- Average saving of 75% of fertiliser costs
- Reduction of CO2 emissions

Mango	T1 (€/ha)	T2 (€/ha)	Saving (%)
Abril	92	25	73
Mayo	92	25	73
Junio	58	39	33
Julio	25	0	100
Agosto	25	3	87
Septiembre	25	3	87
<b>Total</b>	<b>317</b>	<b>96</b>	<b>75</b>

Reclaimed water composition 2023 - 2025

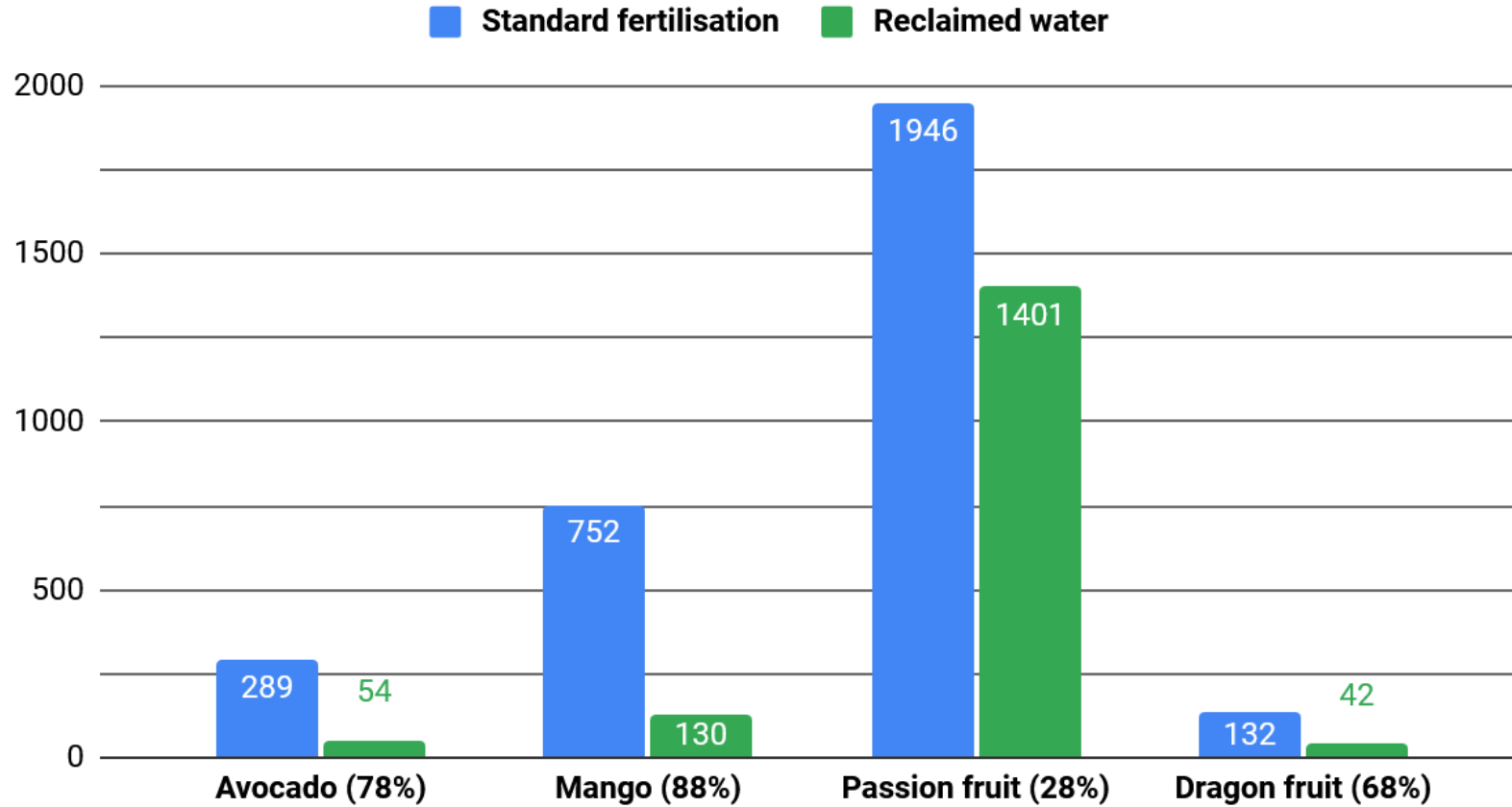


# BONEX Demonstration in Spain: RICHWATER DSS



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### Fertilization economic comparison (€/hectare)



# WEFE Nexus to promote sustainable solutions in the agri sector



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- Nexus Bridging Plans: Implementation pathways for widespread adoption
- Highlight environmental impacts and cross-sectoral policy alignment
- Build on participatory workshops that shape exploitation strategy
- End-user and stakeholder feedback:
  - Better understanding of local problems and confronting views
  - Effective definition of end-users: Advisory services vs. Farmers
  - Build trust
  - Differentiate from massive availability of digital solutions
  - Identification of training needs: e.g. nutrient management
  - Complementarity with other solutions: e.g. agroecology



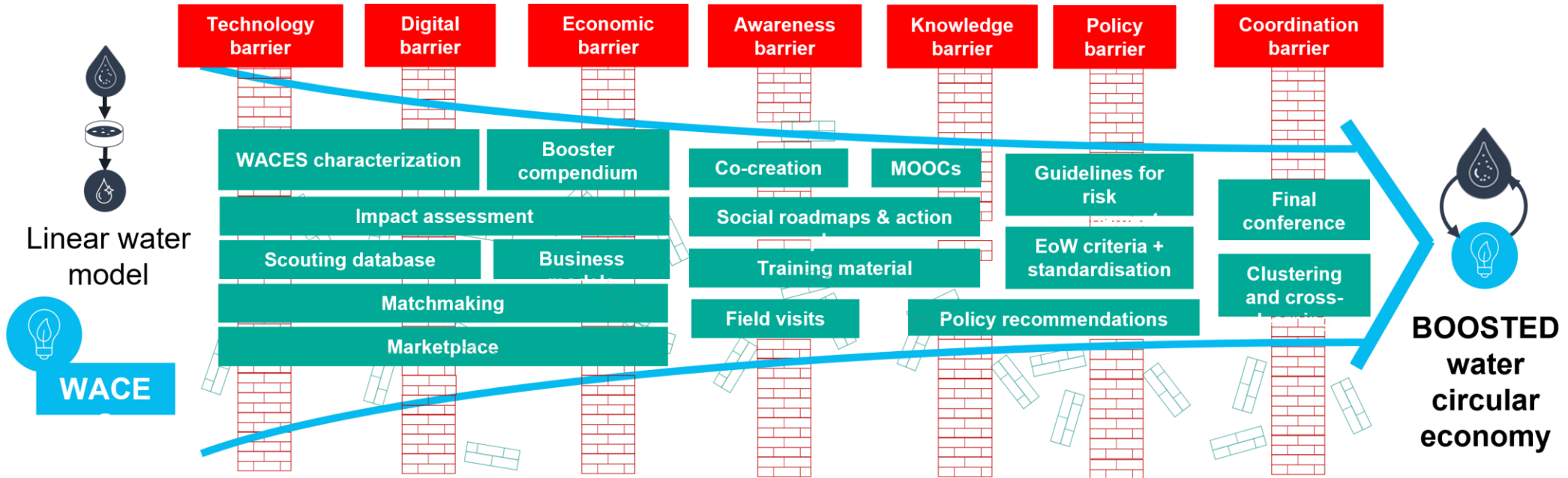


# Boosting the uptake of innovative solutions in the context of water and circular economy

Title is self-explanatory!

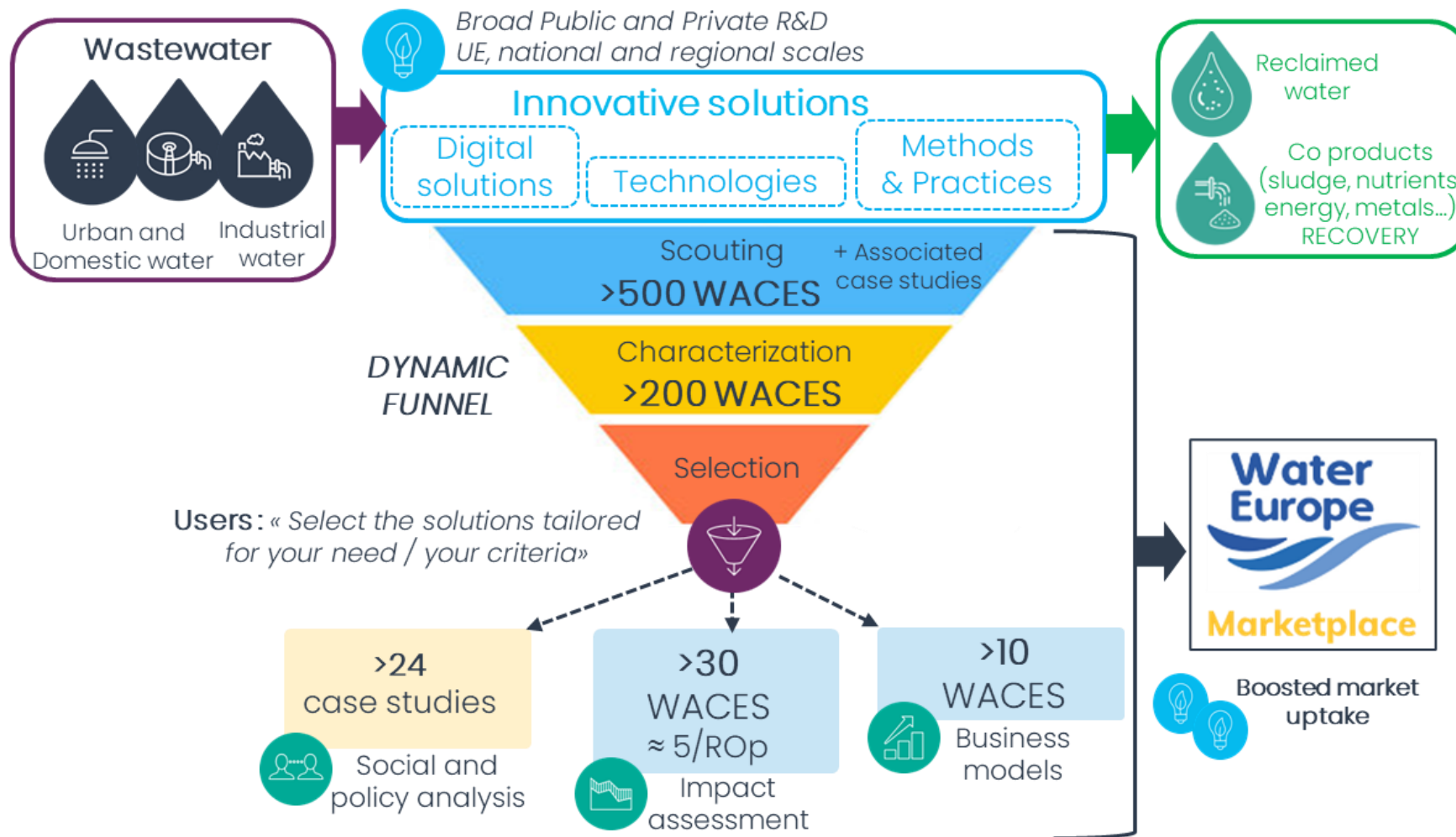


# The Project is focused on barriers





# Funnel model approach



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Thank you!

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