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CLIMATE ADAPTATION AND RESILIENCE DEMONSTRATED IN THE MEDITERRANEAN REGION

Valorisation of non-conventional water loops on Aegean islands

Fabio MASI, PhD - IRIDRA

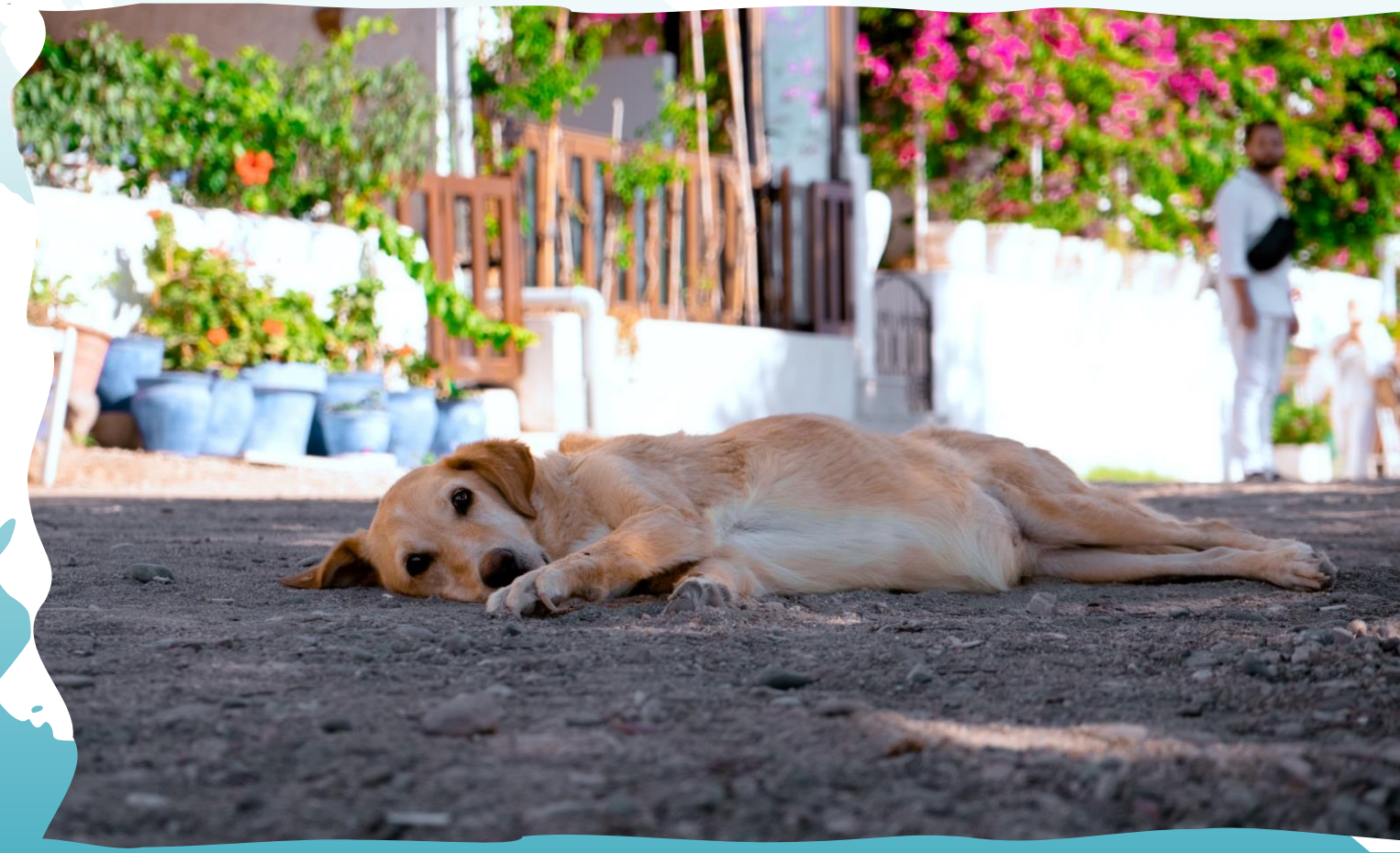
Funded by the European Union

IRIDRA S.r.l.

The mediterranean is a climate hotspot

The mediterranean is a climate hotspot

Land and sea are warming much faster tan global average



The mediterranean is a climate hotspot

180 million people alreay suffer from water scarcity

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The mediterranean is a climate hotspot

Crop yield will reduce due to extreme events, drought, degradation

The mediterranean is a climate hotspot

By 2100 **burnt areas** may double

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Nature-based solutions and EU policy

- Within the European Green Deal NBS are recognized as solutions that support climate change (CC) adaptation:
  - *"Implementing NBS on a larger scale would increase climate resilience;* ***It is vital to better quantify their benefits, and to better communicate them to decision-makers and practitioners at all levels to improve take-up****"* (EU Adaptation Plan, 2021)
  - *"The promotion of healthy ecosystems, green infrastructure and* ***NBS should be systematically integrated into urban planning****" "Particular attention will be paid to measures to incentivize and eliminate barriers for the take-up of NBS"*(EU Biodiversity Strategy, 2020)
- However:
  - Less than 5% of all funding in the water sector alone goes to NBS (OECD, 2020).

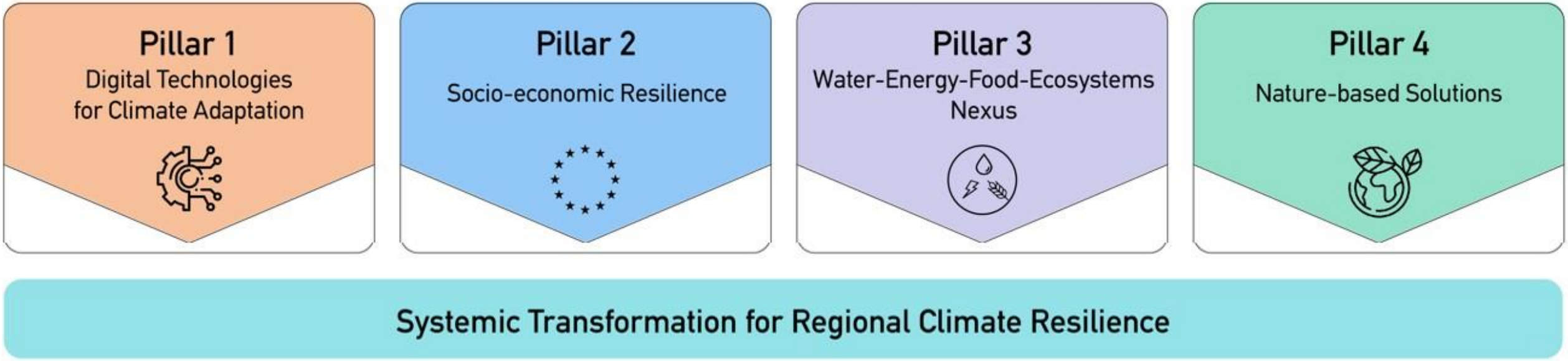
Project General Info

- **Call:** HORIZON-MISS-2022-CLIMA-01
- **Type:** Horizon Innovation Action
- **Duration:** 54 Months
- **Start:** 1st September 2023
- **# of Partners:** 51 (14 countries)
    - 10 Universities & 7 Research Organizations
    - 9 SMEs, 1 large Company and 8 NGOs
    - 6 Regions and 5 Municipalities
    - 5 Authorities/Utilities

# of Affiliated Organizations: 3

Project Vision and Pillars

To Investigate systemic transformations in Climate Resilience *in the MED Region, by unifying and mainstreaming all initiatives* addressing climate adaptation and mitigation through NBS *and other engineered infrastructure*



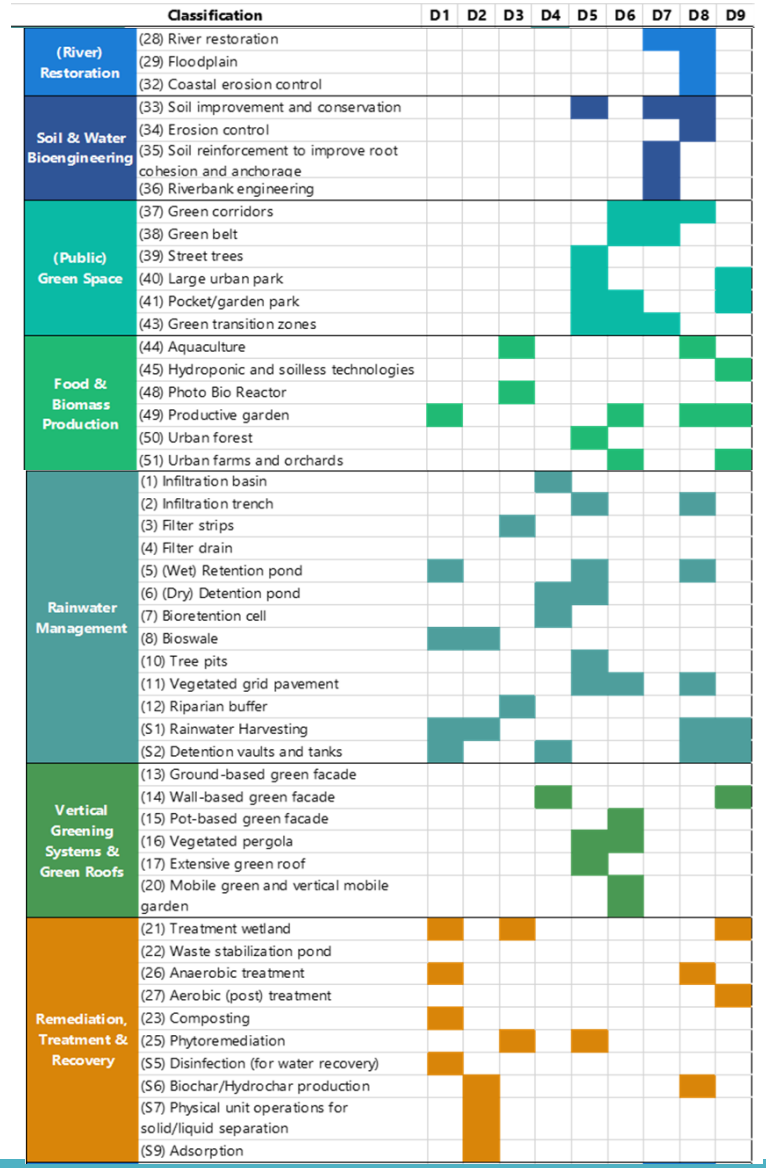
Our biggest challenge is NOT the development and application of the envisaged innovation of each pillar but to holistically connect these solutions at a systems level.

Nature-based Solutions interventions

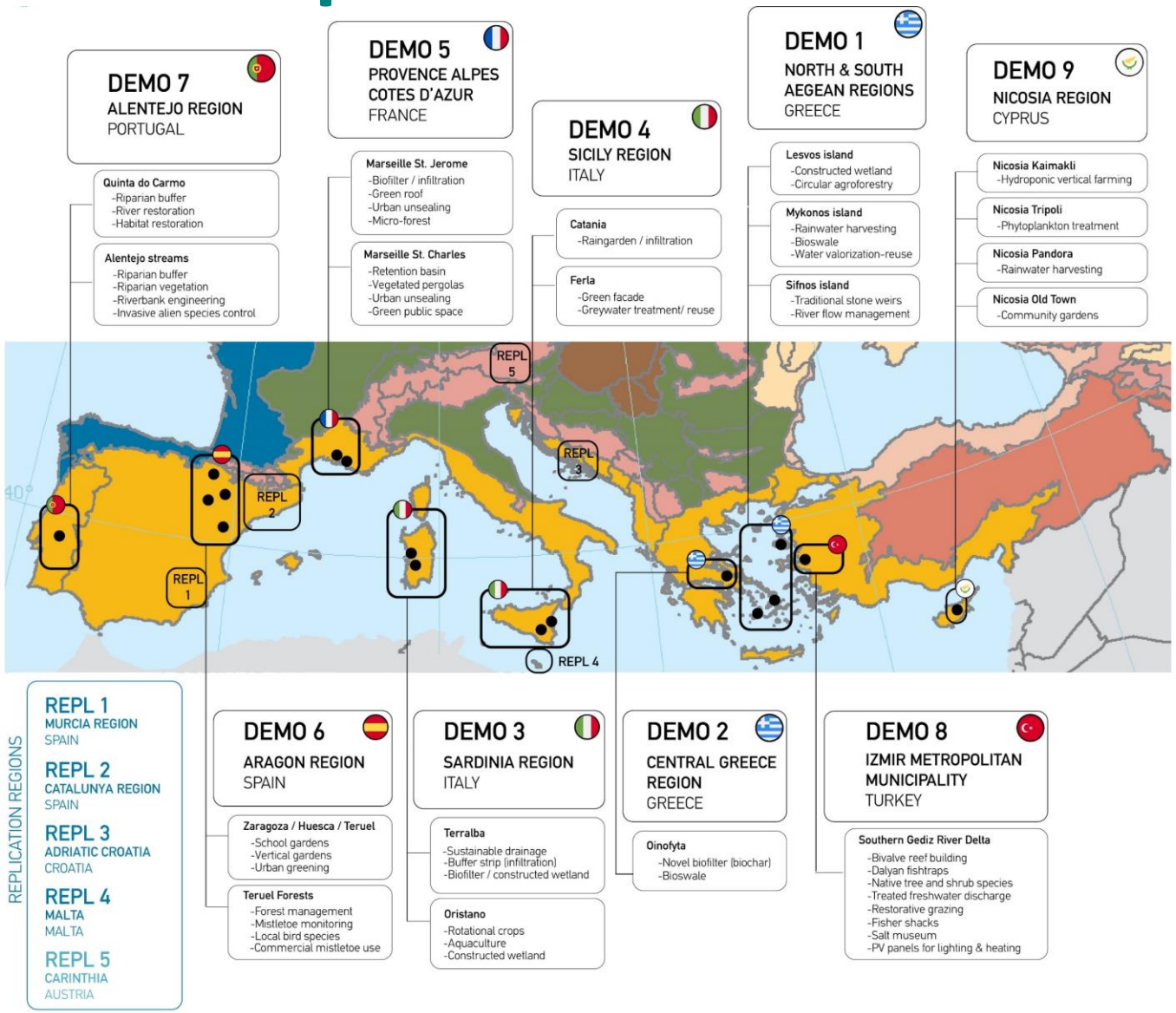
83 interventions of **47 different NBS types** across **10 regions** (9 DEMOS) on **20 locations** involving **28 communities.**

- RAINWATER MANAGEMENT
- VERTICAL GREENING SYSTEMS & GREEN ROOFS
- TREATMENT & RECOVERY
- RIVER RESTORATION
- SOIL & WATER BIOENGINEERING
- PUBLIC GREEN SPACES
- FOOD PRODUCTION

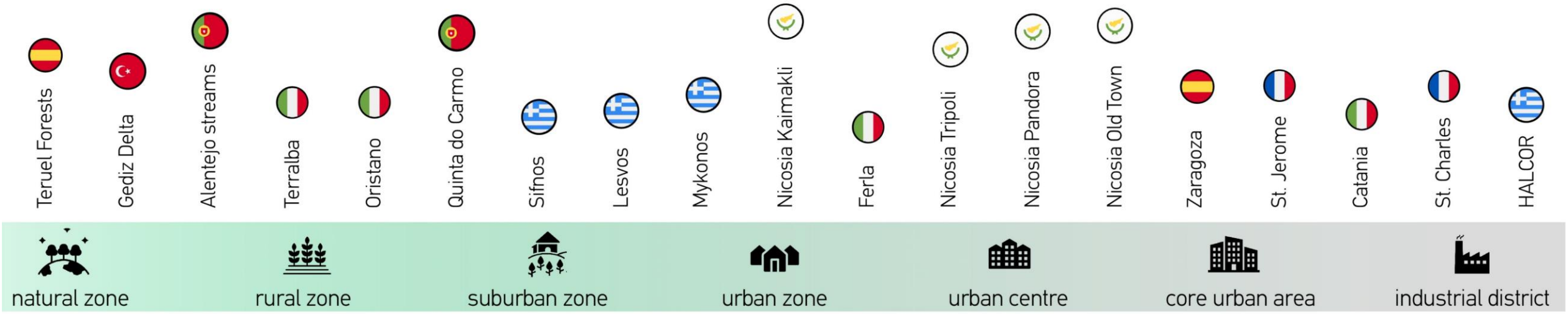
Langergraber et al., 2021



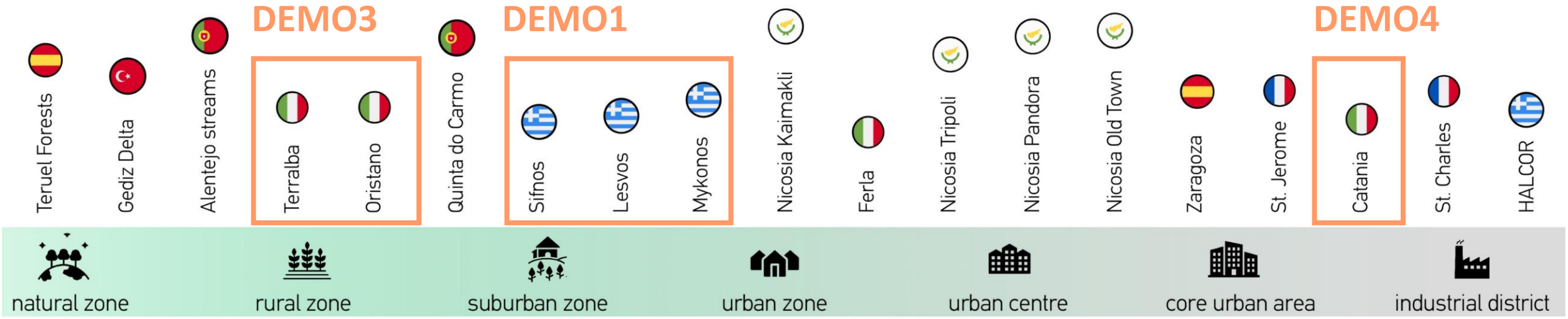
Demonstrators & replication sites



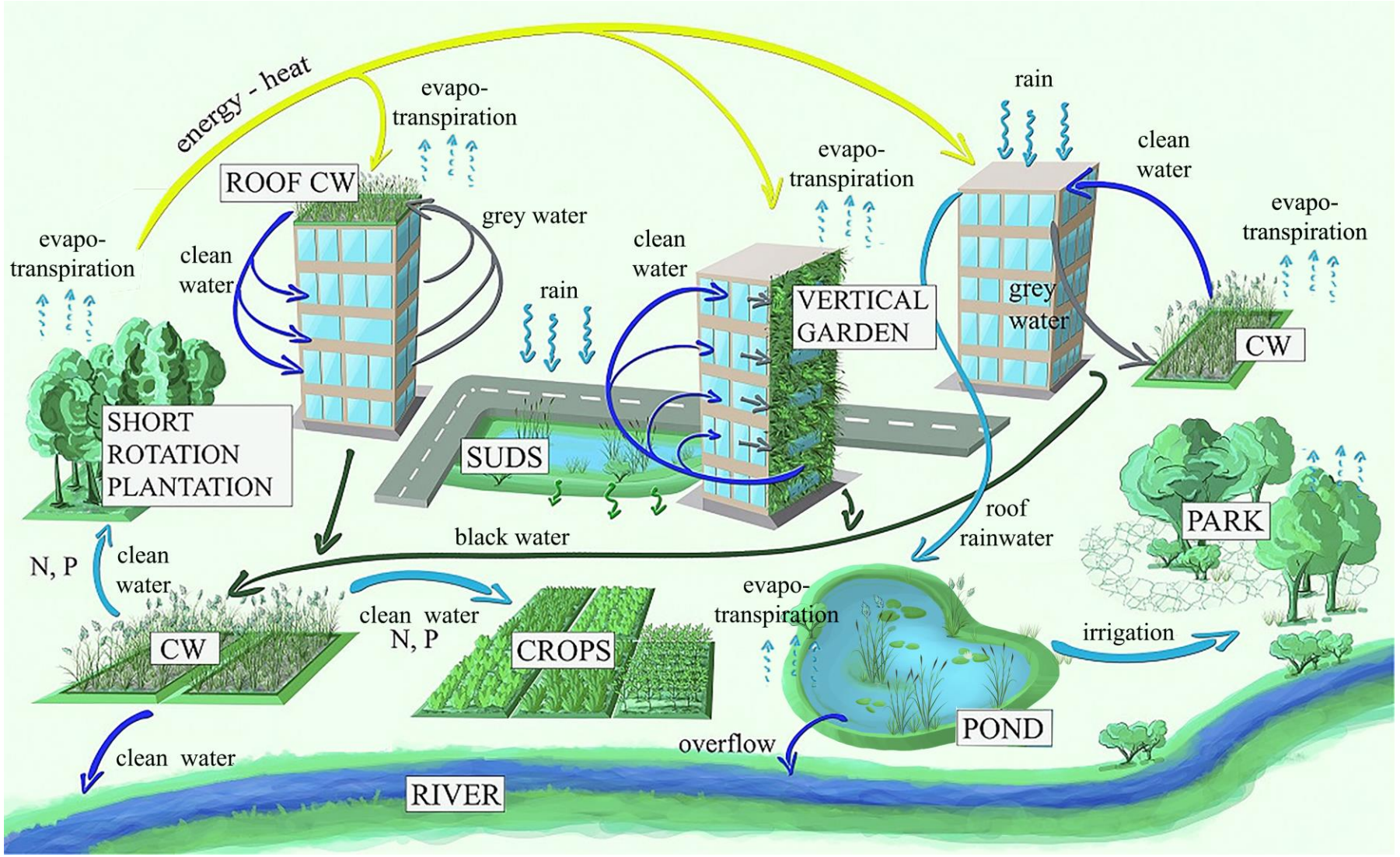
Demonstrators & replication sites



Demonstrators & replication sites



NEXUS IN SMART CITIES



Demonstrators & replication sites

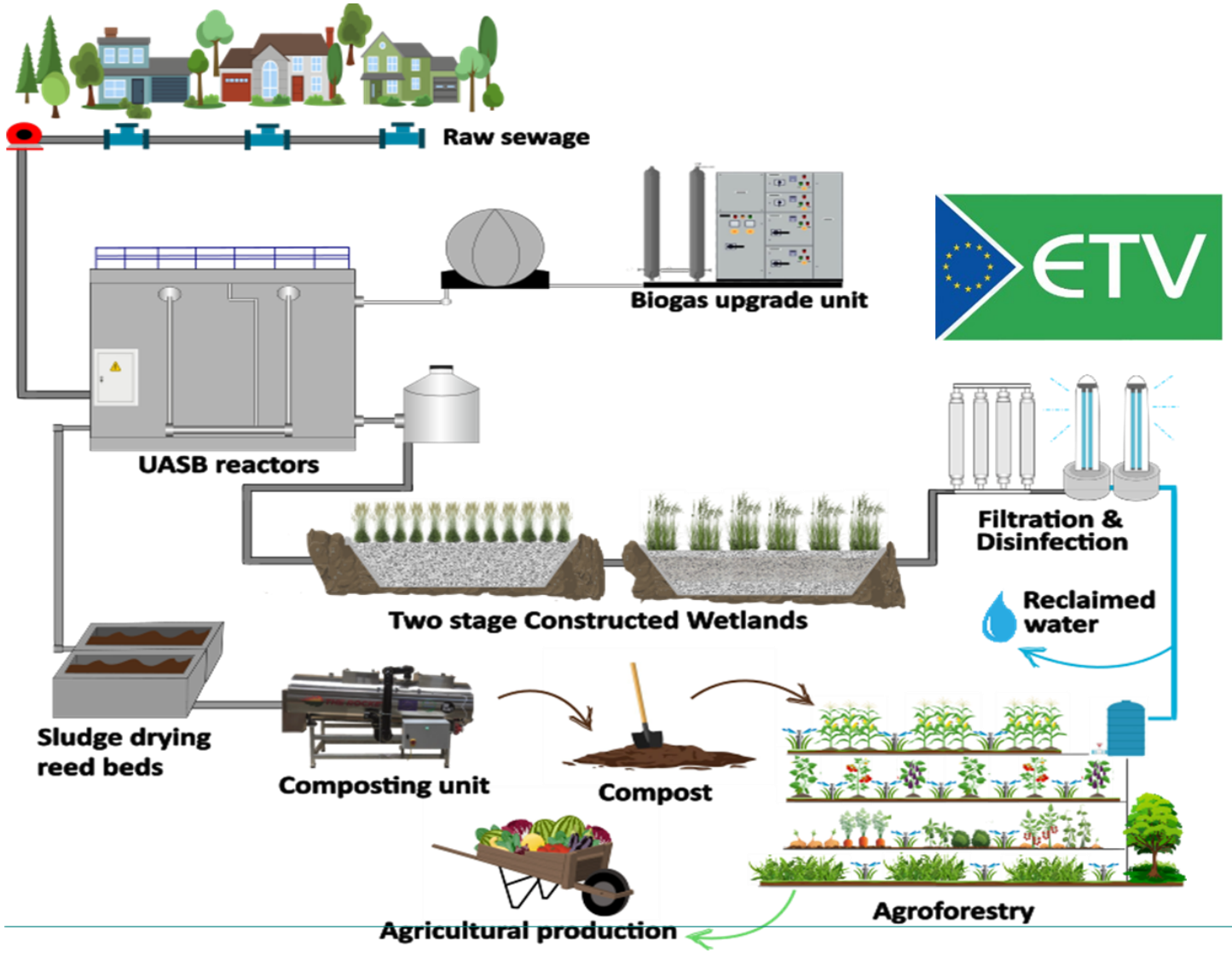
DEMO 1
DEMO 2
DEMO 3
DEMO 4
DEMO 5
DEMO 6
DEMO 7
DEMO 8
DEMO 9

Valorization of non-conventional water loops on Aegean islands

Solutions

- Constructed Wetlands
- Circular Agroforestry
- Water valorisation
- Subsurface water harvesting
- Bioswale
- Traditional stone weirs
- River flow management

Demo 1 – Antissa – Lesvos Island (GR)



Scope

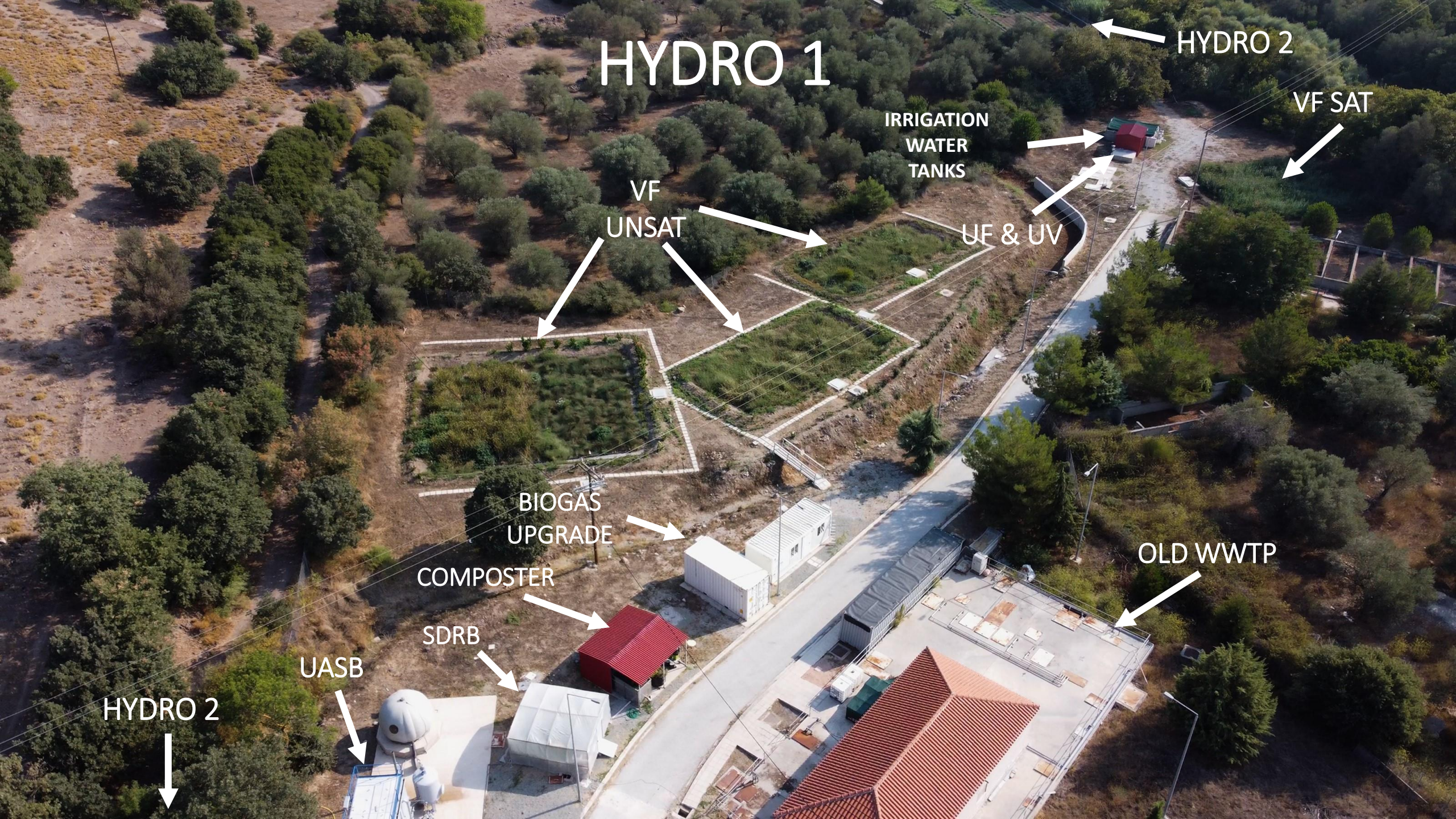
Valorisation of municipal wastewater, energy production, diversified agricultural production, nutrients recycling

Advantages

- Low-cost treatment
- Nutrient recycling
- Versatility (fertigation or irrigation)
- Composting of sludge and green biomass
- Biodiversity enrichment

Challenges

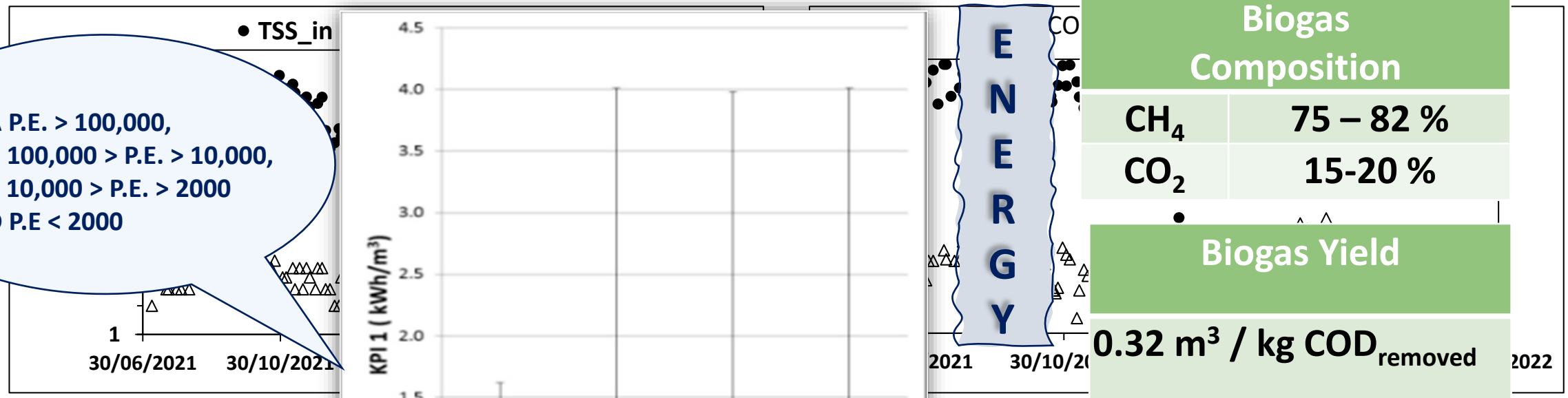
- Community engagement
- Dealing with variable flow rates
- Evidence of cost efficiency


HYDRO 1
HYDRO 2
VF SAT
IRRIGATION
WATER
TANKS
VF
UNSAT
UF & UV
BIOGAS
UPGRADE
COMPOSTER
SDRB
UASB
HYDRO 2
OLD WWTP

HYDRO1, Decentralized WWT, Lesvos Island Greece

O P E R A T I O N

Class A P.E. > 100,000,
Class B 100,000 > P.E. > 10,000,
Class C 10,000 > P.E. > 2000
Class D P.E < 2000

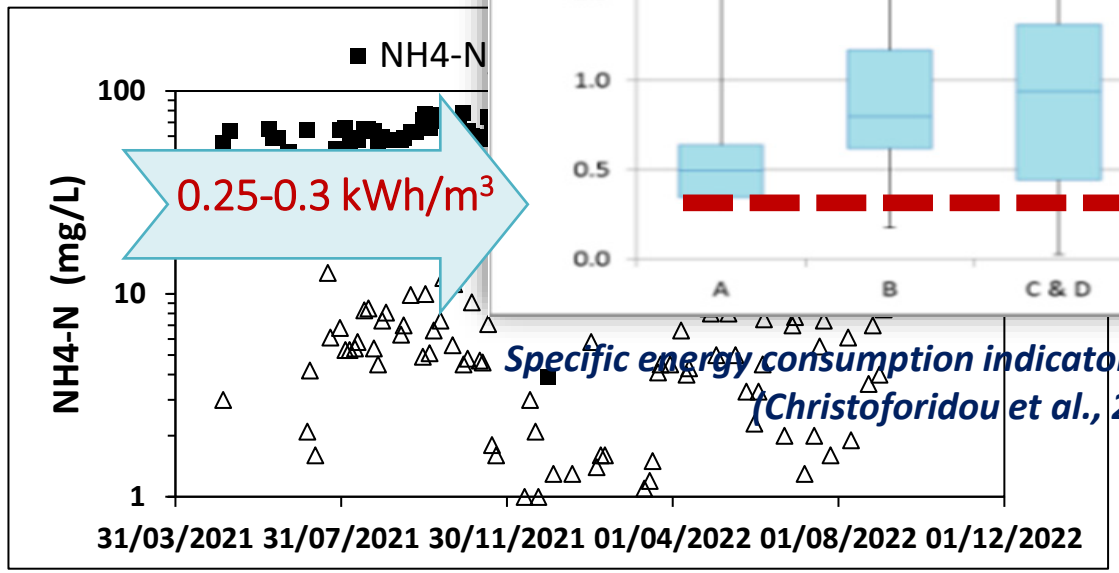


E N E R G Y

Biogas Composition	
CH_4	75 – 82 %
CO_2	15-20 %

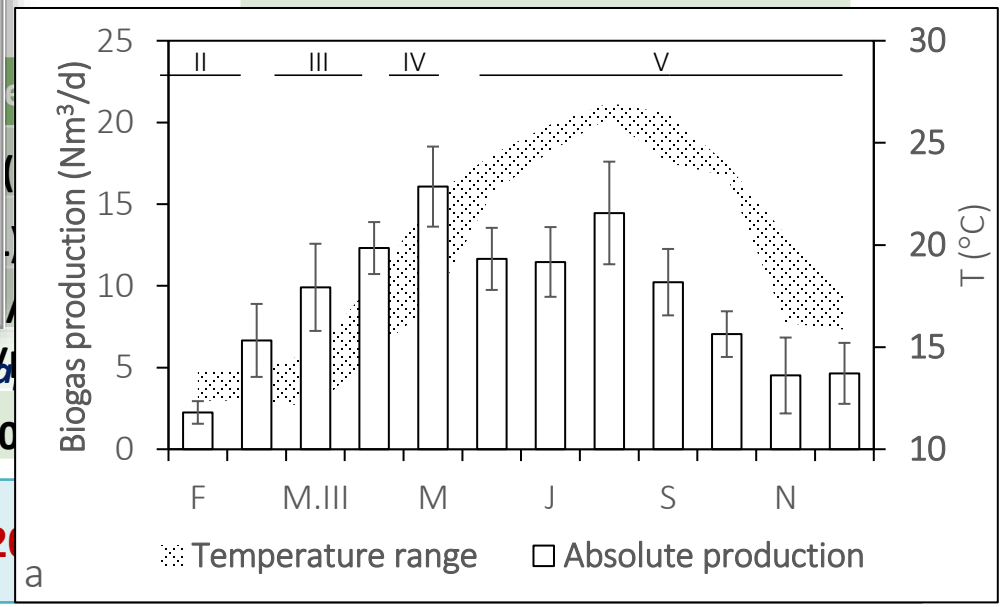
Biogas Yield

0.32 m^3 / kg $COD_{removed}$



0.25-0.3 kWh/m^3

Specific energy consumption indicators per plant (Christoforidou et al., 2020)

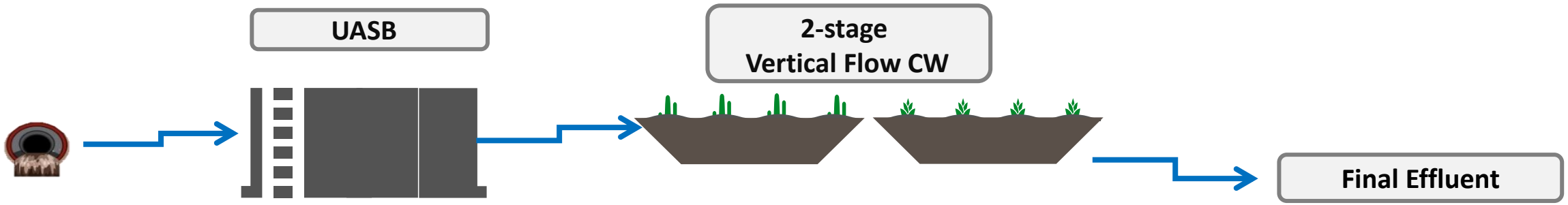


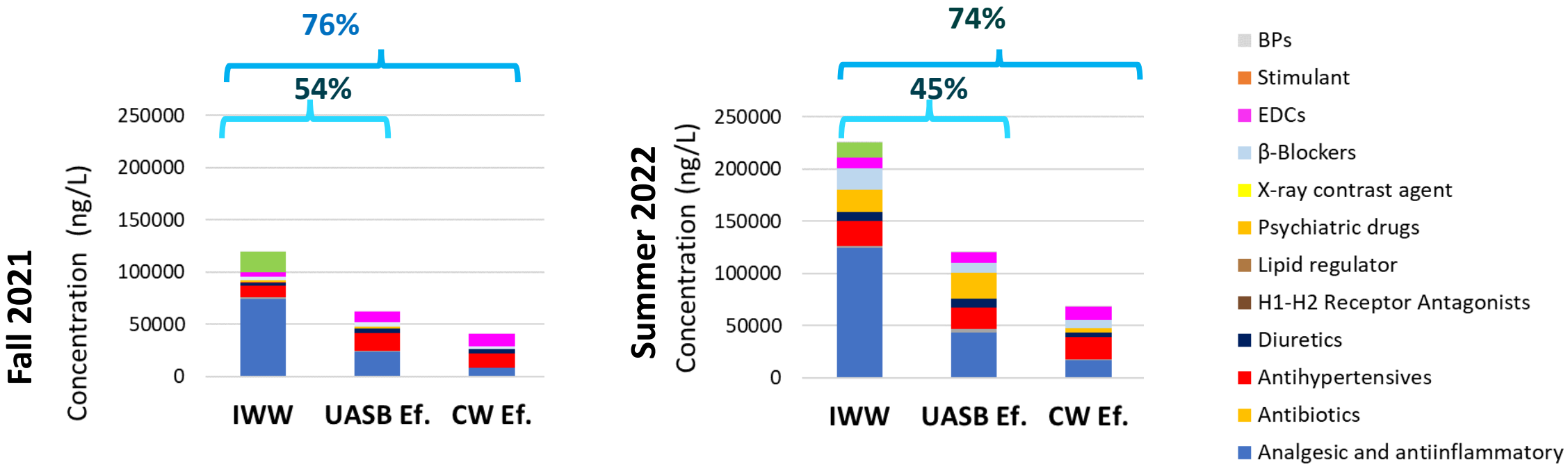
COD (mg/L

EC (/100

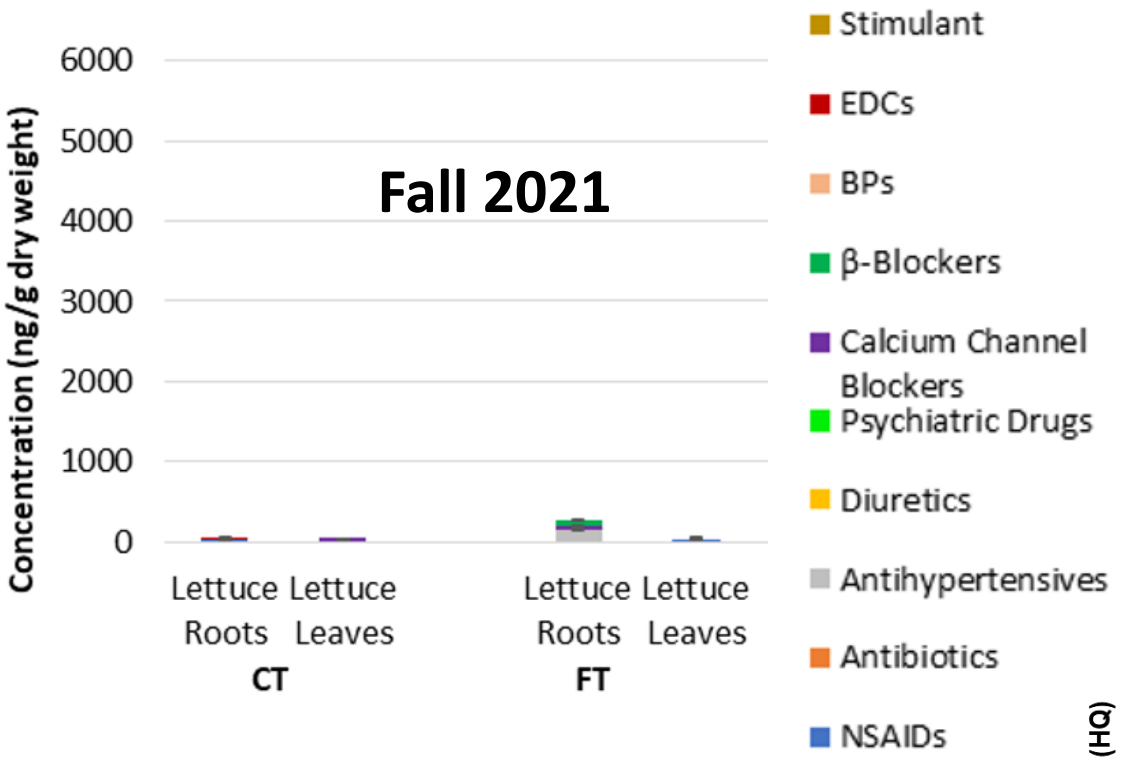
EU, 2020

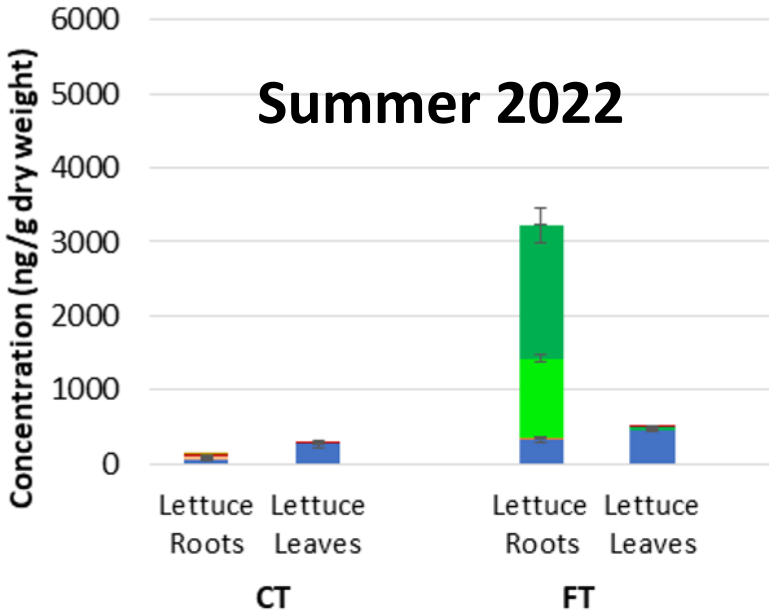
Fate and Removal of Emerging Contaminants in Decentralized Applications



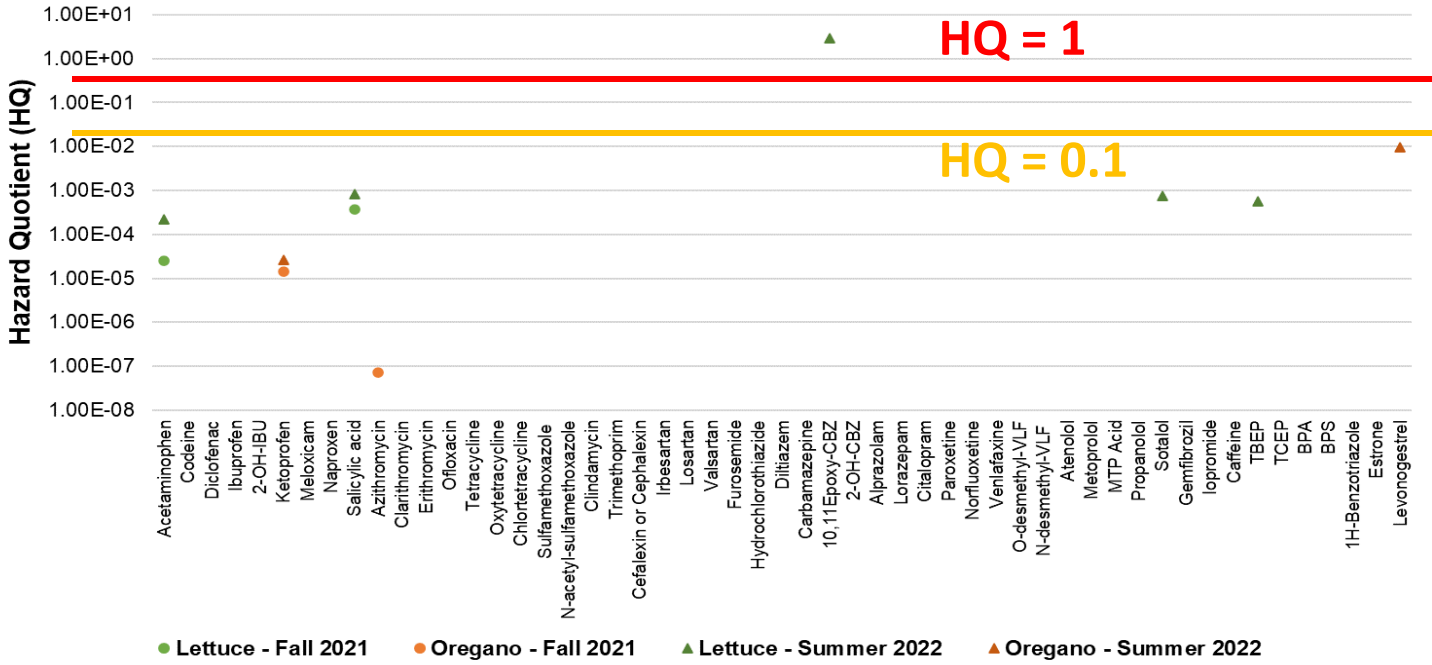


Human health risk assessment: lettuce





No risk generally expected to human health due to the ingestion of **lettuce** and **oregano** irrigated with treated wastewater



HYDRO2. Agroforestry system - Lesvos island Greece

previous status VS current status

Main field - October 2020

Main field - today

Second field - June 2021

Second field - today

- About **10,000 plants** are growing
- Wide diversity of **trees, crops, aromatic plants and vegetables**
- More than **15 tonnes of harvested products**

HYDRO2. Agroforestry system - Lesvos island Greece

Current status

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Thank you for your attention!

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