



# Signing Urban Nature-Based Solutions for Greywater Reuse e-TWS

March 1, 2021

Nature-Based Solutions at European level:  
projects, results and publications

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## Nature Based Solutions for Domestic Water Reuse in Mediterranean Countries

ITALY

- Latina Province, Lead Partner, *Lazio*
- Iridra , *Tuscany*
- Euro-Mediterranean Centre for the Sustainable Development (SVIMED), *Sicily*

MALTA

- Energy Water Agency (EWA)

TUNISIA

- CERTE - Centre for Water Research and Technologies

JORDAN

- University of Jordan, Amman

LEBANON

- American University of Beirut

### ASSOCIATED Partners

Municipality of Tunis (TUNISIA)

Municipality of Ferla (ITALY)

Municipality of Jerash (JORDAN)

Polythecnic of Turin (ITALY)

**Budget: 3.2 Million total budget**  
(90% ENI CBC MED Programme  
EU- contribution)

**Duration in months: 36 months**  
10/09/2019 – 9/09/2022





## THE ENI CBC MED PROGRAMME

The NAWAMED project has been funded under the **2014-2020 ENI CBC Mediterranean Sea Basin Programme.**

ENI CBC Med is the largest **Cross-Border Cooperation initiative** implemented by the EU under the **European Neighbourhood Instrument.**

The Programme brings together the coastal territories of **14 EU and partner countries** in view of fostering fair, equitable and sustainable development on both sides of the EU's external borders.

The strategic framework of the Programme is based on **4 Thematic Objectives and 11 Priorities** as a contribution to the main socio-economic and environmental challenges of the Mediterranean region.

# THE ENI CBC MED PROGRAMME THEMATIC OBJECTIVES AND PRIORITIES



- A.1 - Business and SMEs development
- A.2 - Support to education, research, technological development & innovation
- A.3 - Promotion of social inclusion and the fight against poverty
- B.4 - Environmental protection, climate change adaptation and mitigation



## NAWAMED general objective



Beirut, by Patrick Blanc

NAWAMED aims at **changing the urban water management practice** by mean of innovative, sustainable, and low-cost treatment technologies – **nature-based solutions** applicable in a **decentralized way**, to replace the use of potable water with good quality of NCW – Non Conventional Water.

# Main steps and expected achievements



- ✓ **8 real scale pilot installation** for greywater/rainwater treatment and reuse including living green walls (vertical vegetation set up on building façades), rooftop wetlands
- ✓ **15 technical visits** to pilot sites
- ✓ **5 training workshops** organised for technical staff

## Who will benefit?

- ❖ Owners/managers of the 8 pilot sites
- ❖ 450 practitioners (e.g. engineers, architects, etc.), construction companies, university students
- ❖ 50 staff of local and regional authorities

- ✓ **5 Decision Makers workshops**
- ✓ **‘Water tables’** involving key water stakeholders in participatory processes aimed at boosting new policies for more sustainable water management

# The EU and Nature-Based Solutions (NBS)

The Commission defines Nature-Based Solutions as

“solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience.

Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions”

It further emphasizes that “NBS must benefit biodiversity and support the delivery of a range of ecosystem services”





## NAWAMED: potential for nature-based solutions in circular economy, resource-oriented, and ecosystem services approaches

Fabio Masi and Anacleto Rizzo of IRIDRA s.r.l., technical partner of the NAWAMED project, with Martin Regelsberger of the Austrian Technisches Büro Regelsberger, have recently published an article in the “Journal of Environmental Management” on the role of Nature-Based Solutions, specifically of constructed wetlands, to provide and sustain ecosystem services.



NAWAMED: potential for nature-based solutions in circular economy, resource-oriented, and ecosystem services approaches







NAWAMED



A GREEN WALL  
IMPROVES AESTHETICS,  
REGULATES TEMPERATURE,  
AND ENHANCES BIODIVERSITY  
AND AIR QUALITY

# An obstacle or an opportunity?

For most of the 20th century, decision-makers treated the conservation of nature as peripheral to national and global agendas. At best, it was considered a worthy interest, at worst an obstacle to development. However, growing scientific consensus indicate that such views were misplaced and that “nature is essential for human existence and good quality of life”



# UN – a new framework to go beyond the GDP

Making nature count



**United Nations**

Department of  
Economic and  
Social Affairs



System of  
Environmental  
Economic  
Accounting

## MAKING NATURE COUNT

with the System of Environmental-Economic Accounting

[seea.un.org/ecosystem-accounting](https://seea.un.org/ecosystem-accounting)

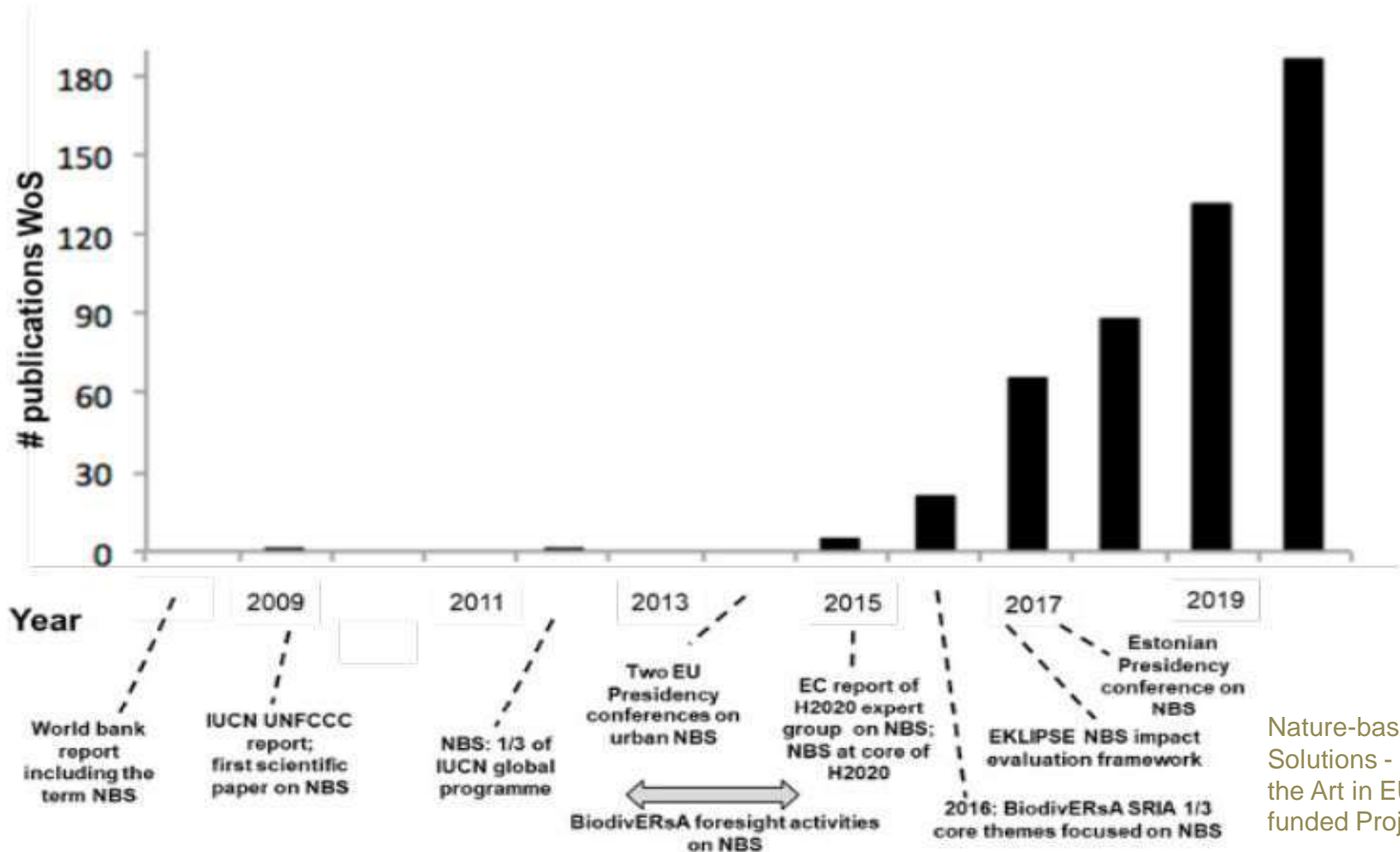
#MakeNatureCount



# 2002-2015-2020



**Figure 1.** NBS publications and policy development timeline (Biodiversa, undated)



Nature-based  
 Solutions - State of  
 the Art in EU-  
 funded Projects

# The challenge

Nature Based Solution are now visible in European, global and national policies.

NBS therefore provide an important opportunity for innovation, research, business development and trade.

However

their practical application cannot yet be classed a 'routine business'.

# Smart solutions



In the urban context, innovative solutions mostly concern **smart engineering solutions**, such as green roofs, urban farming, vertical gardens, green barriers, and sustainable urban drainage systems (SUDS)

**Constructed wetlands** are good examples of *innovative* engineered NBS, designed and constructed **to utilise the natural functions** of wetland vegetation, soils and their microbial populations to treat contaminants in surface water, groundwater, or wastewater.



## Progettazione impianti per pubbliche amministrazioni e enti pubblici

ANNO	PROGETTI	COMMITTENTE	IMPORTO LAVORI €	GRADO DI ATTUAZIONE
1995- 1998	Progetto Esecutivo impianto fitodepurazione SFS-h + prato umido (350 a.e.). Direzione lavori, avvio e monitoraggio impianto. Loc. Isola di Gorgona – Parco Arcipelago Toscano - Premio Carnia '97.	Ministero di Grazia e Giustizia - Isola di Gorgona (LI)	490.634,00	Realizzato
1998	Progetto Esecutivo di un sistema di trattamento dei reflui civili mediante fitodepurazione (900 a.e.): sistema a 3 stadi SFS-h+SFS-v+SFS-h .	Comune di Montecarotto (AN)  (con Studio Tecnico Ing. Gara Jesi (AN))	432.274,00	Realizzato
1999- 2003	Progetto esecutivo impianto misto SFS e FWS per post-trattamento depuratore consortile (60.000 a.e.), Comune di Jesi (AN).	Consorzio Gorgovivo  Comune di Jesi (AN) (Gestore fognatura e depurazione)	1.774.685,00	Realizzato
1999-	Progetto Preliminare, Definitivo, Esecutivo,	Comune di S.	1.013.683,57	Realizzato

1995/1998

[http://www.iridra.eu/it/c  
hi-siamo-new/cv.html](http://www.iridra.eu/it/c hi-siamo-new/cv.html)

# The use of NCW





# INNOVATING WITH NATURE

**Nature-based solutions** are designed to bring more nature and natural features and processes to cities, landscapes and seascapes. These innovative solutions also support economic growth, create jobs and enhance our well-being.





# Pathway



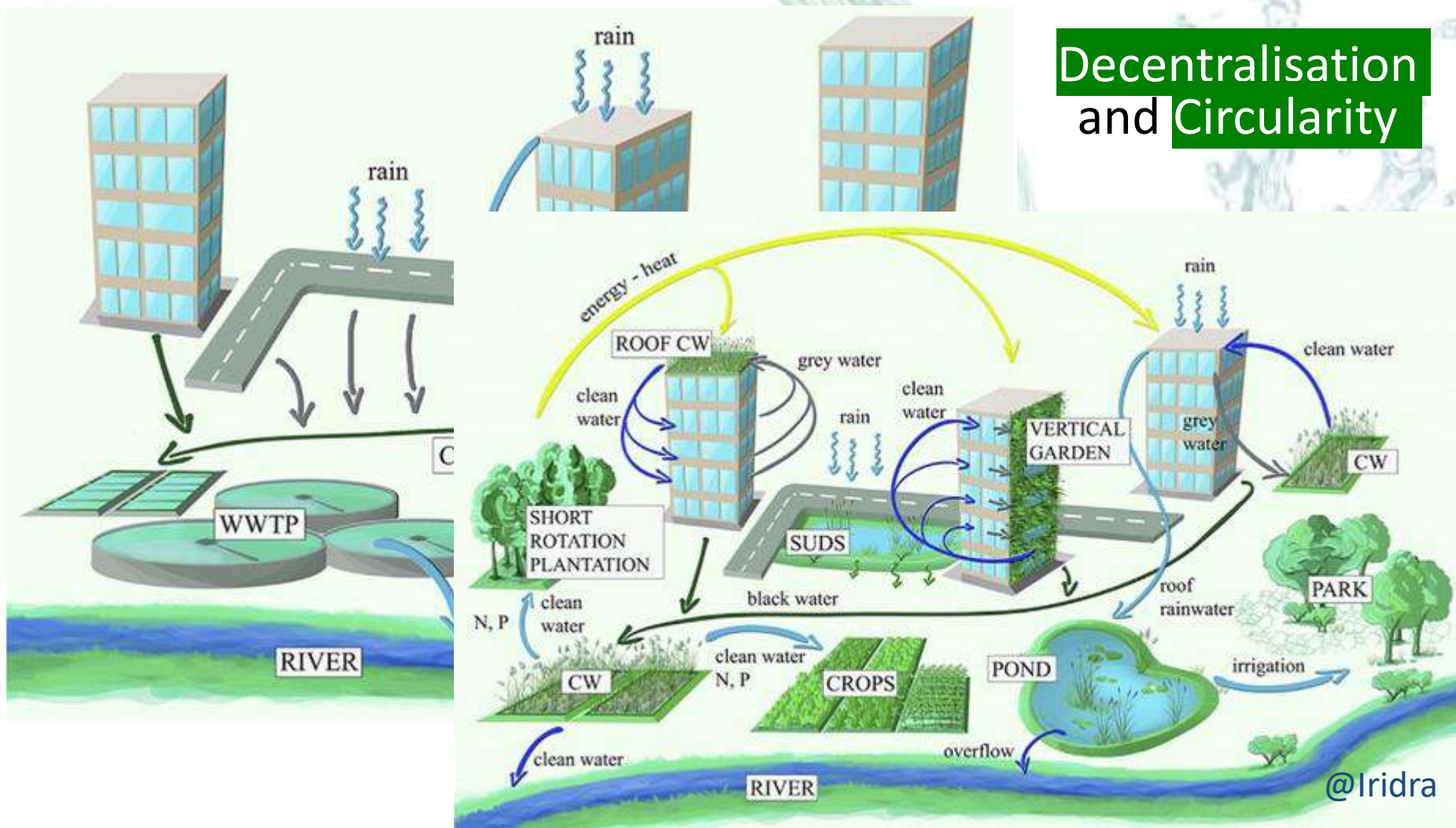
*Yanweizhou multipurpose wetland park in Jinhua, China (<https://oppla.eu/casestudy/18018>)*

Cities need tailored services but also to enhance the physical&mental well-being of citizens

# System


**NAWAMED**

Decentralisation  
and Circularity



@Iridra



# The opportunity to re-think the approach

The benefits and opportunities achievable using Nature-based Solutions to address global and societal challenges have never been more relevant, important or urgently needed than now.

However

a key question is how to shift them from niche to mainstream



# NATURVATION

WATER CHALLENGES AND NATURE-BASED  
SOLUTIONS

Rethinking water in cities, new partnerships and funding arrangements, new ways of working, enhanced public participation, increased collaboration, and long-term city planning are key factors to achieve environmental, social and economic benefits and create healthier, more resilient and more prosperous cities.

H2020 project: <https://naturvation.eu>

# Multiple challenges for NBS projects



- There is not considerable knowledge regarding designing, implementing, and maintaining NBS or quantifying (including economic valuation) the benefits and co-benefits of their ecosystem services.
- There is a lack of deep understanding among key actors, and a deficiency of skills and experience in various levels of NBS project development.
- Decision makers and practitioners often lack the knowhow to successfully address possible trade-offs and make optimal use of the available technical solutions.
- The lack of ready to use technologies and ready to apply scientific results and concepts, makes the adoption of NBS even more challenging.
- The insufficient follow-up monitoring of implemented NBS impedes the evaluation of their effectiveness and, as such, deprives decision makers and practitioners from valuable conclusions concerning the cost-benefit analysis, the performance, and the longevity of NBS



# Are NBS appropriate for Grey water (GW) treatment?



Science of The Total Environment  
Volume 711, 1 April 2020, 134731



Review

## A review of nature-based solutions for greywater treatment: Applications, hydraulic design, and environmental benefits

Fulvio Boano <sup>a</sup>, Alice Caruso <sup>a</sup>, Elisa Costamagna <sup>a</sup>, Luca Ridolfi <sup>a</sup>, Silvia Fiore <sup>a</sup>, Francesca Demichelis <sup>a</sup>, Ana Galvão <sup>b</sup>, Joana Pisoeiro <sup>b</sup>, Anacleto Rizzo <sup>c</sup>, Fabio Masi <sup>c</sup>

Is it possible to assess the environmental benefits connected to the application of NBS to GW treatment compared to conventional WW treatment processes?

Is there enough available information to guide designers in the full-scale application of NBS for GW treatment?

[A review of nature-based solutions for greywater treatment: Applications, hydraulic design, and environmental benefits - ScienceDirect](#)



# Financial and administrative barriers

- NBS are often more cost-effective than traditional grey infrastructure alternatives, but despite this, the barriers to their implementation are often more complex. These can be linked to management change, lack of education, partnership working, and securing investment for an emerging and less understood sector
- There is also limited knowledge on how to integrate and mainstream NBS into urban policies, planning processes, and decision-making mechanisms



# HYDROUSA



NAWAMED project: joint efforts are necessary to face institutional fragmentation and legislative bottlenecks to close the water-related loop

*“To fully deliver resource recovery and sustainable water management a co-existence of a proper enabling environment, institutional capacity and management instruments is*



<http://www.enicbcmmed.eu/nawamed-project-join-efforts-face-institutional-fragmentation-and-legislative-bottlenecks-close>





Institute for  
European  
Environmental  
Policy

# Enhancing the uptake of nature-based solutions across EU policies

February 2021



## Case study 2: HYDROUSA – Nature's solutions to water scarcity

HYDROUSA is an EU Horizon 2020 Innovation action project which promotes regenerative, nature-based solutions to water scarcity. Taking inspiration from nature, they develop innovative approaches to help the Mediterranean and other water-scarce regions develop **circular water management and treatment models which simultaneously boost their local economies**.

This nature-based project started in 2018 and brings together 28 partners from a range of different groups including research institutions, water utilities, NGOs, companies and municipalities.

Their innovative solutions will be implemented in six demonstration sites on three Greek islands:

1. **Lesbos.** Here, natural anaerobic processes and constructed wetlands will be used to **treat household sewage in a completely circular system** where all by-products can be re-used. Biogas will be used to fuel cars, sludge will be used as fertiliser and clean water will then be used to irrigate agricultural land. Some of this nutrient-rich wastewater will then be used to maintain a rich **agroforestry** ecosystem so that a variety of products, from forestry trees for food and timber to superfoods for essential oils, can be cultivated with no fertiliser input.
2. **Mykonos.** Here, two **rainwater harvesting systems** will be used: one in a remote area to cultivate oregano and another in a residential area to collect rainwater from rooftops to meet household water needs, recharge

Policy brief

## Nature-based solutions and their socio-economic benefits for Europe's



# mood board

## Think globally, act locally

## Think nature, act locally



### LARGE-SCALE DEMONSTRATION PROJECTS

living labs connect researchers,  
public authorities, businesses,  
industry, local communities



### CO-DESIGN, MUTUAL LEARNING

local, regional and national decision-makers, researchers,  
private investors, businesses and industry and citizens  
will be encouraged to collaborate, design  
and implement innovative solutions





# Cooperation



[Home](#) [NBS Knowledge Hub](#)

## NATURE-BASED SOLUTIONS Cooperation Manifesto

*Re-naturing cities through the cooperation and  
support of the European Nature-Based Solutions Projects*

One of the most critical impacts on human society and the global environment is aggressive urbanisation, which has increased in scope and scale. Cities have become a point of intersection of problems characterized by complexity and uncertainty. NatureBased Solutions (NBS) are a unifying concept that can support

[H 2020 project - Cooperation Manifesto | ThinkNature Platform \(think-nature.eu\)](#)



# The projects involved





# Networking



is a resource for the nature-based solutions community, creating opportunities for local, regional and international cooperation to **maximise the impact and spread of nature-based solutions.**

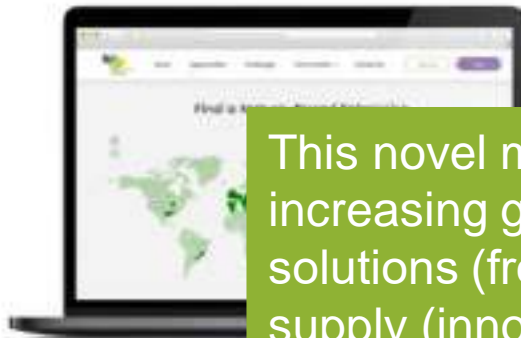


# Connecting Nature Enterprises platform



Home About Innovations Enterprise Platform Summit Series UrbanByNature Resources Cities News

## Connecting Nature Enterprise Platform



The Connecting Nature Enterprise platform is an online marketplace connecting potential buyers with suppliers of nature-based solutions who can help to design, deliver,

This novel marketplace aims to directly connect increasing global market demand for nature-based solutions (from public and private sector 'buyers') with supply (innovative enterprises developing new sustainable nature-based solutions).

# Circular CONCLUSION

One reason for the wide adoption of NBS is that the concept of nature providing solutions is simple in construct and logical for non-specialist understanding.

This has encouraged its uptake in policy, practice and by the private sector, and facilitates opportunities to bring together diverse sectors and stakeholders

Nevertheless, there is yet a risk that NBS will remain a vague term, without operational rigor.

[Core principles for successfully implementing and upscaling Nature-based Solutions](#) - ScienceDirect



# Nature-based solutions | European Commission



Demonstration green walls to treat and reuse grey water:  
from theory to practice



# WE ARE NAWAMED

LET'S JOIN OUR FORCES TO BOOST THE USE OF NON-CONVENTIONAL WATER



INVEST IN NATURE-BASED SOLUTIONS

partners



GOVERNMENT OF  
SARDINIA

HIRIDRA

svimed



AUB  
ARABIC UNIVERSITY OF  
BAGHDAD

THE ENERGY  
& WATER  
INSTITUTE







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**DESIGN AND ARCHITECTURE  
CAN MAKE A BUILDING AN EFFICIENT  
WATER PRODUCER RATHER  
THAN A WATER CONSUMER**