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# Ancestral Hydro-Technologies for Climate Emergency. Using the Past to Rescue the Future

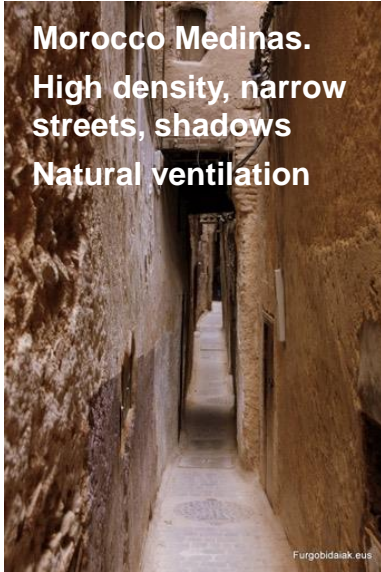
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UNIVERSITAT POLITÈCNICA  
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# Can we learn from the past to adapt to future?

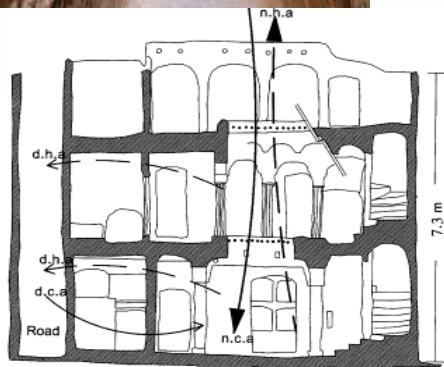


**Human beings have been historically able to adapt to extreme conditions.**

Understanding **how a local population have been co-existing with extreme events and conditions in the past, managing and adapting to their environment.**



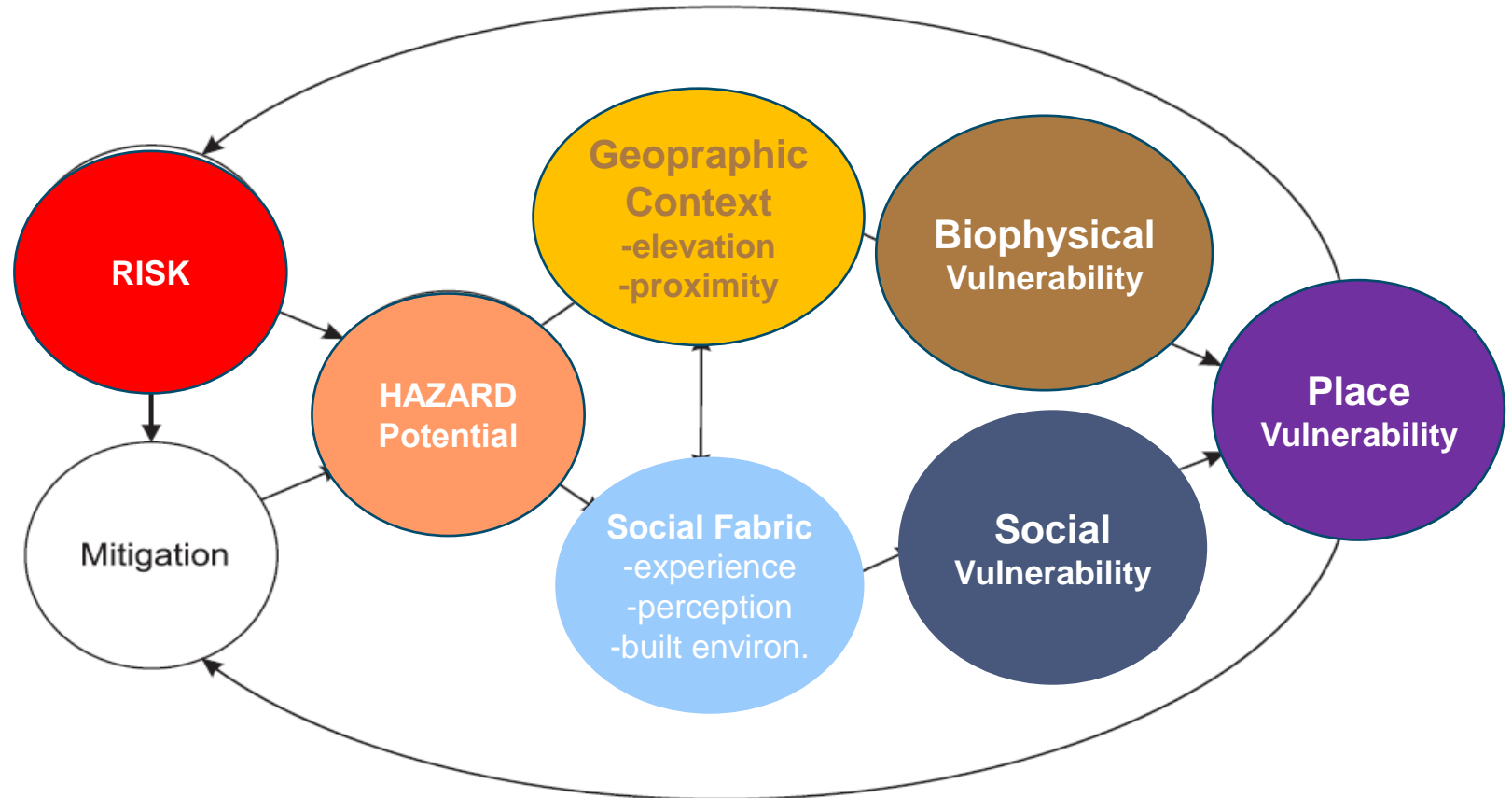
Recover, understand and transfer the specific socio-ecological-cultural and technical systems (SETS), the **intangible heritage, basic to improve climate adaptation**



# The “social fabric” to reduce vulnerability

**Social Fabric:** Experience of community with different threats, and its capacity to confront them, to recover and to adapt (to the presence and to the effects).

**The place:** Physical geography and its characteristics of built territory.



# Local and/or Indigenous Knowledge Systems

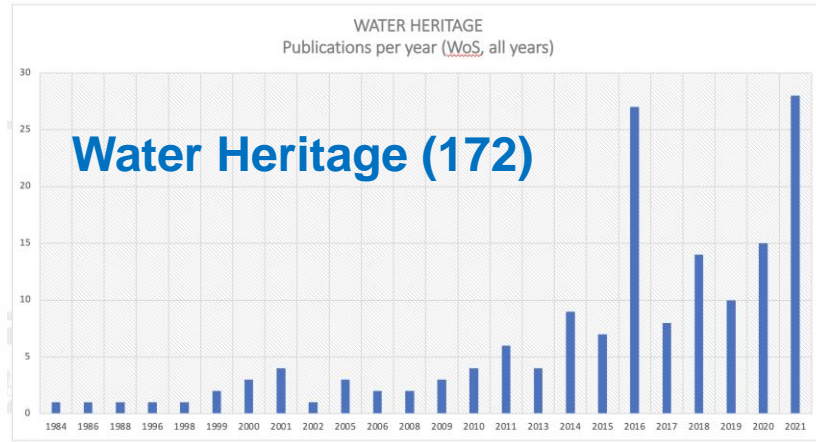
**Knowledge of the specific socio-cultural and technical system of an area is essential to understand how a **local population** has coexisted with extreme events in the past, managing their adaptation to the environment.**



*Community experience in the face of different threats and its capacity to confront, recover and adapt.*



# Water Heritage



- Hydro-Technologies (45)
- Hydraulic Heritage (21)
- Ancestral Water (24)
- Ancient Water (24)



# Lessons Learned from the past - Water Heritage

(a) These civilizations understood the **importance** of sanitation, water supply, and drainage and sewerage systems **for human survival and well-being** and made these an **essential part of urban planning to achieve water resource sustainability**;

(b) **Water quality and security** as one of the critical aspects of the design and construction of their water supply systems.

(c) A **combination and balance of smaller scale measures** (such as cisterns for water harvesting systems) **and the large-scale water supply projects** (such as reservoirs for storage of aqueduct flows) were used by many ancient civilizations thereafter;

(d) **Water technologies** were characterized by **simplicity, ease of operation**, and the requirement of no complex controls, making them more sustainable



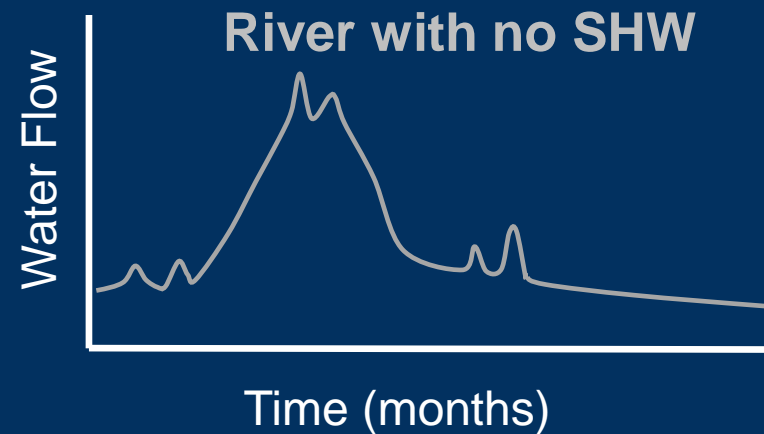
# Ancestral Hydro-technologies: Amunas, Perú

AMUNAS Perú  
Prehispanic Recharge Channels



**AMUNAS - Raining harvesting** above 4,400 meters through **ditches**, taking water to previously identified areas with fractured rocks on the mountain. The **water slowly moves to emerge, months later, through the springs (springs or puquios)**, that are between 1,500 and 1,800 meters below.

## SOWING AND HARVESTING WATER



# Ancestral Hydro-technologies: Hydraulic Zenu system, Colombia

**Zenu Society - 400-600 bC**

**Complex hydraulic system  
(over 500.000 Ha)**

**MULTIFUNCTIONAL**

- Flooding Control**
- Water Security**
- Food Security**

Combination of ridges (Camellones), channels (natural and artificial) and water reservoirs (deep ponds /dikes)

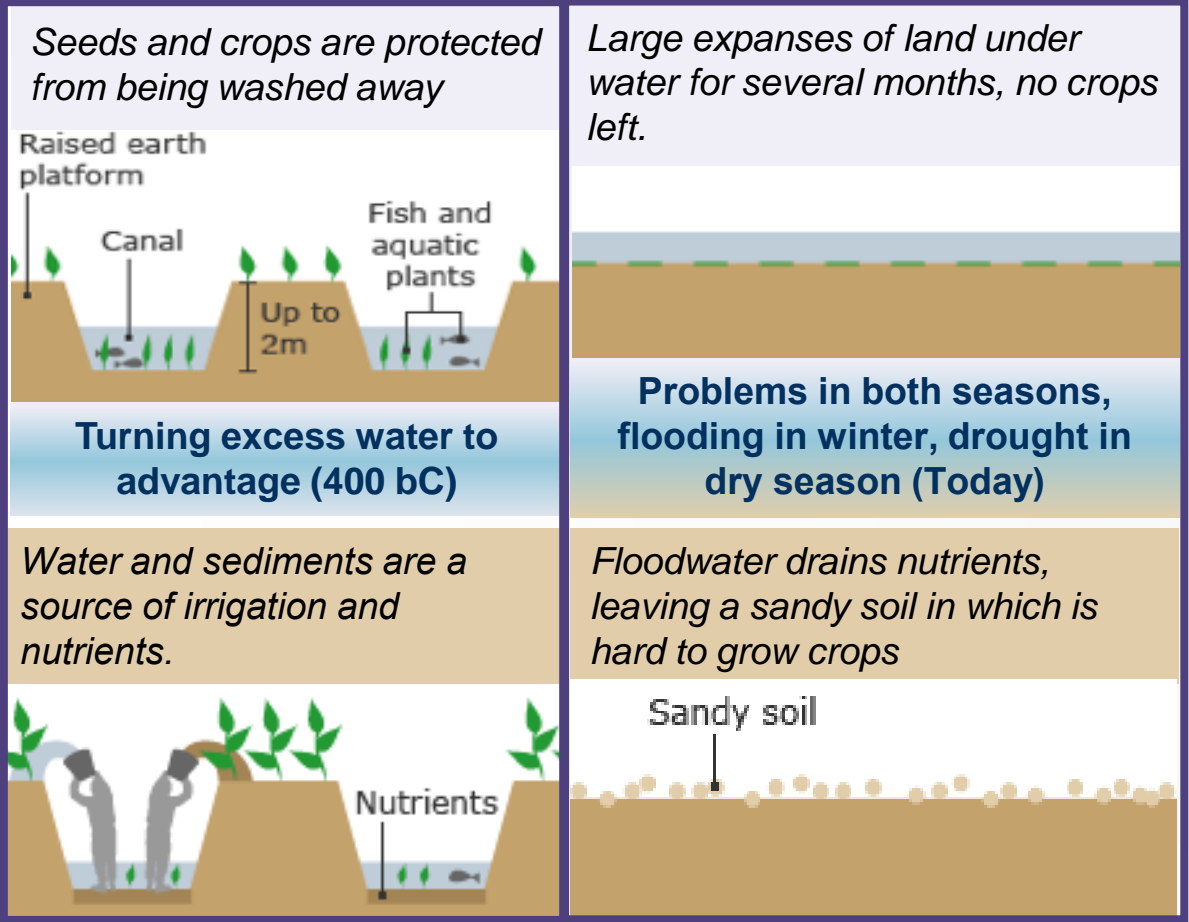


Barcelona, La Mojana - Sucre (Colombia)

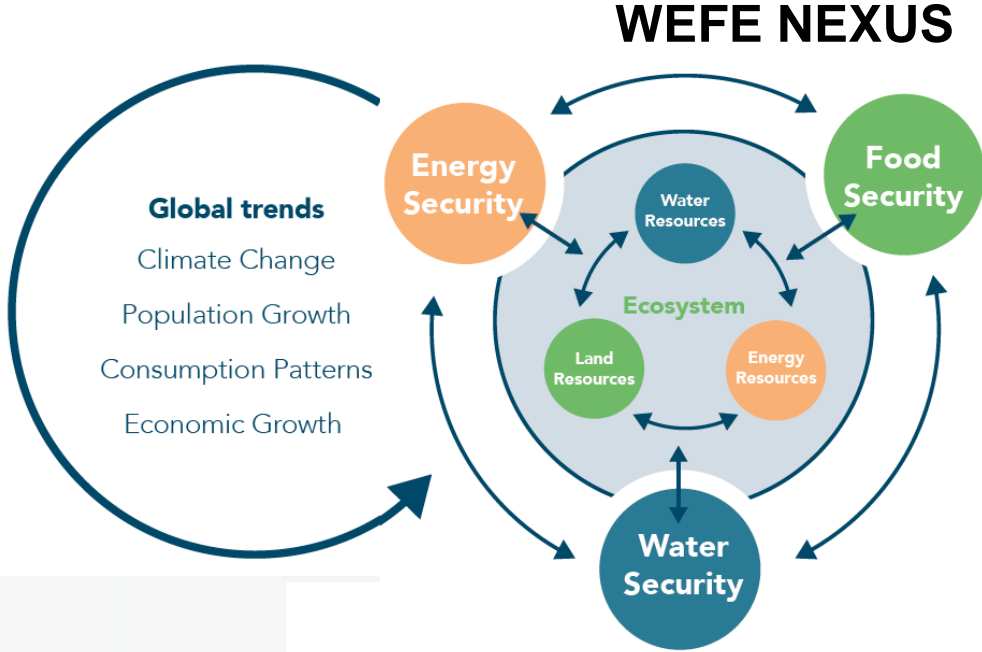




# Ancestral Hydro-technologies: Hydraulic Zenu system, Colombia



**Rainy Season**



**Dry Season**



# Can we replicate Ancestral Hydro-technologies?



Association of producers, fishermen, farmers and agroecological artisans of Purísima Córdoba



**Construction and Implementation of an Ancestral Model of amphibian culture for Adaptation to Climate Change, Socio-Ecosystem Resilience and the Conservation of wetlands.**



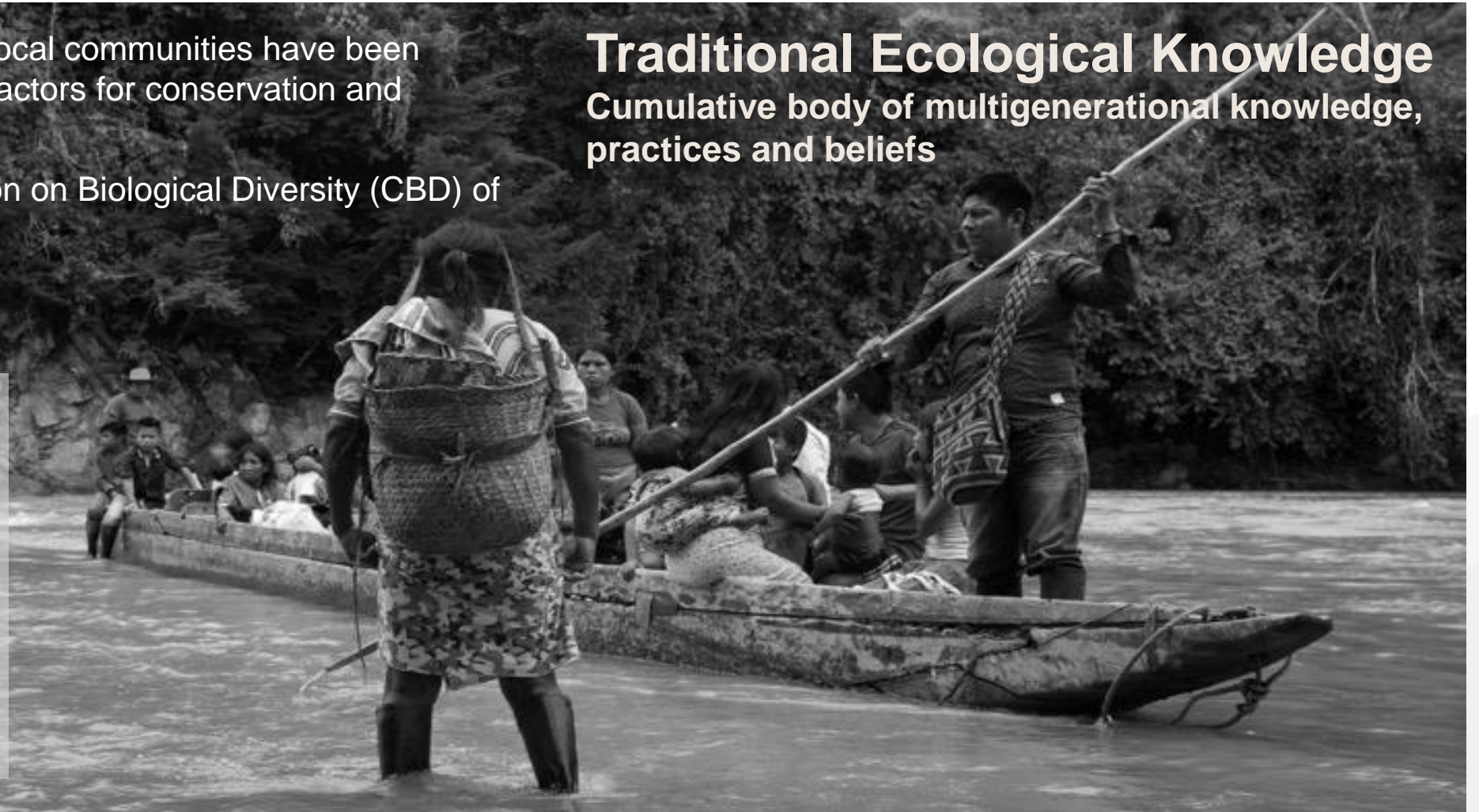
# Using the past to rescue the future: TEK and NBS

Indigenous peoples and local communities have been recognized as key social actors for conservation and sustainable development

Article 8j of the Convention on Biological Diversity (CBD) of the United Nations (UN).

**Traditional Ecological Knowledge**  
Cumulative body of multigenerational knowledge, practices and beliefs

**TEK, developed in direct contact with nature, engineered to sustain rather than exploit resources, fostering symbiosis between species.**



# TEK & Nature-Based Solutions

## Biomimicry – NATURE INSPIRING

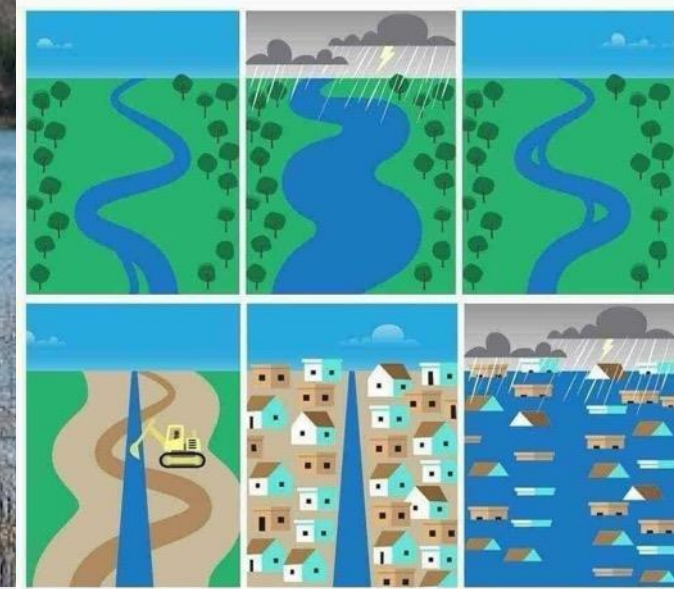
Ecohydrology

Ecotechnologies

Appropriate Technologies

Phytotechnologies

Bioengineering



**Living solutions** inspired by, continuously supported by and utilizing Nature, designed to address societal challenges in a resource efficient and adaptive manner, while providing economic, social and environmental benefits (EC, 2015)

## NATURE BASED SOLUTIONS

### Good for biodiversity

Deployment of urban green infrastructure increases habitat for nature.

### Good for disaster risk reduction

Coral reefs dissipate more than 97% of wave energy.

[Nature communications, 2014]

### Good for our health

Health benefits from NBS include

- reduced depression,
- mental health improvement,
- reduced cardiovascular morbidity,
- improved pregnancy outcomes,
- obesity and diabetes reduction.

[EKLIPSE, 2017]

### Important for jobs and business

Over 56,000 jobs created through the Emscher Landscape Park in North Rhine Westphalia region in Germany.

[WWF ILO Report: Nature Hires, 2020]

### Vital for the climate

37% of climate mitigation needed until 2030 to keep global warming below 2°C.

[IPBES GA SPM key message 08, 2019]

- References:
1. EKLIPSE, An impact evaluation framework to support planning and evaluation of nature-based solutions projects, 2017, <https://bit.ly/3da5n5C>.
  2. IPBES Global Assessment on Biodiversity and Ecosystem Services, Status and Trends - Nature's Contributions to People (NCP), 2019, <https://bit.ly/3i7Bbx>.
  3. Nature communications, The effectiveness of coral reefs for coastal hazard risk reduction and adaptation, 2014, <https://go.nature.com/30FR2y3>.
  4. WWF & ILO, NATURE HIRE: How Nature-based Solutions can power a green jobs recovery, 2020, <https://bit.ly/3k7CFd0>.



There is a vast need for sustainable and cost-effective water supply and sanitation facilities.

Applicability of selected ancient water supply management systems (e.g., storage of rainfall runoff facilities) for the contemporary developing world should be seriously considered.

**Several ancestral hydro-technologies should be considered not as historical artifacts, but as potential models for sustainable water technologies for the present and the future.**



# International Conference

## Ancestral Hydrotechnologies as a Response to Climate, Health and Food Emergencies in the Mediterranean

“Use of Cultural Heritage to Rescue the Future”

Convened by:

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH UNESCO Chair on Sustainability

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WATER MUSEUMS GLOBAL NETWORK

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