

# BEYOND MUSEUMS

12 WEBINARS  
Every Friday from  
October 22nd, 2021 to  
January 21st, 2022  
13.00-15.00 CET

Tools for Promoting the Natural  
and Cultural Water Heritage

## Ancestral Hydrotechnologies for climate emergency Using the past to rescue the future

#Action for transformation



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<http://www.unescosost.org>



Càtedra UNESCO de Sostenibilitat

# UNESCO CHAIR ON SUSTAINABILITY

AT UNIVERSITAT POLITÈCNICA DE CATALUNYA - BARCELONATECH



<http://www.unescosost.org>

## UNESCOSOST IN NUMBERS

THE UNESCO CHAIR ON SUSTAINABILITY (UNESCOSOST)

ESTABLISHED AT THE POLYTECHNICAL UNIVERSITY OF CATALONIA IN

**1996**

Is an organization dedicated to articulate and facilitate a multi-networking collaboration between different institutions in Europe and Latin America and the Caribbean, focused on knowledge and best practices transfer in sustainable human development, from local scale to the global level.

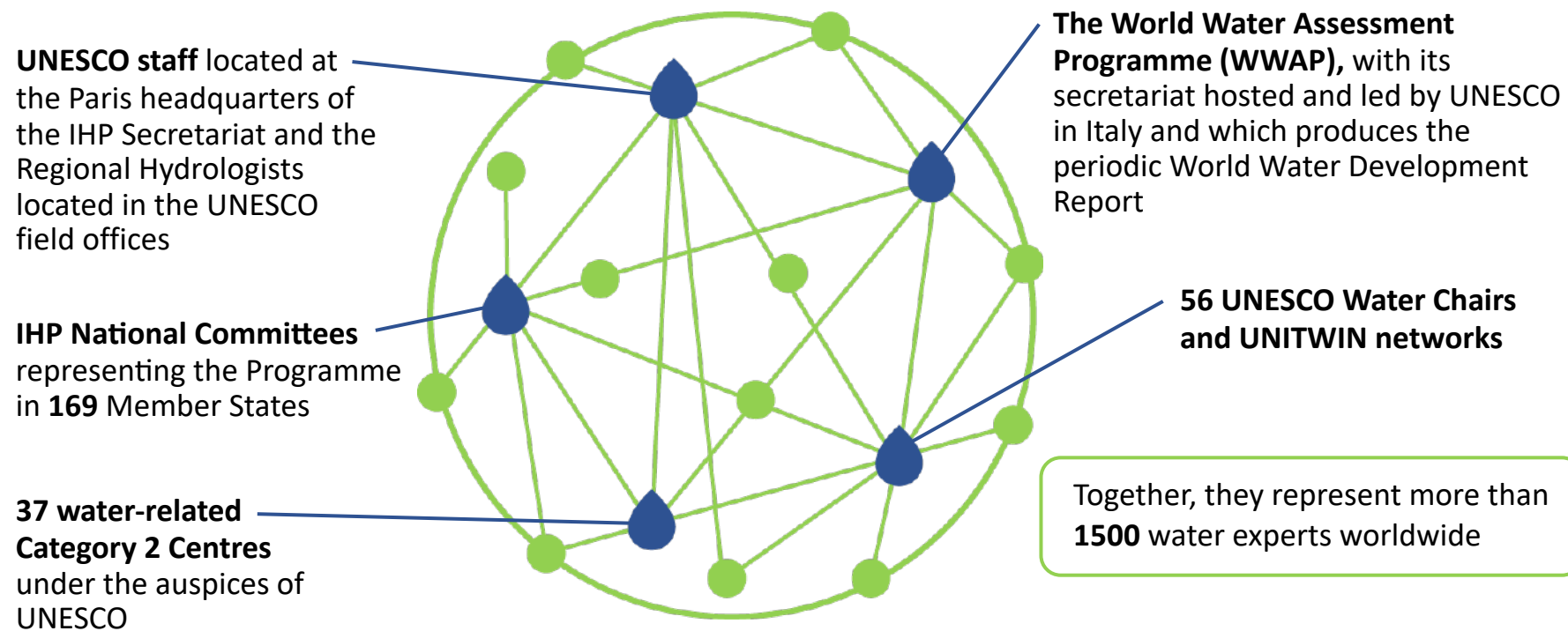
The work carried out over the last

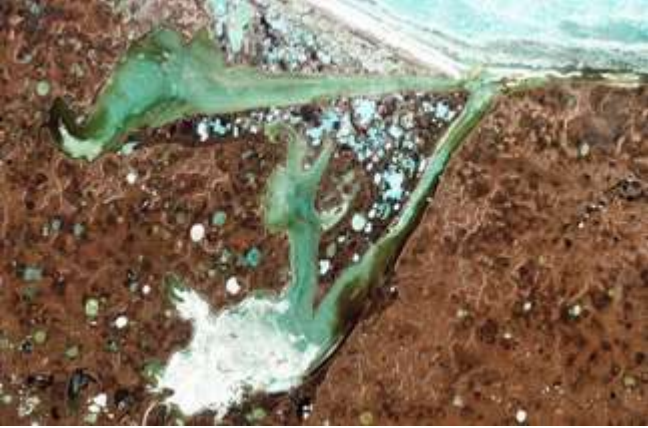
**20 YEARS**

has contributed to turn UNESCOSOST into a model and a pole of innovation and excellence in matters related to the sustainable human development, especially in sustainable water resources management in innovative technologies to meet social, environmental and economic needs, and in the design and articulation of transformation participative projects oriented to SDG.

# The UNESCO Water Family

Since the inception of IHD, UNESCO has been developing a network of networks, often called the UNESCO Water Family. Today, as IHP is working on its eighth phase (IHP-VIII), the UNESCO Water Family operates globally as a network which includes:





# A WORLD IN CLIMATE HEALTH EMERGENCY



## Future of the human climate niche

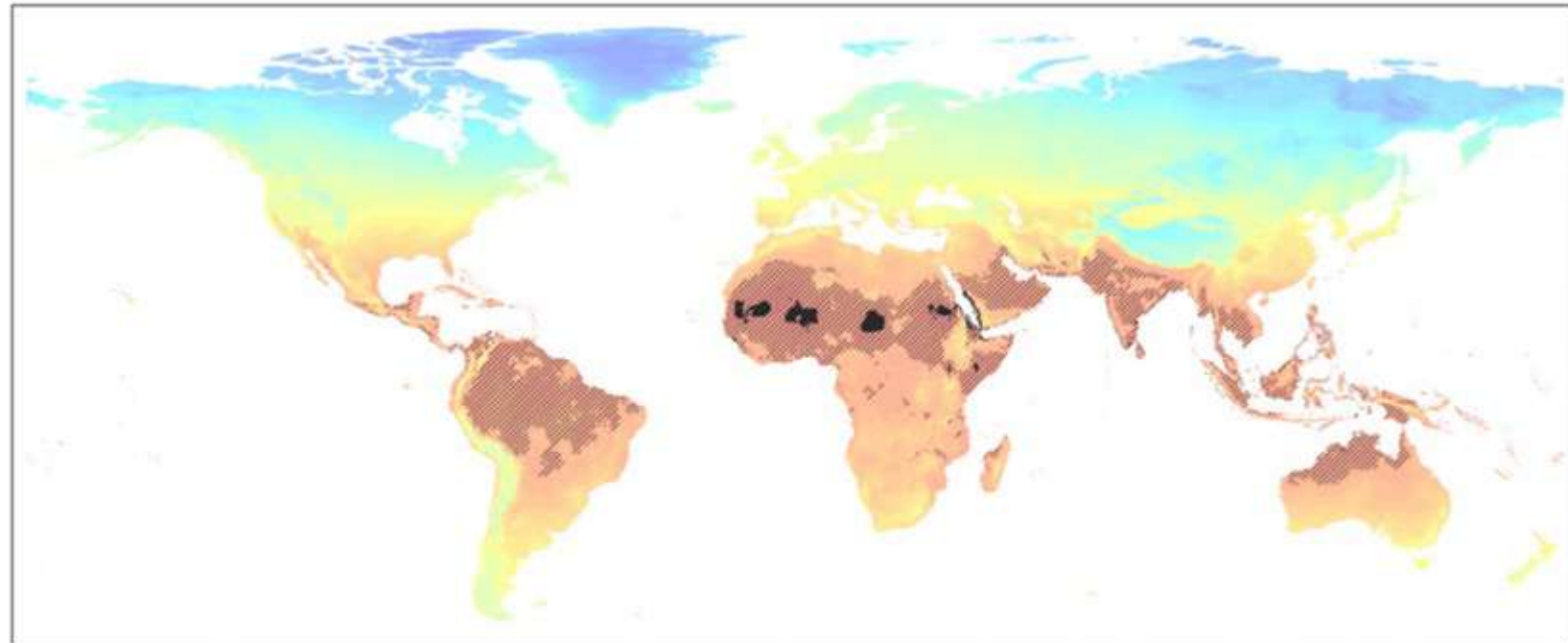
Chi Xu (徐驰)<sup>a,1</sup>, Timothy A. Kohler<sup>b,c,d,e</sup>, Timothy M. Lenton<sup>f</sup>, Jens-Christian Svenning<sup>g</sup>, and Marten Scheffer<sup>c,h,i,1</sup>

<sup>a</sup>School of Life Sciences, Nanjing University, Nanjing 210023, China; <sup>b</sup>Department of Anthropology, Washington State University, Pullman, WA 99164; <sup>c</sup>Santa Fe Institute, Santa Fe, NM 87501; <sup>d</sup>Crow Canyon Archaeological Center, Cortez, CO 81321; <sup>e</sup>Research Institute for Humanity and Nature, Kyoto 603-8047, Japan; <sup>f</sup>Global Systems Institute, University of Exeter, Exeter, EX4 4QE, United Kingdom; <sup>g</sup>Center for Biodiversity Dynamics in a Changing World, Department of Bioscience, Aarhus University, DK-8000 Aarhus C, Denmark; <sup>h</sup>Wageningen University, NL-6700 AA, Wageningen, The Netherlands; and <sup>i</sup>SARAS (South American Institute for Resilience and Sustainability Studies), 10302 Bella Vista, Maldonado, Uruguay

**HUMAN  
CLIMATE NICHE**  
(mean annual T)  
**11-15 °C**



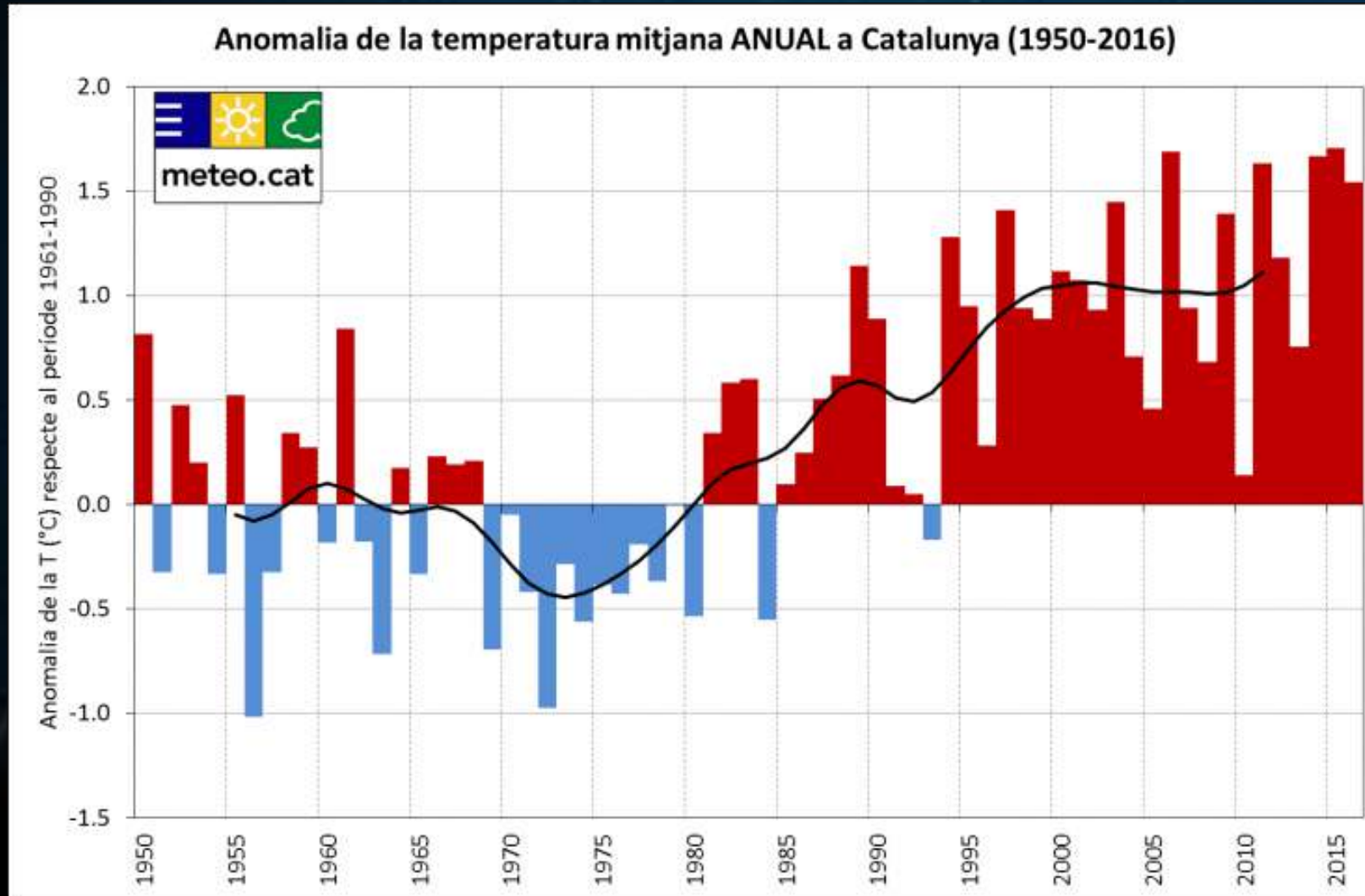
**MAT > 29°C**  
**50 year scenario**



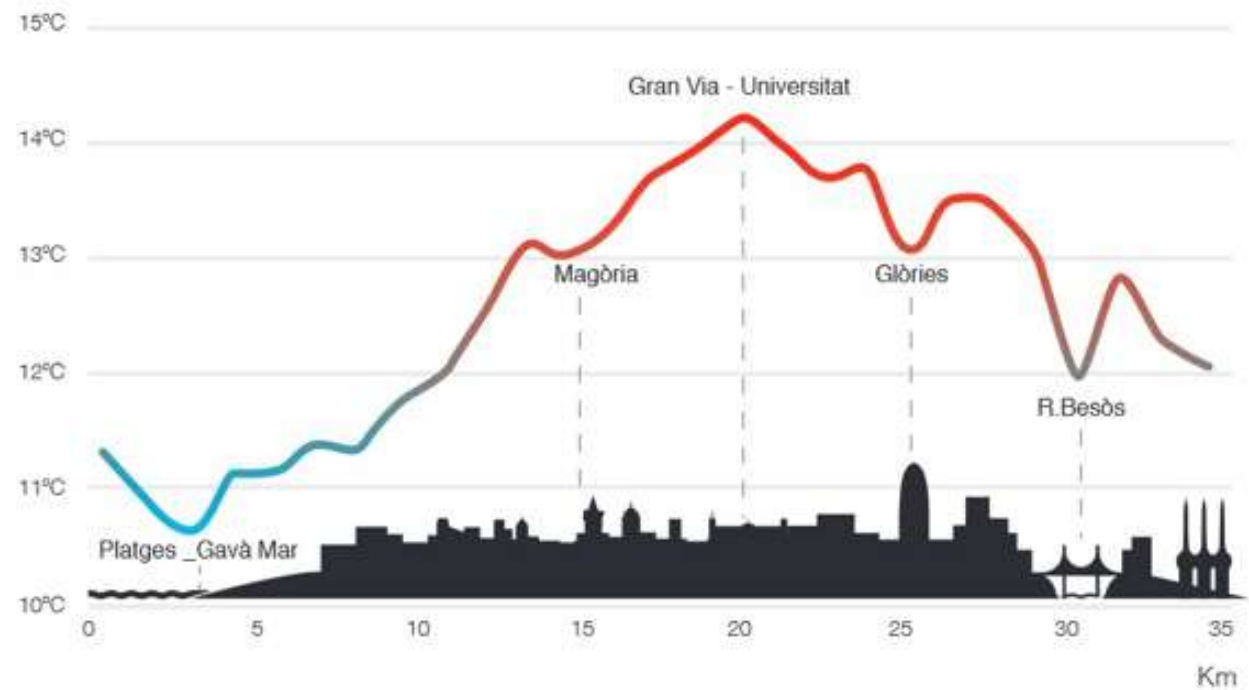
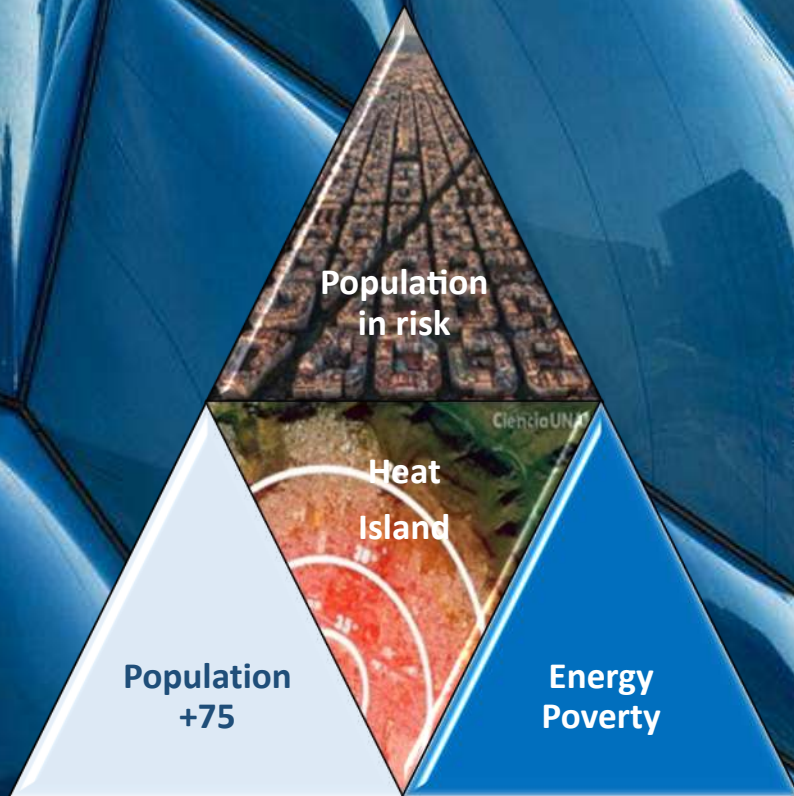
Mean annual temperature



The average temperature has increased 1,6 °C since 1950 in Catalonia.



# HEAT ISLAND EFFECT



# Climate Extreme Events

Drought in Catalonia - 2007 winter – 2008 spring





## Climate Extreme Events

11.10.2018  
Sant Llorenç des Cardassar, Mallorca  
13 dead



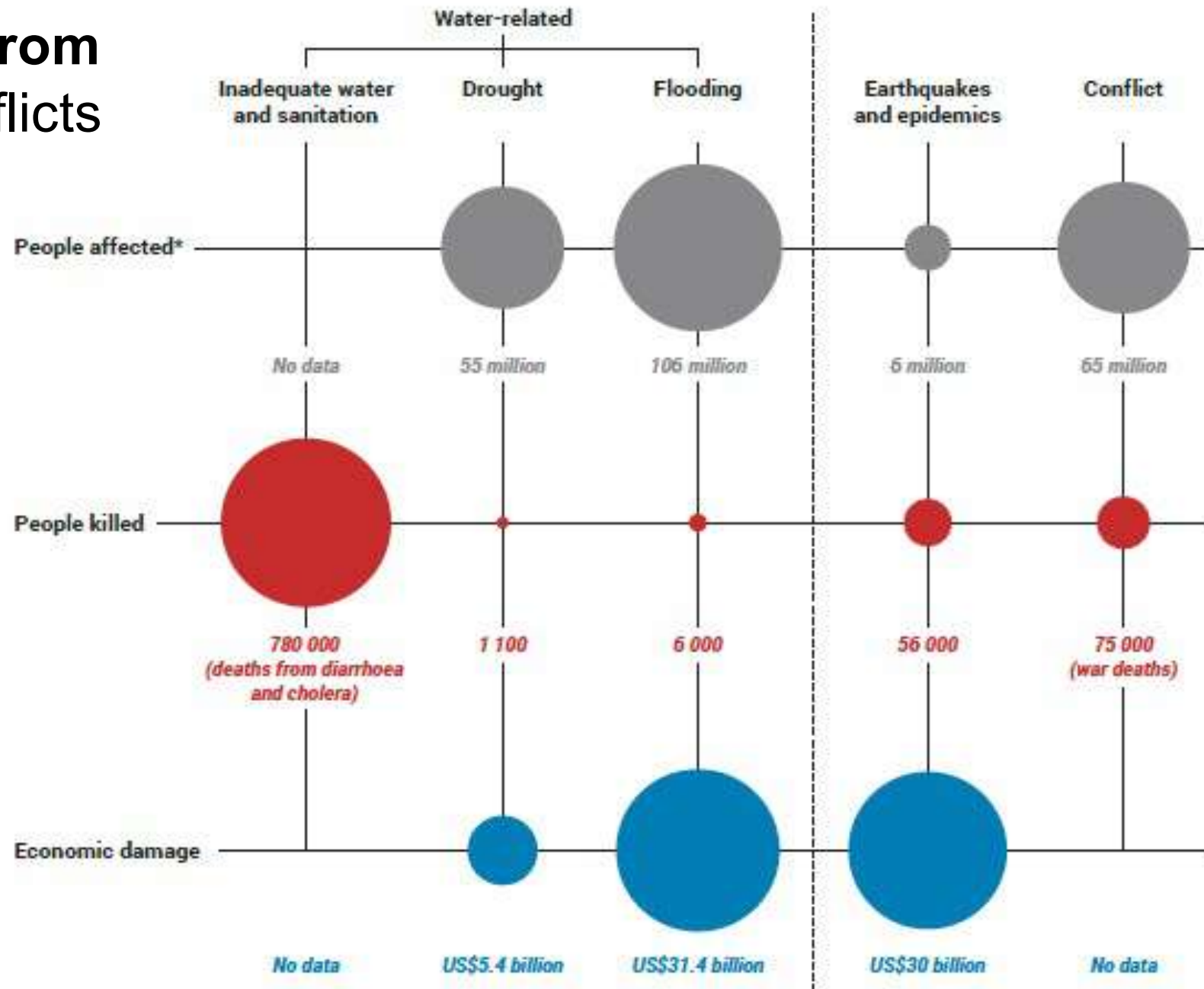


Terrassa  
Rubí

1962

Joana Biarnés, 1962

# Average annual impact from water problems and conflicts





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# AN OVERCROWDED URBAN WORLD



## LESS DEVELOPED COUNTRIES

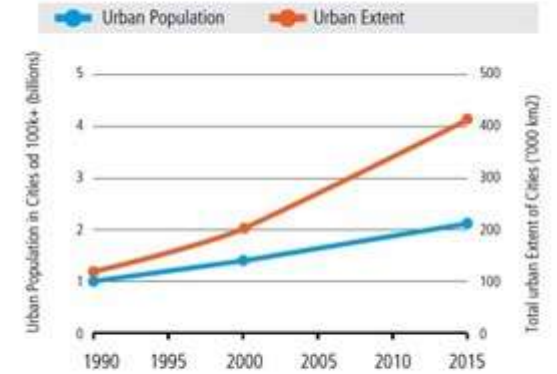


Figure 3: Urban population and urban extent in Less Developed Countries (UN-Habitat, New York University, Lincoln Institute of Land Policy (2016))

## MORE DEVELOPED COUNTRIES

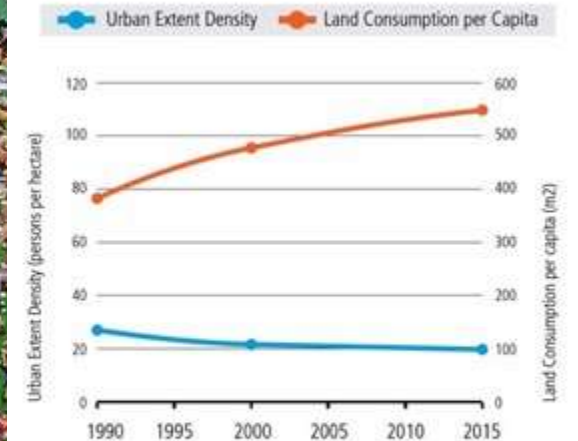


Figure 4: Urban extent density and land consumption per capita in More Developed Countries (UN-Habitat, New York University, Lincoln Institute of Land Policy (2016))



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# AN OVERCROWDED URBAN WORLD - NOT PLANNED

## Urban planning has dramatically decreased

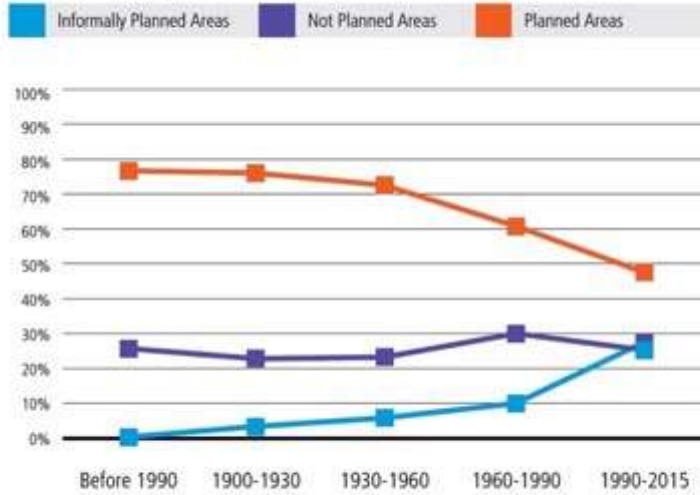


Figure 5: Proportion of urban expansion areas planned, informally planned and not planned (before 1990 to 2015) (UN-Habitat, New York University, Lincoln Institute of Land Policy (2016))



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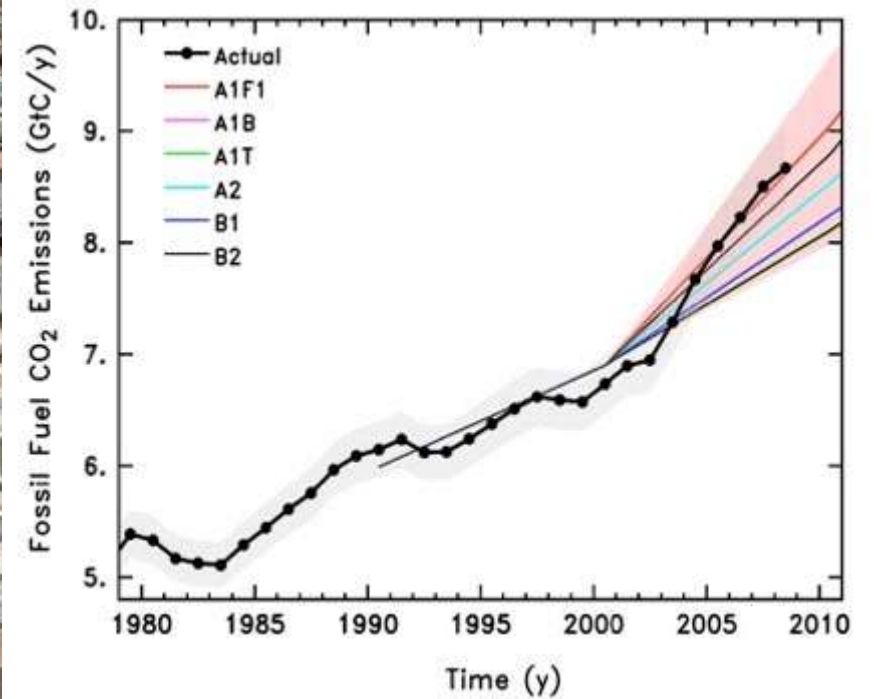
**Territorial model that  
spreads and expands to  
exploit resources**

**City as a consumption  
system**

2% surface

50% population

>75% GHG emissions





CAN WE LEARN FROM THE PAST  
TO ADAPT TO FUTURE?





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## LEARNING FROM THE PAST

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.*



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Chia, Colombia - 2010



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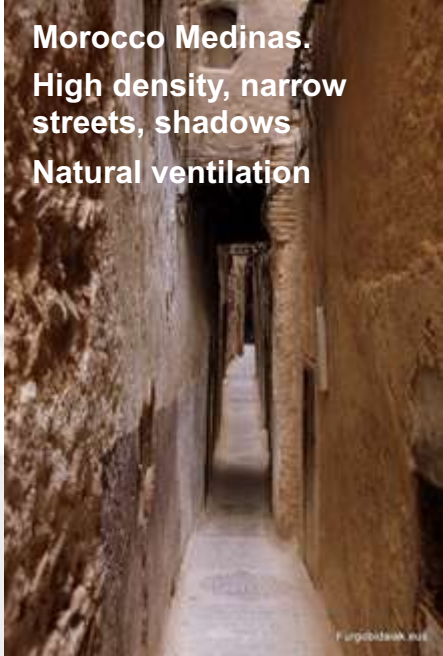


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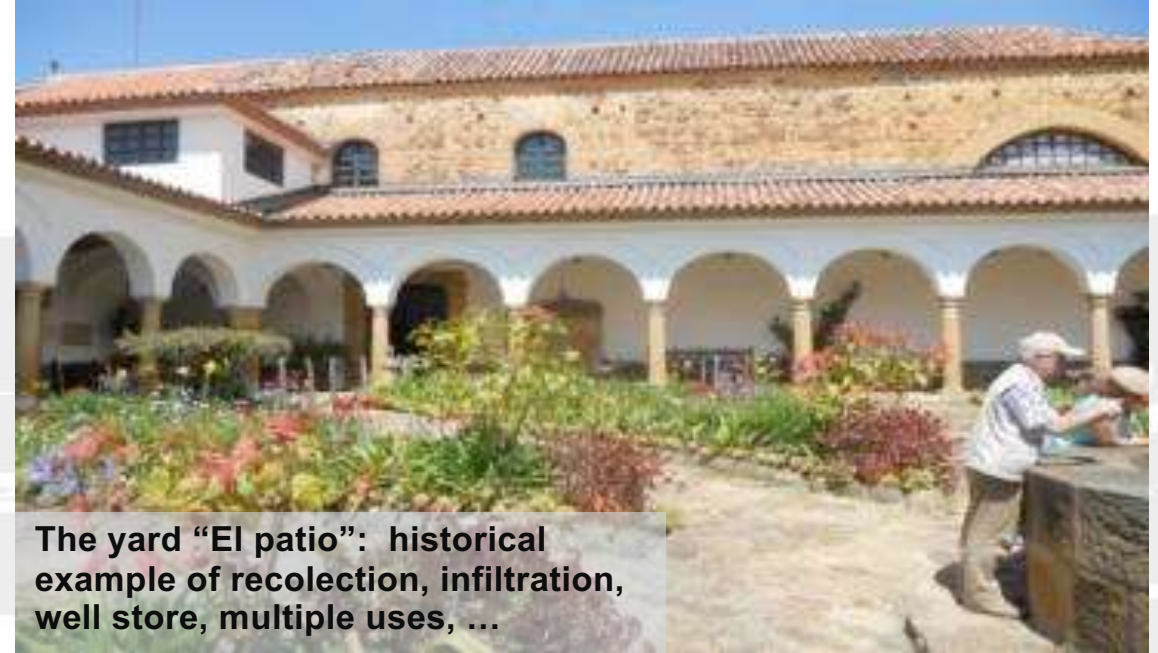
# SETS – SOCIO-ENVIRONMENTAL & TECHNICAL SYSTEMS ... & CULTURAL

Morocco Medinas.  
High density, narrow  
streets, shadows  
Natural ventilation

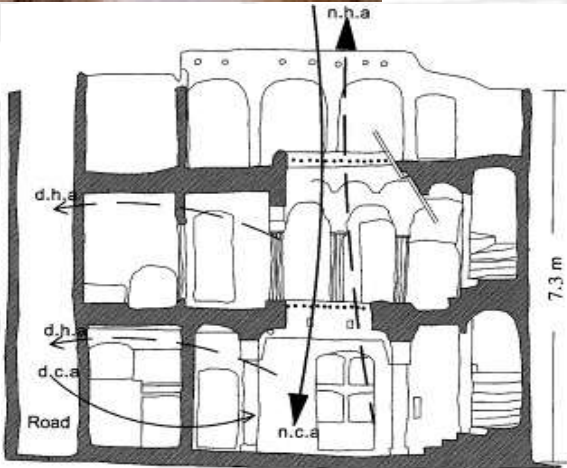


**Human beings have  
been historically  
able to adapt to  
extreme conditions.**

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



The yard “El patio”: historical  
example of reollection, infiltration,  
well store, multiple uses, ...



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

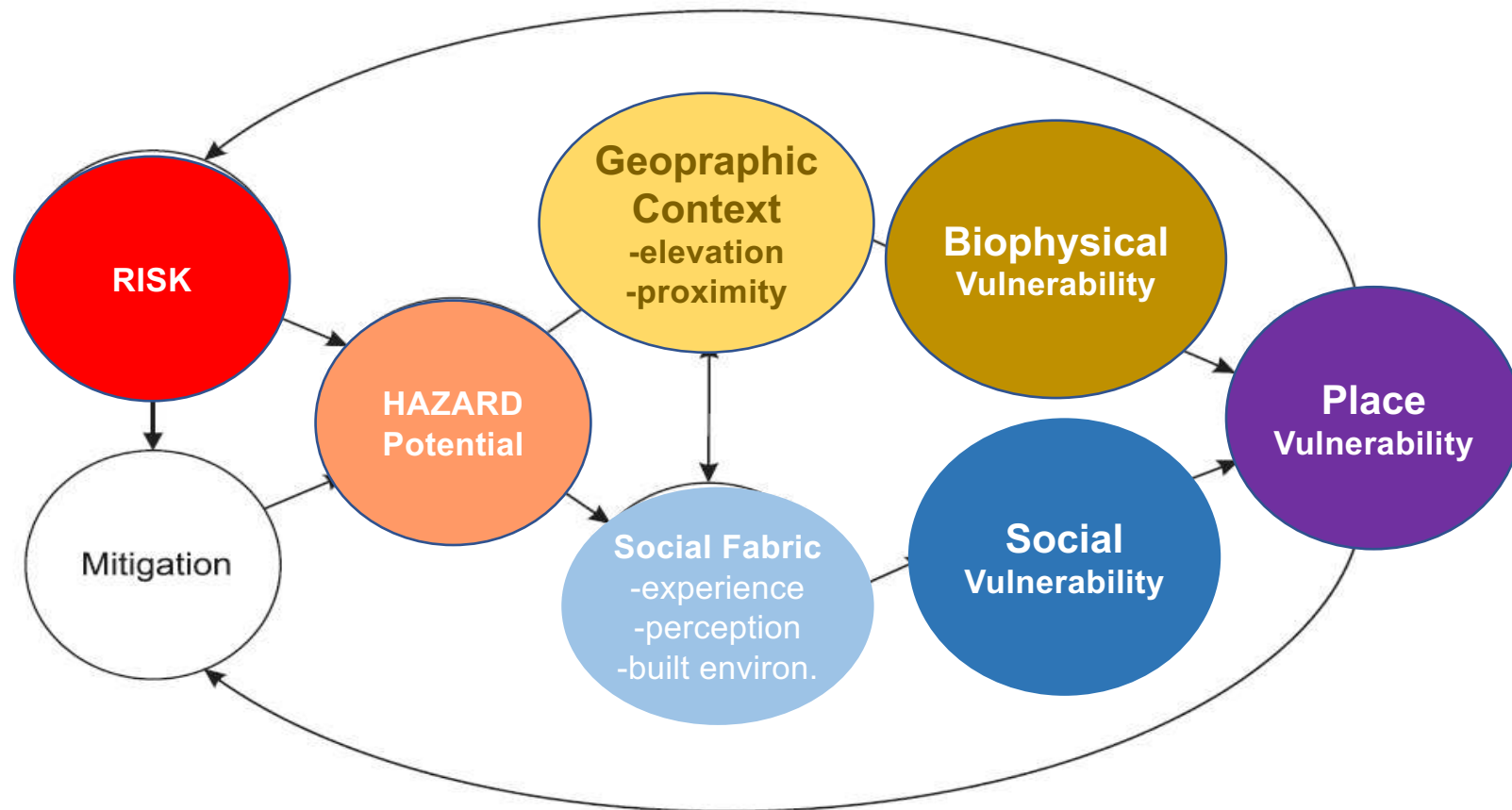




# SOCIAL FABRIC – VULNERABILITY

**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.





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# SOCIAL FABRIC & TRADITIONAL ECOLOGICAL KNOWLEDGE (TEK)

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).

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

**+ Cultural Diversity  
+Resilience**

**Traditional Ecological Knowledge** (cumulative body of multigenerational knowledge, practices and beliefs)



Pawarando – Embera Katío (Cordoba, Colombia)

© Iván Leonardo López Martínez

**From the Darwin "survival of the fittest" to "survival of the most symbiotic." (Margulis, 1998).**

Traditional knowledge on **adaptation to land use** in seasonal climate behaviour has progressively been forgotten from people's memory and from institutional territorial planning.



Northeastern Brazil, Bahia State.

From the concept of...

**Struggle against drought  
to...**

**Living/coexist with the  
semiarid**



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# Ancestral Hydrotechnologies: Hydraulic Zenú System

*Zenu Society - 400-600 bC*

Barcelona, La Mojana - Sucre (Colombia)

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

***Flooding Control***

**ANCESTRAL CULTURES**  
*Harmony with land*

© Jordi Morató – 2020



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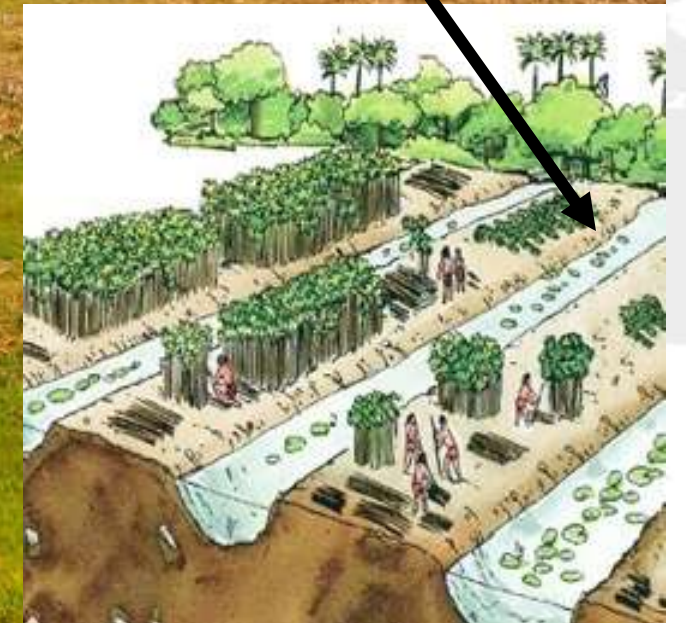
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# Ancestral Hydrotechnologies: Hydraulic Zenú System

Barcelona, **La Mojana** - Sucre (Colombia)



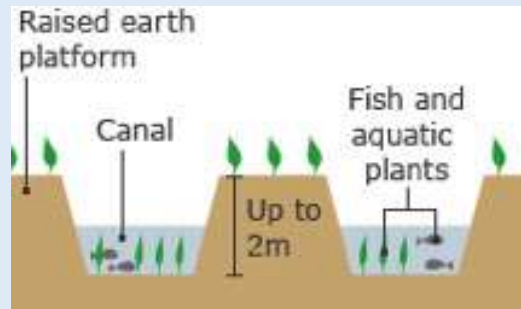
“Camellones”



# Ancestral Hydrotechnologies: Hydraulic Zenú System

## Rainy Season

*Seeds and crops are protected from being washed away*



**Turning excess water to advantage (400 bC)**

*Water and sediments are a source of irrigation and nutrients.*



*Large expanses of land under water for several months, no crops left.*



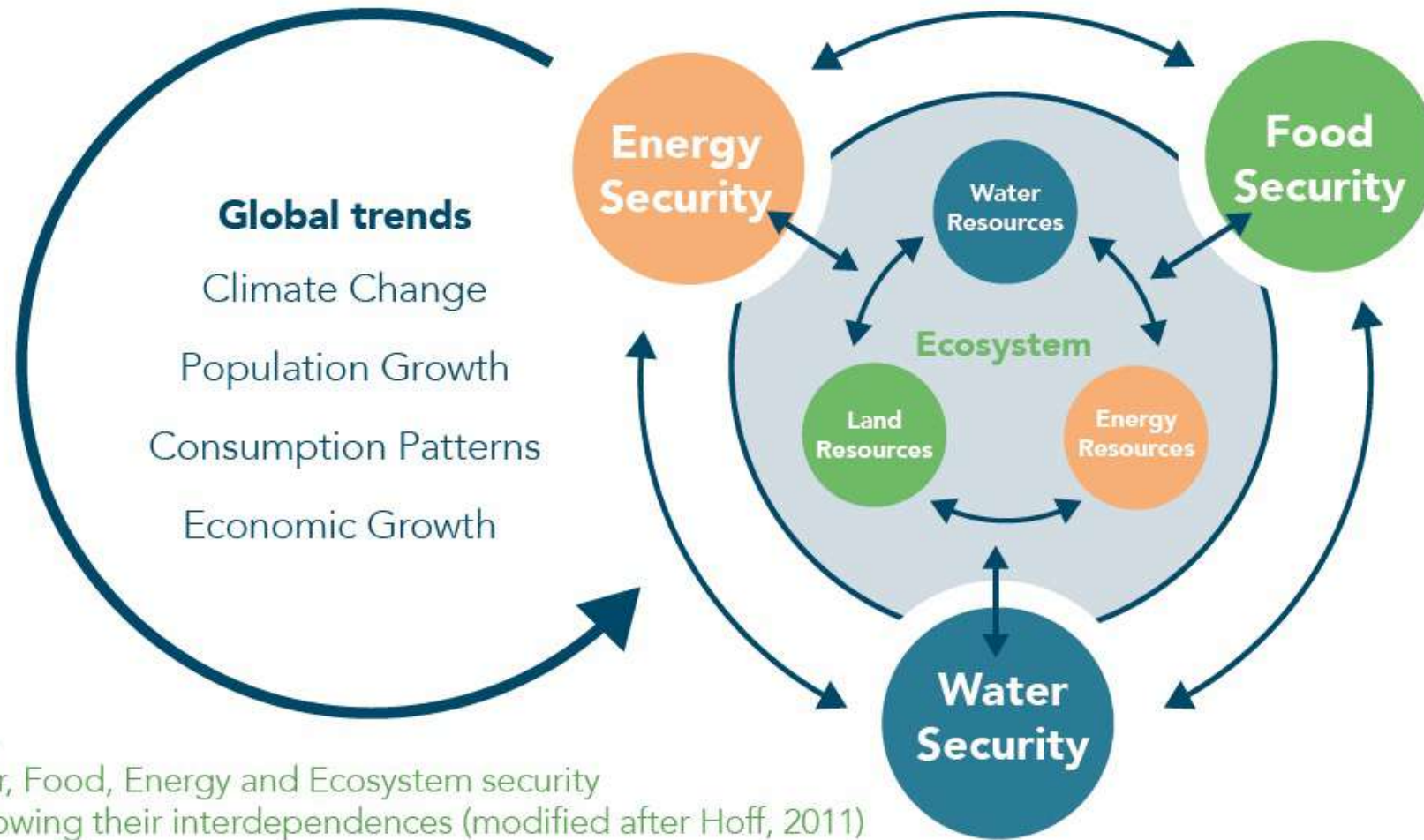
**Problems in both seasons, flooding in winter, drought in dry season (Today)**

*Floodwater drains nutrients, leaving a sandy soil in which is hard to grow crops*



## Dry Season

# Nexus **Water** - **Energy** – **Food** - **Ecosystems**



**Figure 1.**  
The Water, Food, Energy and Ecosystem security  
Nexus showing their interdependences (modified after Hoff, 2011)



# ANCESTRAL HYDROTECHNOLOGIES

JAISALMER, Rajastán, India – 1150 d.C

160mm/year



"If the elephant is submerged there will be water for 6 or 7 months"



"Its reputation is that it never dries"



(...)

In Jaisalmer, they **collect every drop of rainwater** and designed **52 permanent bodies of water** around the city, in a public-private partnership





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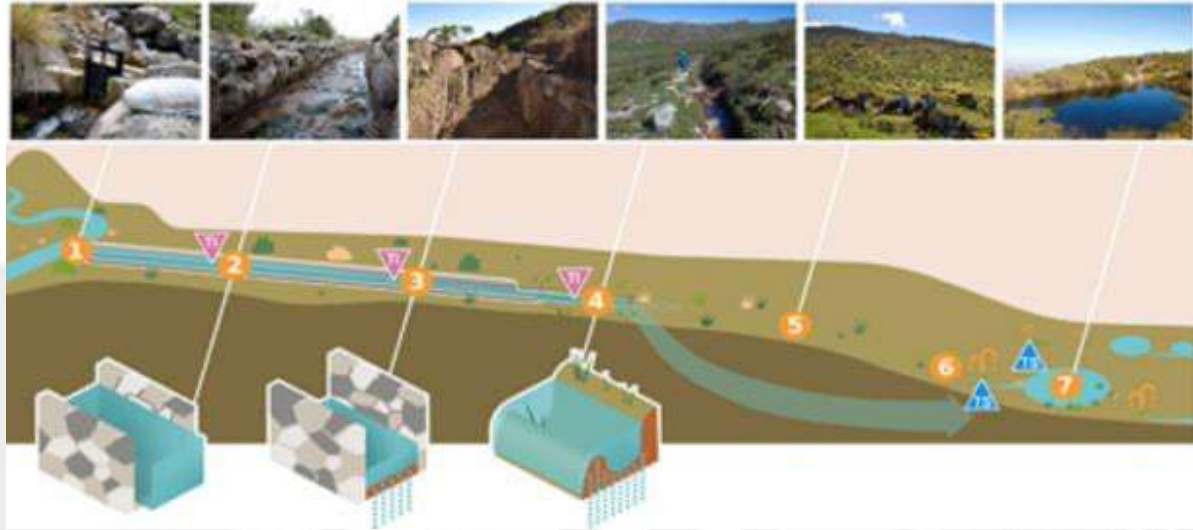


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# ANCESTRAL HYDROTECHNOLOGIES: AMUNAS

## AMUNAS Perú



**AMUNAS - Raining harvesting** above 4,400 meters through **ditches**, taking water to previously identified areas with fractured rocks on the mountain.

Upon entering the rock, the **water slowly moves within it to emerge, months later, through the springs (springs or puquios)**, that are between 1,500 and 1,800 meters below.

**1 km Amuna**  
**225.000 m<sup>3</sup> /year**



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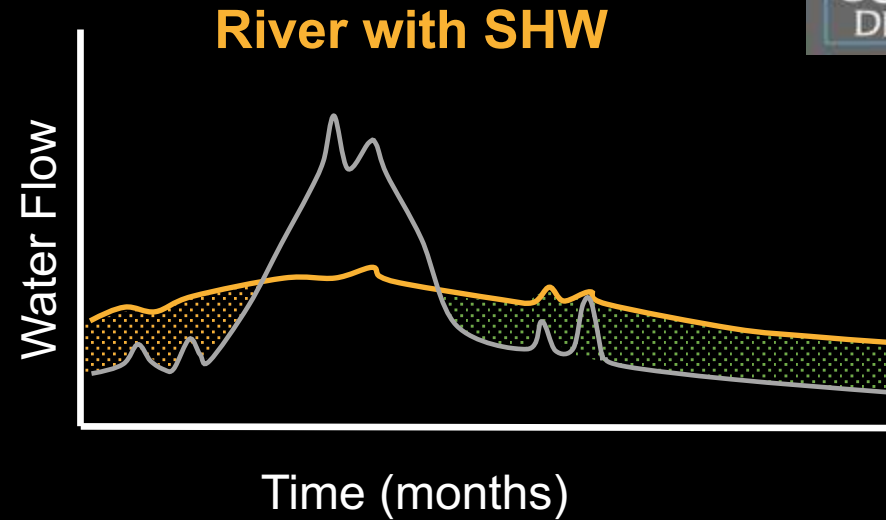


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# ANCESTRAL HYDROTECHNOLOGIES: AMUNAS

## SOWING AND HARVESTING WATER





# “Acequias de Careo” Sierra Nevada – Granada, SPAIN



**CAN WE REPLICATE  
ANCESTRAL  
HYDROTECHNOLOGIES?**



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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE



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

It has several ridges (Camellones), channels (natural and artificial) and water reservoirs (deep ponds / dikes)



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



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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE

**APROPAPUR - Model Based on the Ancestral Zenú Culture and  
the Amphibious Culture of Cordoba, Colombia**





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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE



## WOMEN EMPOWERMENT



*Community Empowerment Workshops  
for the APROPAPUR Association and  
follow-up to community work*



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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE



## AGROECOLOGY



**Productions in less than 3 months.**  
50 kg of BEANS in 7 camellones  
36 kg of WATERMELON in 1 camellon.

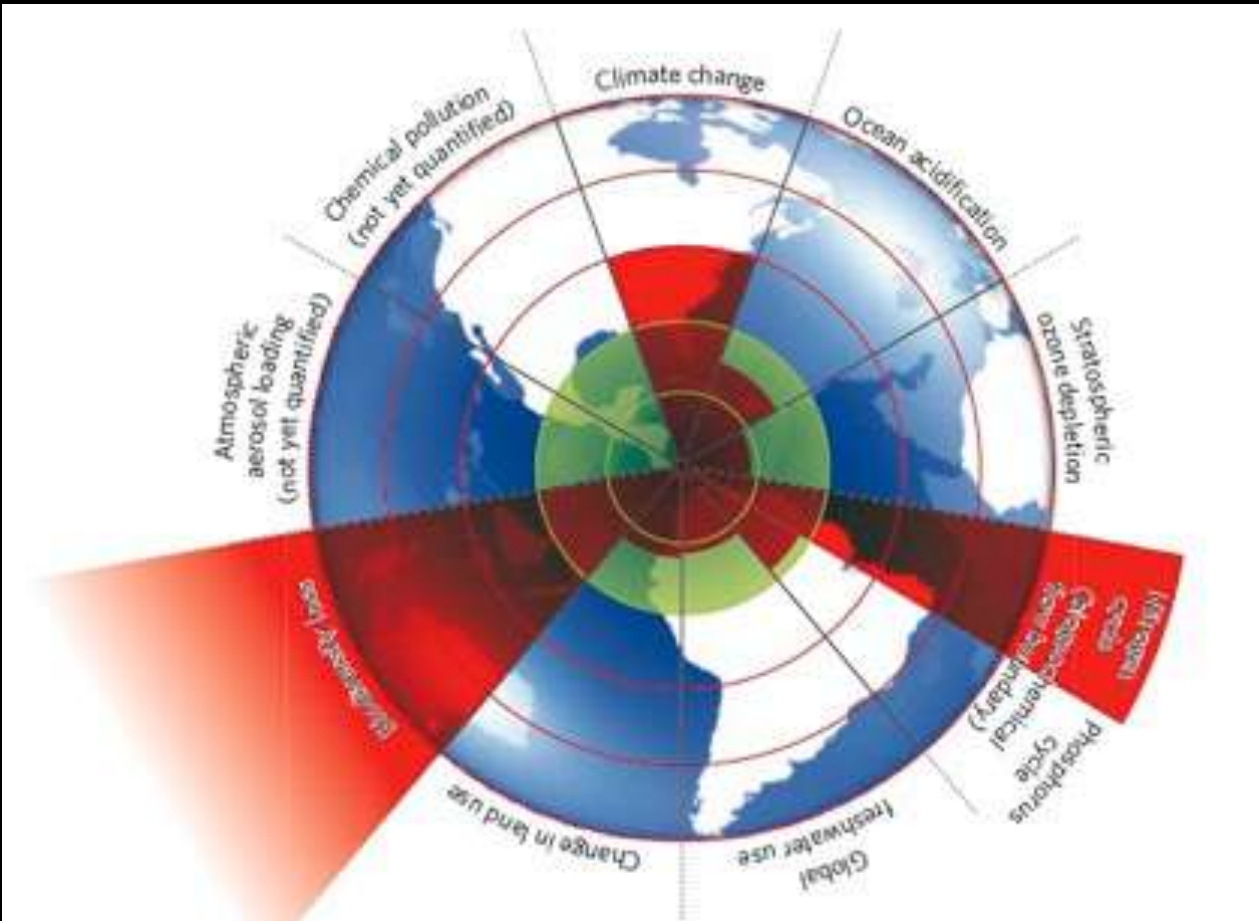


**HOW CAN WE EXTEND THE  
USE OF ANCESTRAL  
HYDROTECHNOLOGIES FOR  
CLIMATE EMERGENCY?**

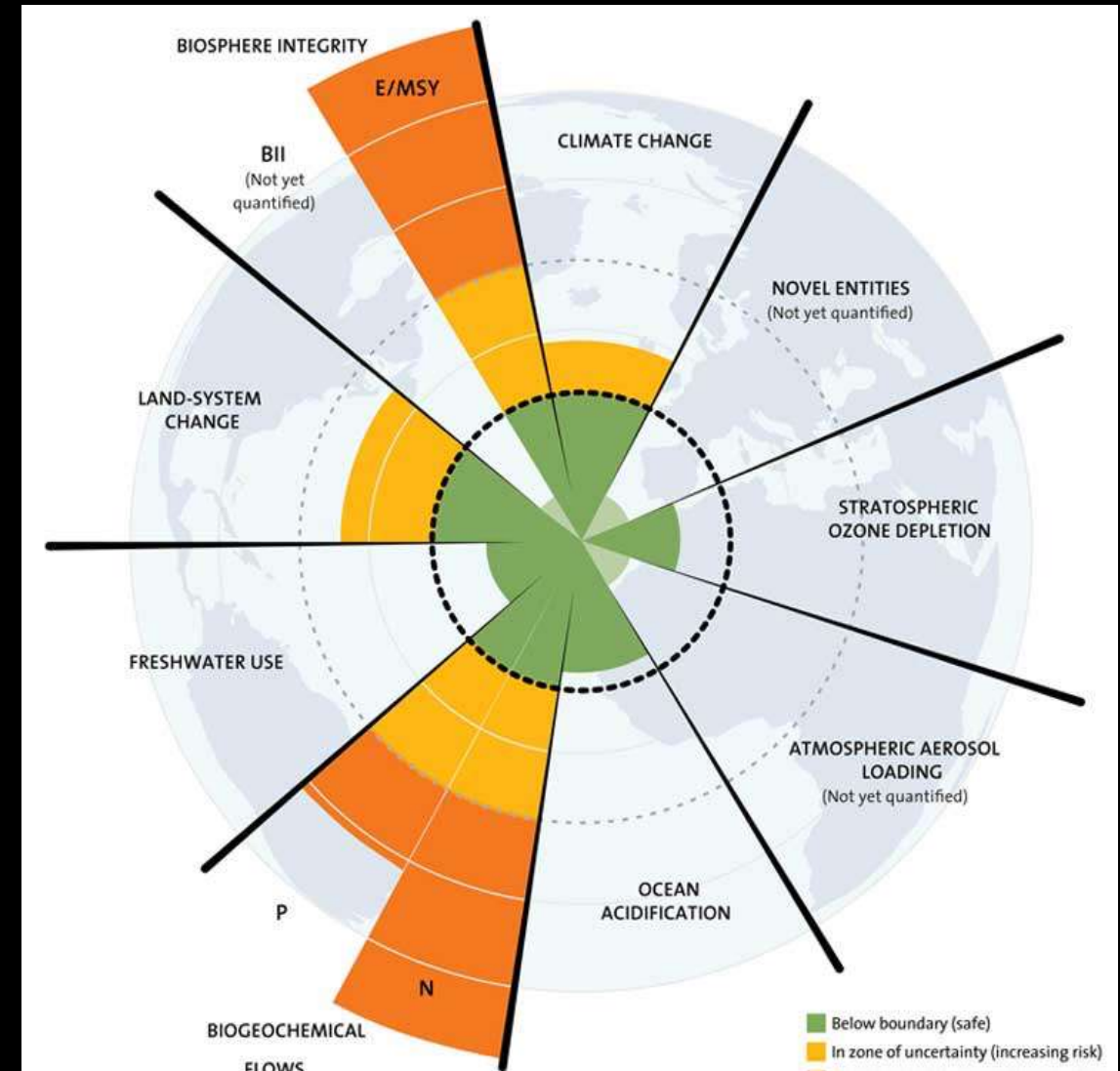
*Nature* 461, 447-448 (24 September 2009)

## Earth's boundaries?

An attempt to quantify the limits of humanity's load on our planet opens an important debate.



Steffen et al. 2015. Planetary Boundaries: Guiding human development on a changing planet. *Science* Vol. 347 no. 6223





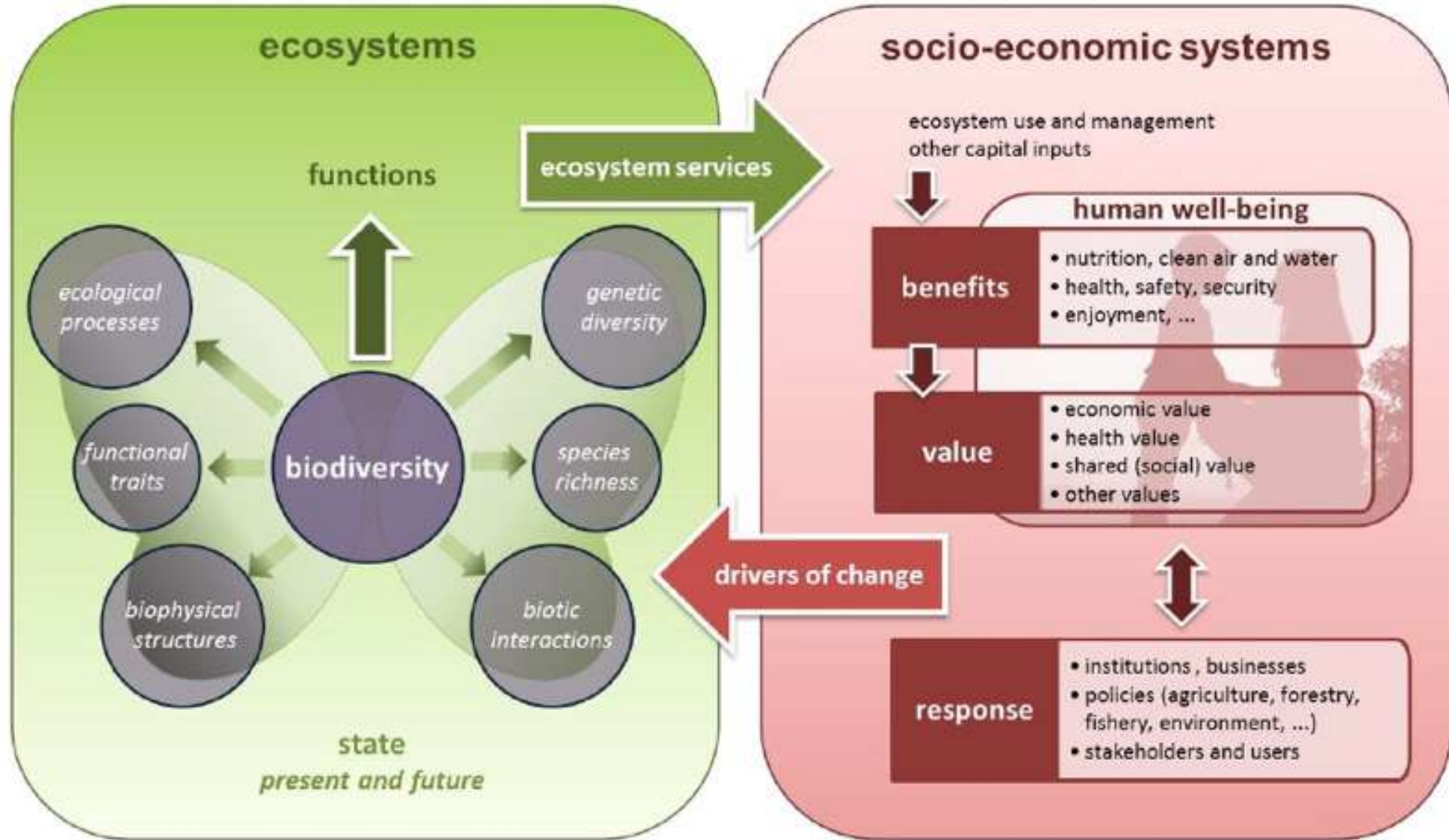
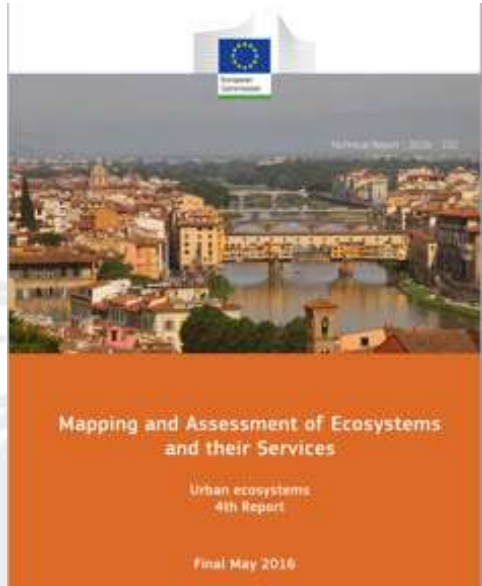
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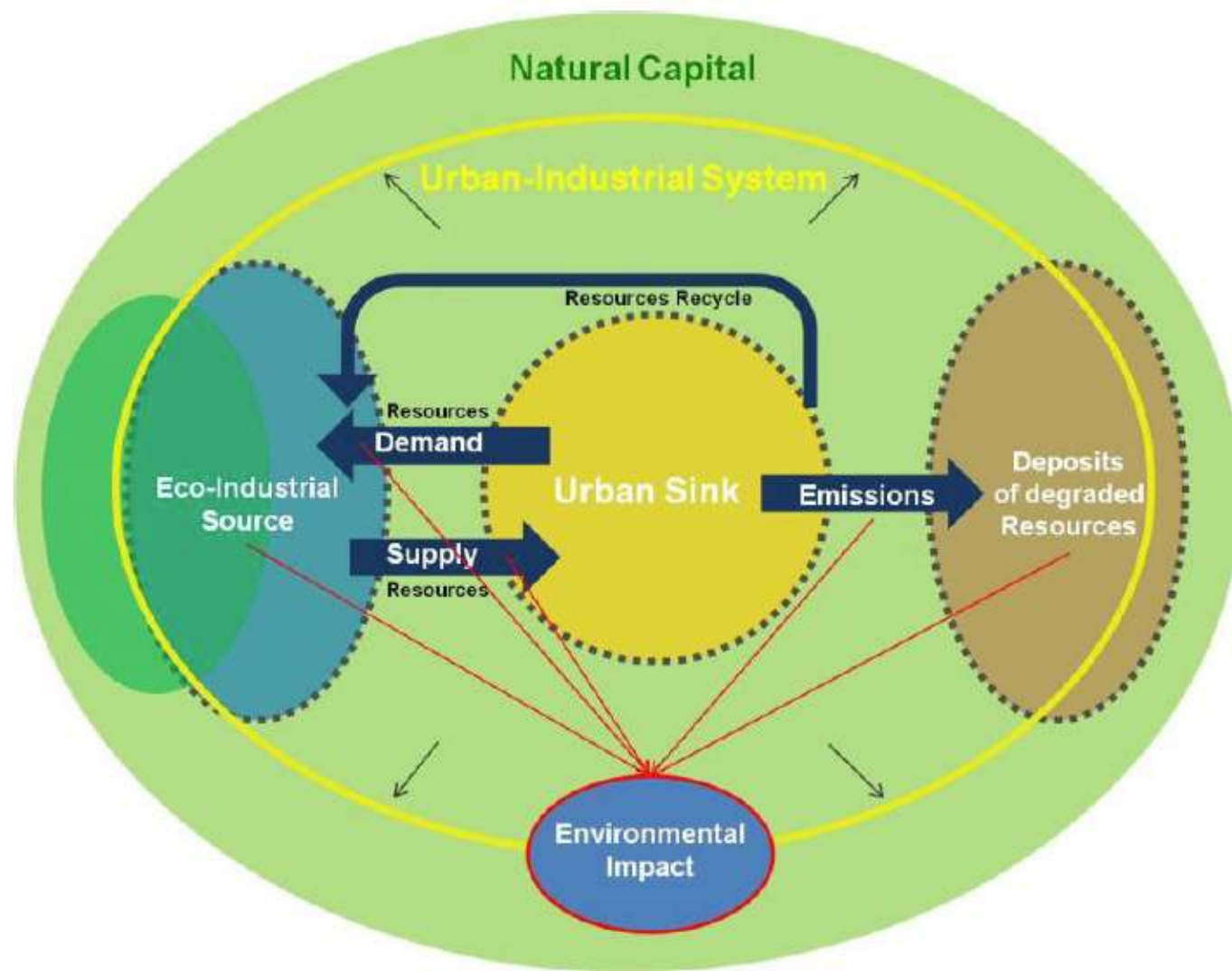
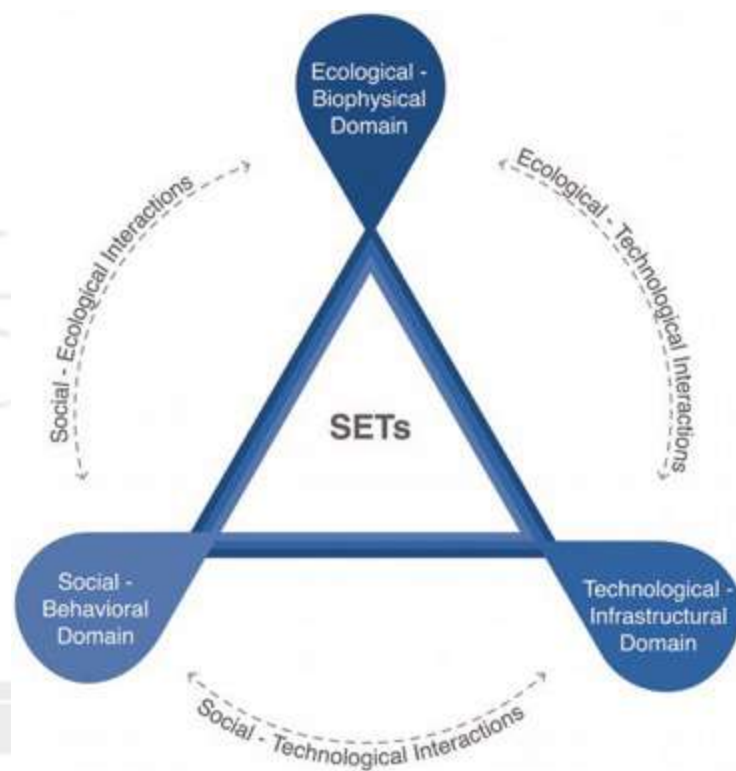
# Mapping and Assessment of Ecosystem Services



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# SETS – Socio ecological Technical Systems



K. Krumme. "Why smart is not enough - system ecology and strong sustainability as conceptual drivers for experimental cities: Options for an integrated framework on urban transition management. Working Paper, University of Duisburg-Essen, 2016

T. McPhearson, S. T. A. Pickett, N. B. Grimm, J. Niemelä, M. Alberti, T. Elmqvist, C. Weber, D. Haase, J. Breuste and S. Qureshi. "Advancing Urban Ecology toward a Science of Cities." *BioScience*, vol. 66(3), pp. 198-212, 2016.

Fig .6. Advanced Ecological Economics Urban-Industrial System Metabolism Model

# SETS – Socio ecological Technical Systems

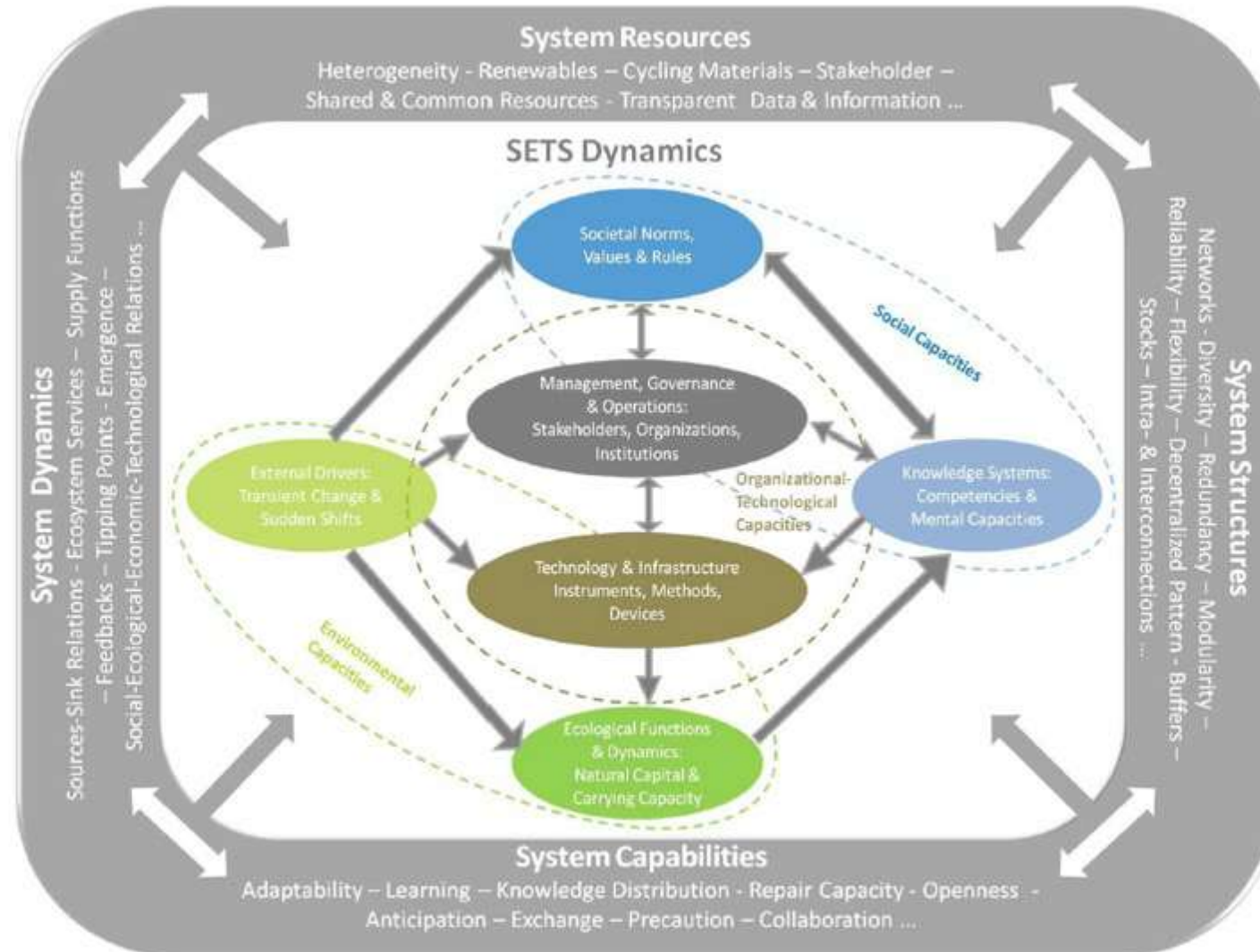


Fig .8. Conceptual Model of Resilience Design Dimensions and SETS Dynamics (own conceptualization with reference to Walker, Holling et al. 2004, Hahn, Schultz et al. 2008)

# Biomimicry – NATURE INSPIRING

Appropriate Technologies

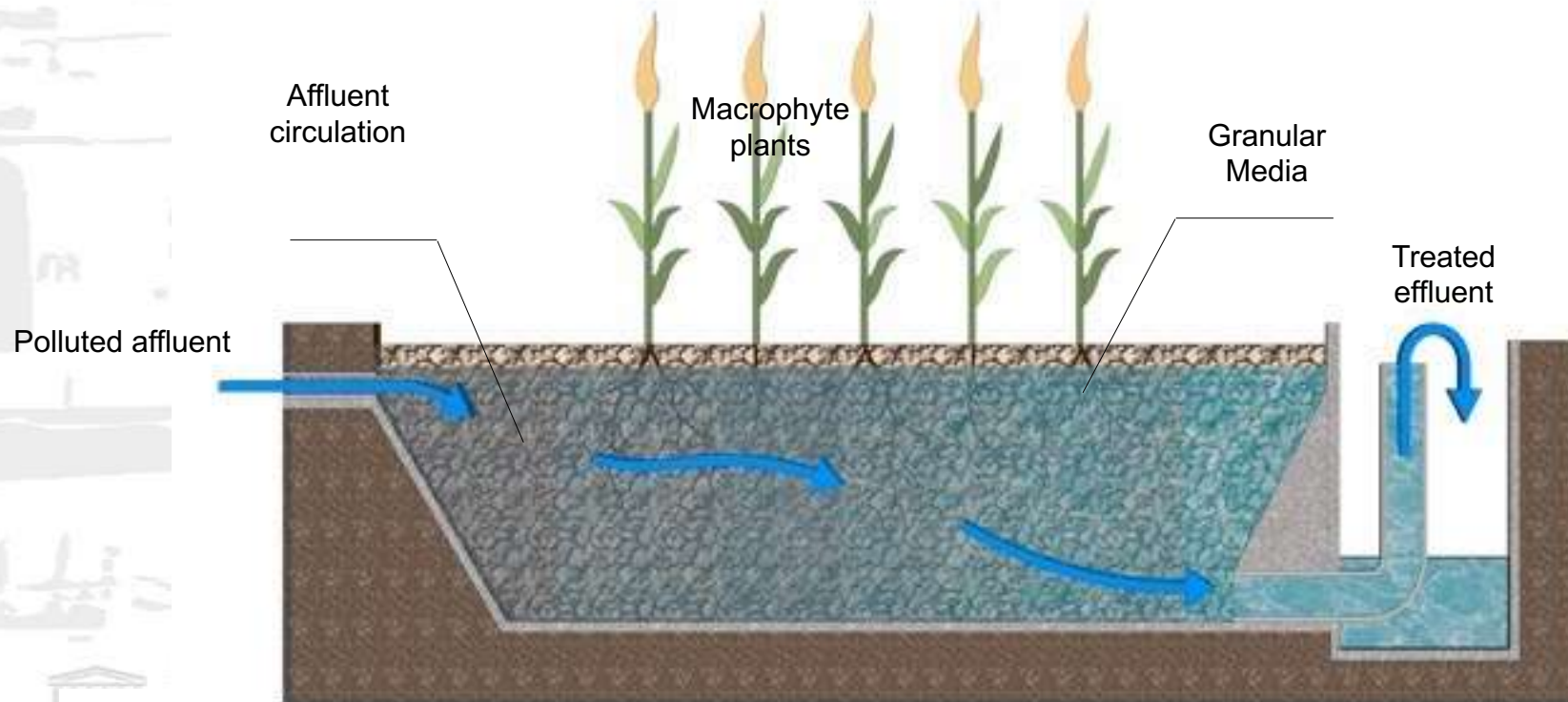
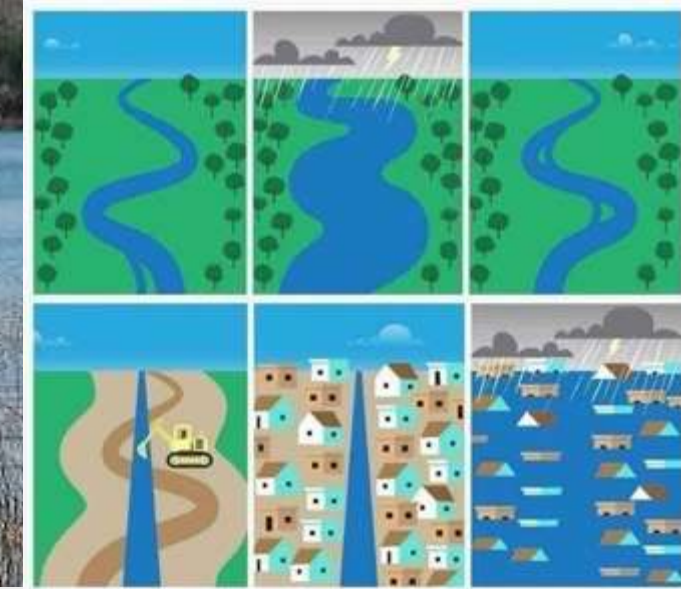
## Nature-Based Solutions

Ecohydrology

Ecotechnologies

Phytotechnologies

Bioengineering



**TREATMENT  
WETLANDS FOR  
POLLUTED  
EFFLUENT  
TREATMENT**





# NATURE BASED SOLUTIONS



**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)







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# NATURE BASED SOLUTIONS



## 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 communication, 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.

(ECLIPSE, 2017)

### Important for jobs and business

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

(WWF IJL Report: Nature Parks, 2020)

### Vital for the climate

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

(IPBES GA SPM key message 06, 2019)

#### References:

1. ECLIPSE, An impact evaluation framework to support planning and evaluation of nature-based solutions projects, 2017, <https://bit.ly/35a5r5C>.
2. IPBES Global Assessment on Biodiversity and Ecosystem Services, Status and Trends - Nature's Contributions to People (NCP), 2019, <https://bit.ly/3i7fbx>.
3. Nature communications, The effectiveness of coral reefs for coastal hazard risk reduction and adaptation, 2014, <https://doi.org/10.1038/ncom2575>.
4. WWF & ILO, NATURE HBES: How Nature-based Solutions can power a green jobs recovery, 2020, <https://bit.ly/3a7CF60>.



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Baixo Sul da Bahia, Bahia – Brasil (2015)

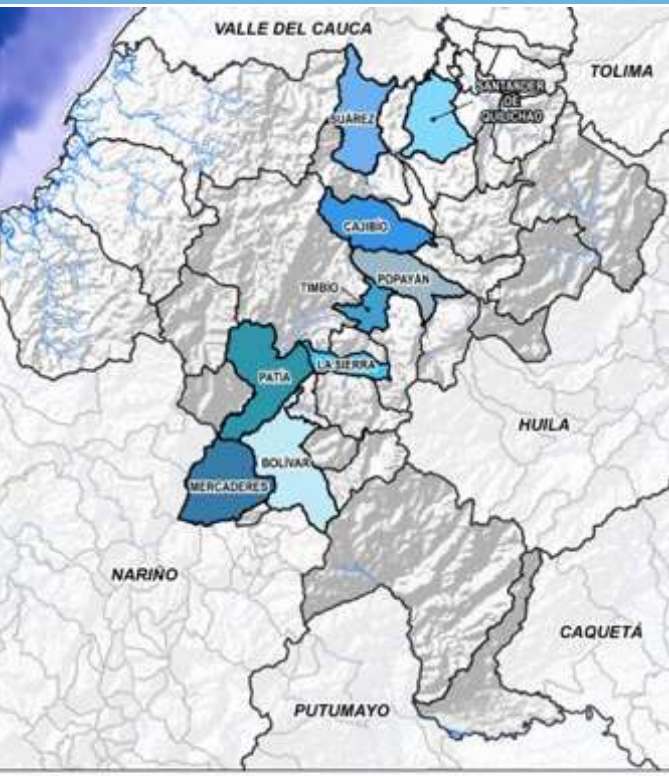
# PRODUCTOR DE AGUA

## Agriculture Runoff & Storm Water Control for Tertiary roads & Aquifer Recharge

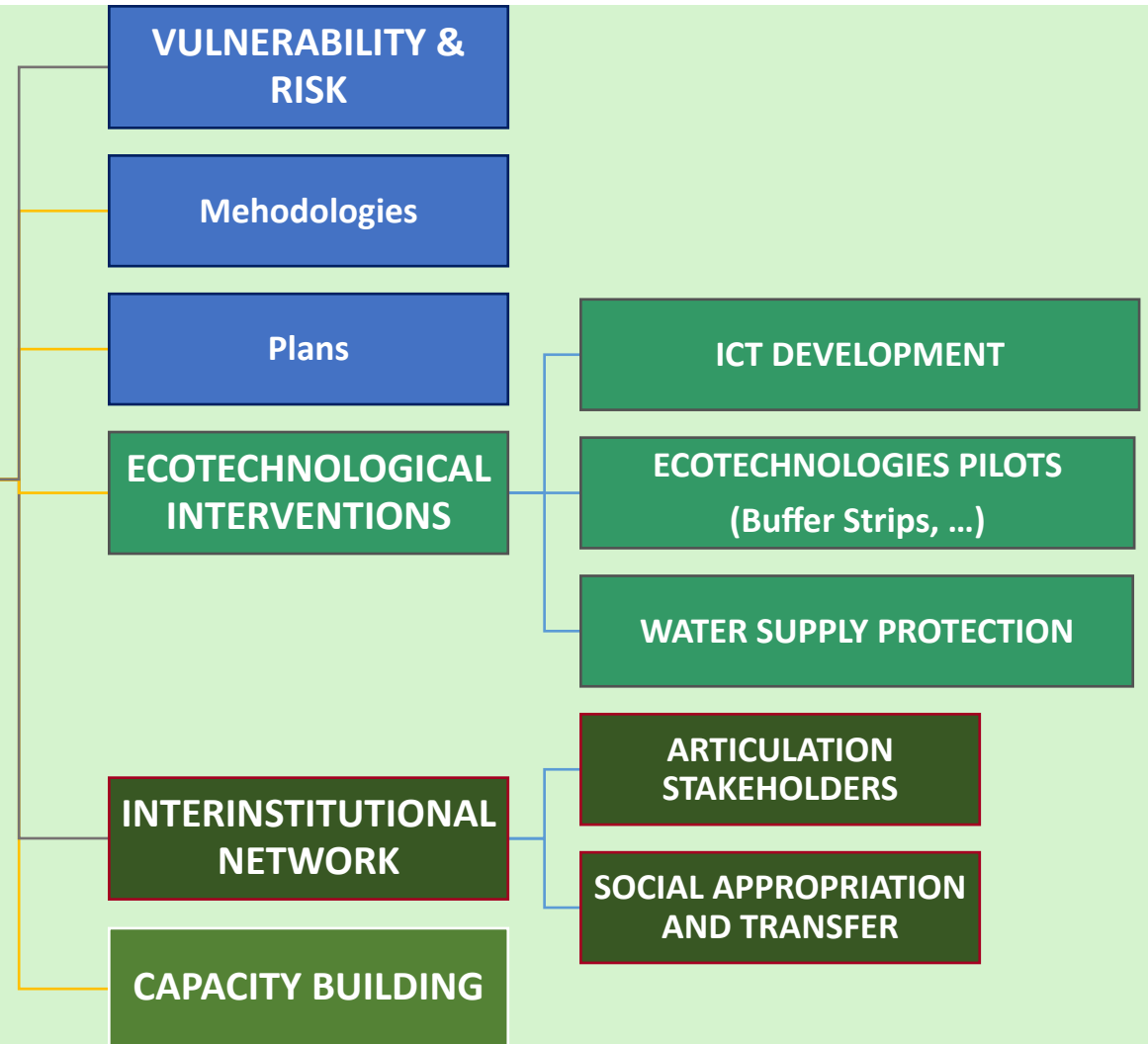


# ECOSYSTEMIC SERVICES AND RIVER BASIN MANAGEMENT

## Ecosystemic Services Analysis in RB and Adaptation to Climate Change



**VULNERABILITY  
ANALYSIS &  
IMPLEMENTATION  
OF EARLY ALERTS  
FOR WATER SUPPLY  
SYSTEMS IN  
CAUCA  
DEPARTMENT  
(COLOMBIA)**



# AQUARISC PROJECT (Cauca, Colombia)

## URBAN-RURAL

1. Protect upper river basin for water supply improvement at urban scale
2. Diffuse pollution from agriculture/cattle raising
3. Flooding control
4. Drought prevention

## CLIMATE CHANGE PROBLEMS

1. Changes in the normal months of rain and drought (modification agricultural calendar).
3. Heavy/Long rains concentrated in small areas (landslides, floods).
4. Prolonged droughts (lack of water for consumption, losses agriculture).





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# NATURE BASED-SOLUTIONS



Infiltration cells



Buffer strips



Wetland  
conservation/improvement

***Flooding control***  
***Erosion prevention***  
***Runoff Management***  
***Aquifer Recharge***





# A GREENER CITY?

Blue Green Biodiverse  
Ecoinfrastructures  
Green Urban Governance



# ECOSYSTEMIC SERVICES FROM URBAN BIODIVERSITY

<b>ECOSYSTEMIC SERVICES</b>	<b>Regulation</b>	Air filtration Microclimate regulation Noise reduction Rainwater drainage Improvement of wastewater quality
	<b>Provision</b>	Food / medicine supply Shadow <b>Water</b>
	<b>Cultural</b>	Pedagogical Aesthetic Social

Restore / regenerate the natural balance of water in urban areas  
Increase technical and social resilience

*Urban Water Balance*

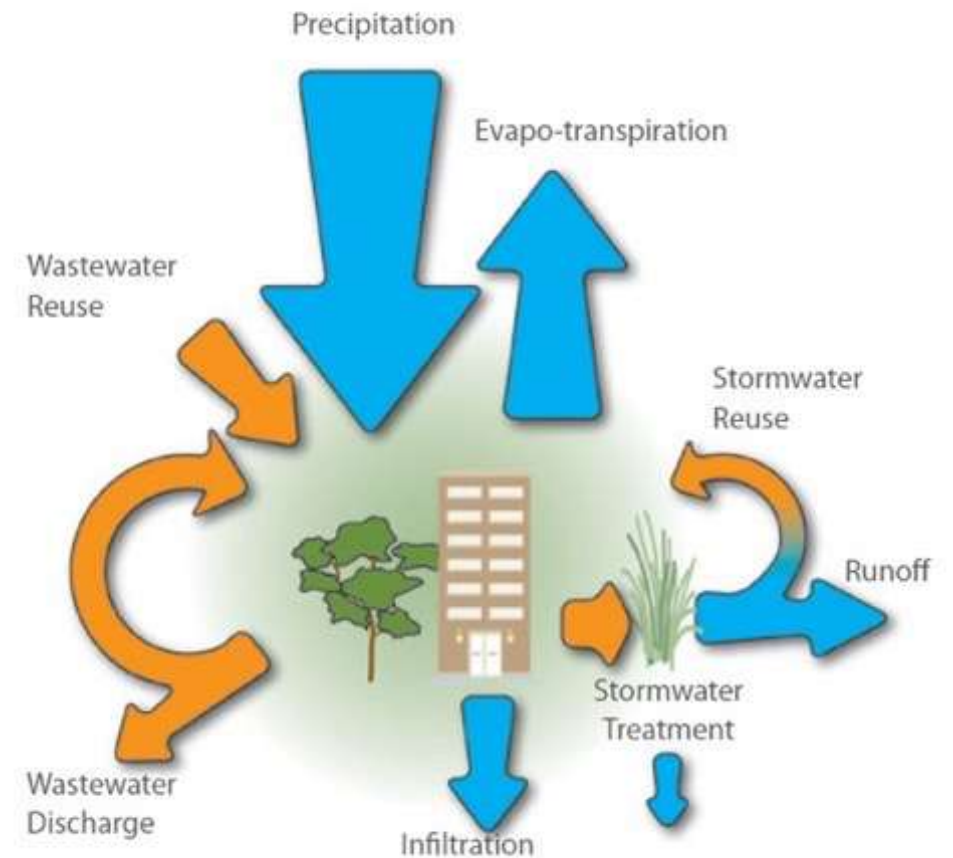


**+Vegetation  
+ Permeability**

**Use of rainwater  
- use of imported water**

**Sustainable sanitation  
Close cycles  
Wastewater reuse**

*WSUD Water Balance*



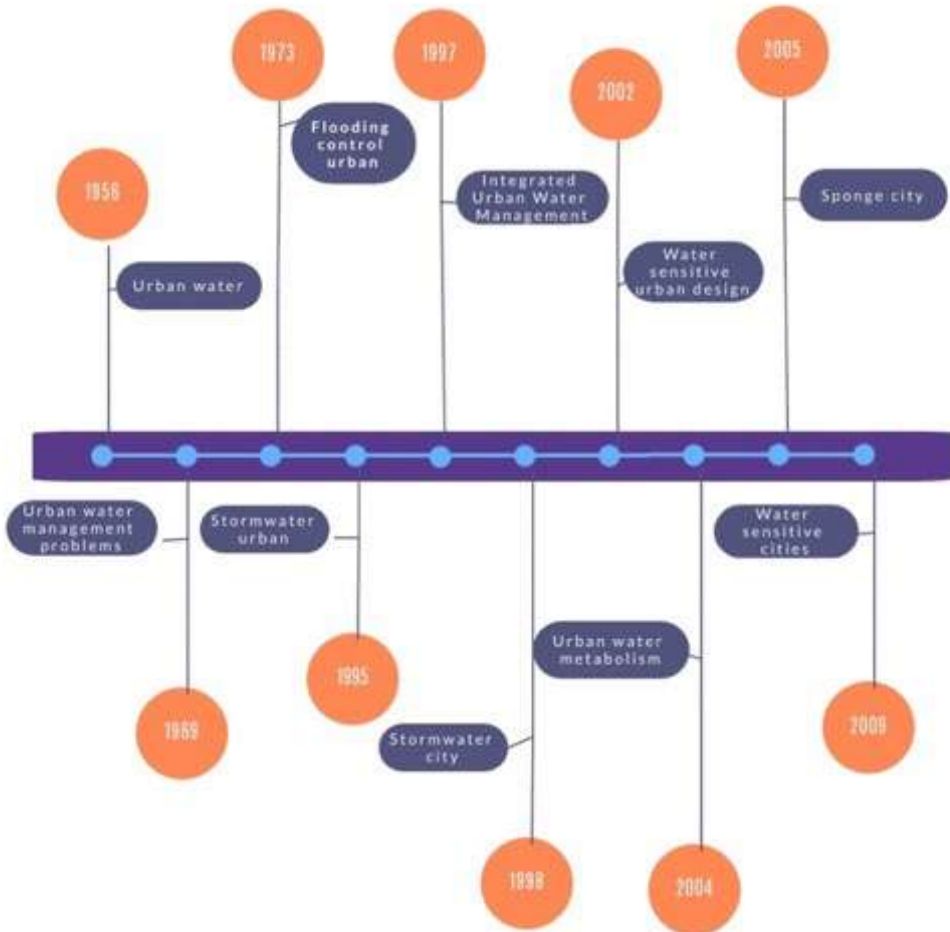




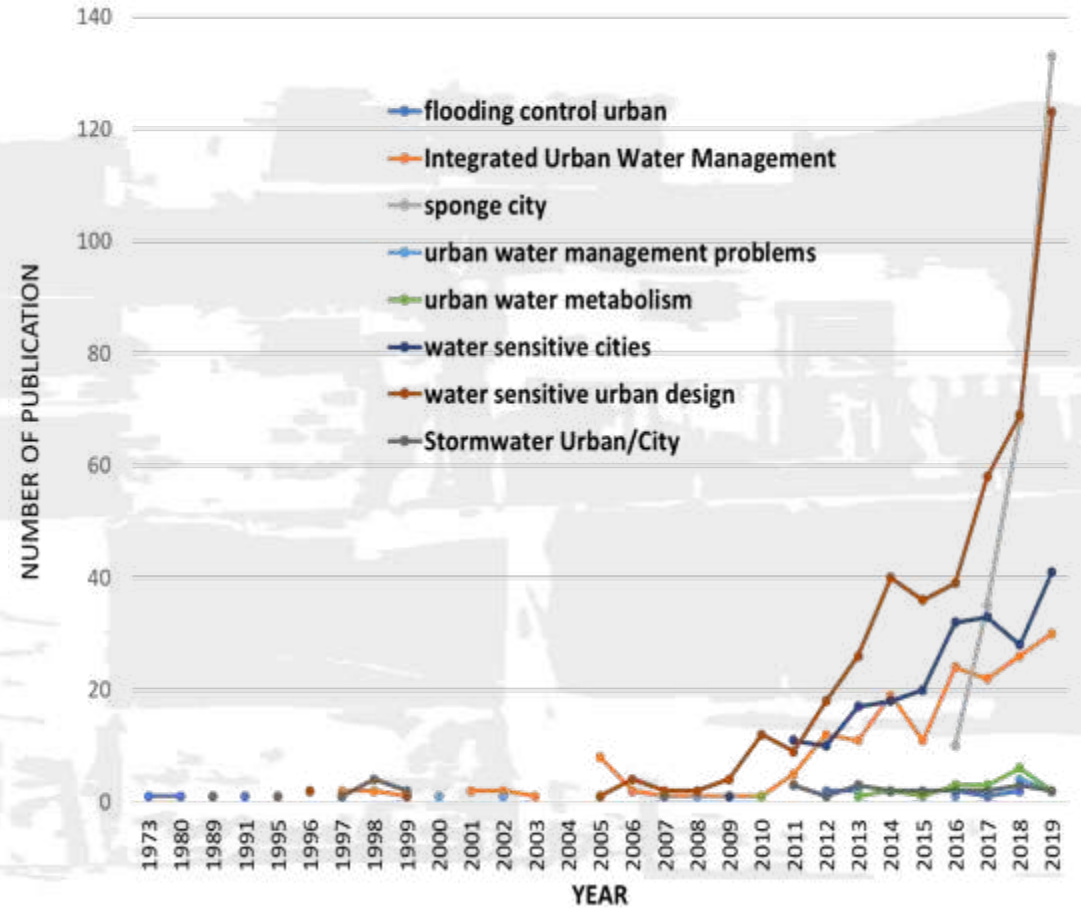
# WATER SENSITIVE URBAN DESIGN



# WATER SENSITIVE URBAN DESIGN– SPONGE CITIES



PUBLICATIONS/YEAR



# WATER SENSITIVE URBAN DESIGN – SPONGE CITIES



*Sponge City*





# URBAN GREEN SPACES – GREEN CITIES

## Naturation & Naturalization as a Green Urban Governance tools

**Naturation** is a process based in the implementation of strategies and actions on urban Green, adding more vegetation and more Green spaces with ecological criteria, and with the purpose to achieve a “**Naturalization**” of the Urban System, or to favor the autochthonous wildlife and flora (Briz, 1999 y 2004) that could not be dangerous.

A good naturated urban system could be a biodiversity reservoir, comparable to a natural reserve area (Boada i Gómez, 2008).



Naturalization

Initial biodiversity

Urban biodiversity

Naturation (Trophotope Genotope)

### NATURATION

Efforts to provide urban ecosystems with sustainable green spaces

### NATURALIZATION

Process of biodiversity entry that is carried out on the basis of naturation.



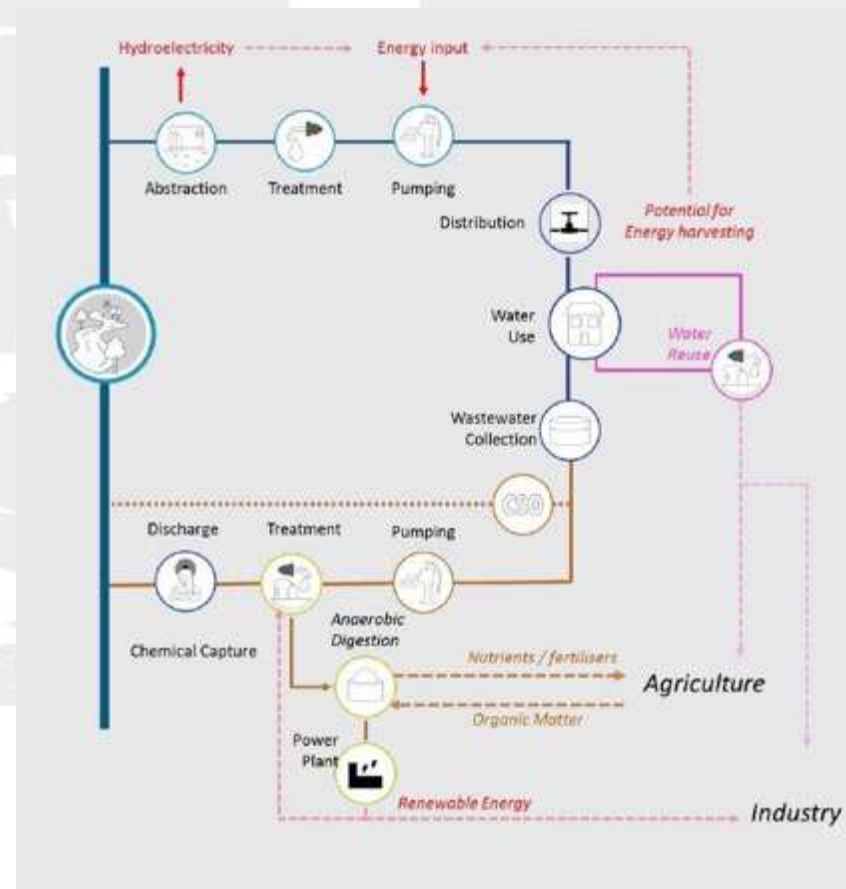
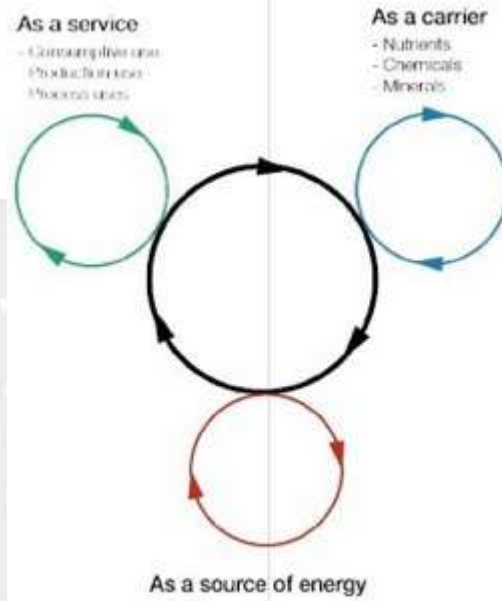
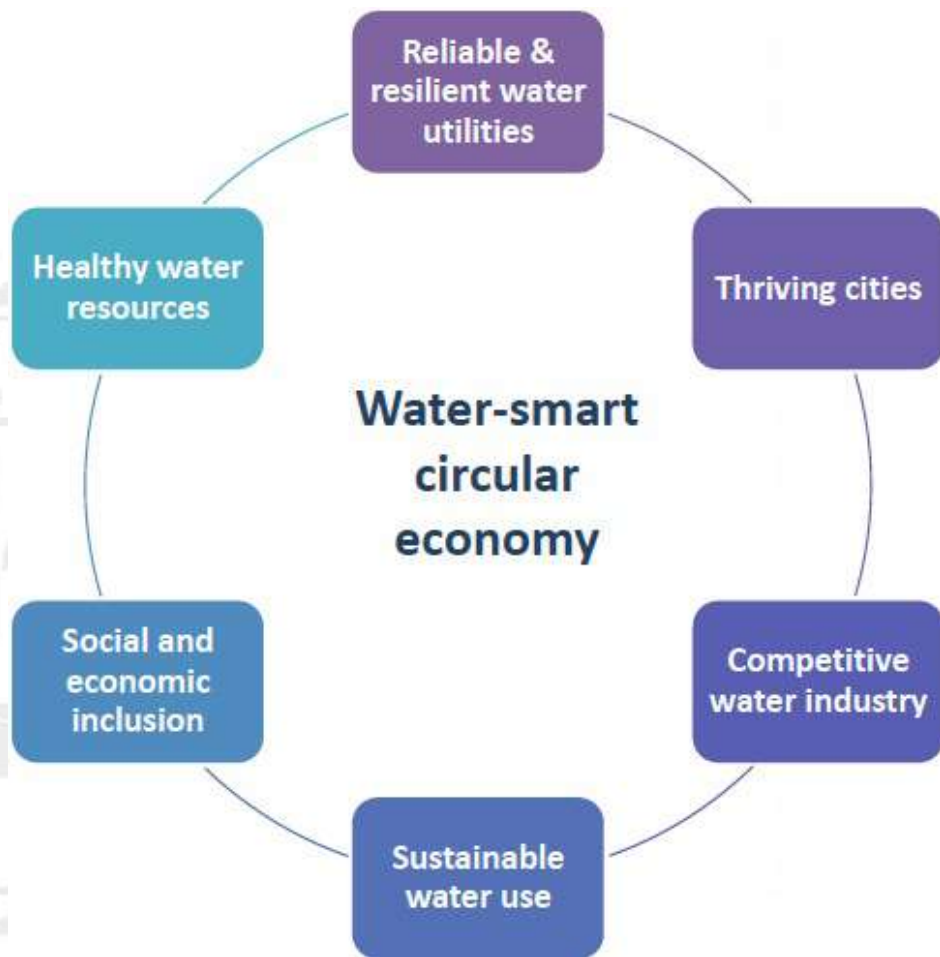
# BIODIVERSITY, one of the best ecosystem quality indicators

**Urban biodiversity have direct effects on life quality and wellbeing (and health).**

Having **access to the green space is generally beneficial for health**. Exposure to nature is linked to:

**Low mortality** (Donovan et al., 2013, Gascon et al., 2016, and others)

**Better physical and mental health** (Gascon et al., 2015; Triguero-Mas et al., 2015)



# HOW TO APPLY?

*Community based interventions*

## Action for Transformation



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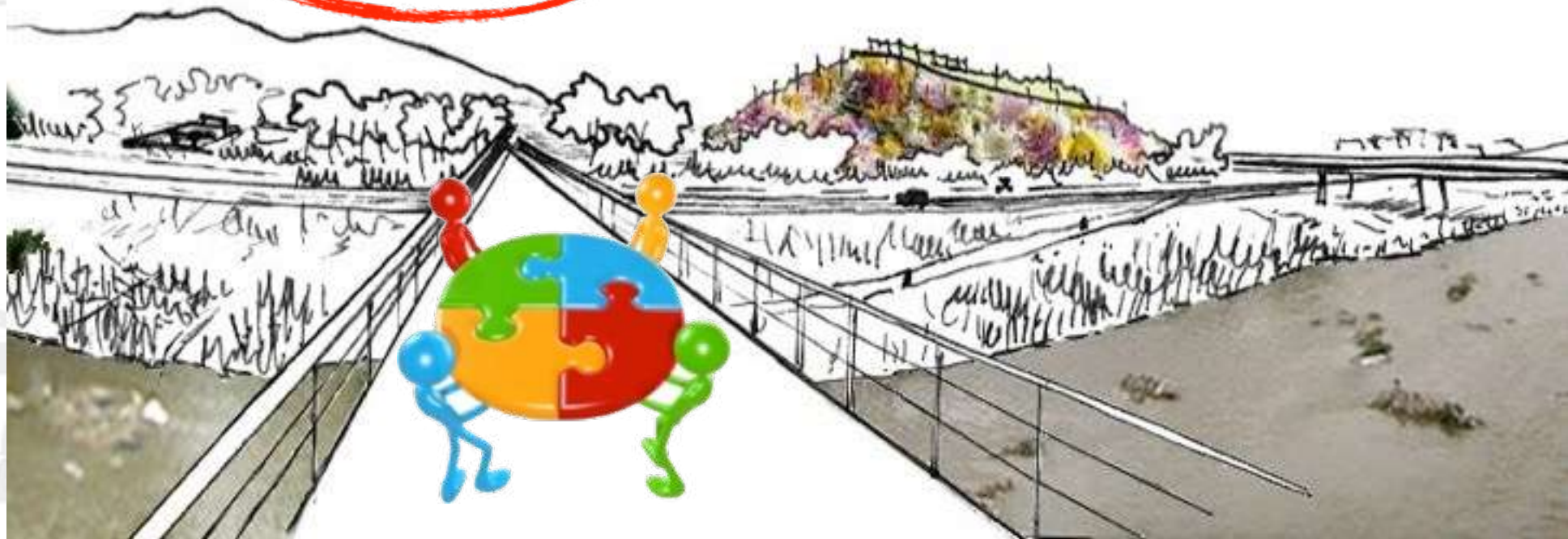
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# PARTICIPATORY TRANSFORMATION PROCESS

## Moravia Week

*Open dialogue for technicians and population*

**Participatory &  
Inclusive**



Inform



Consult



Concert



Involve



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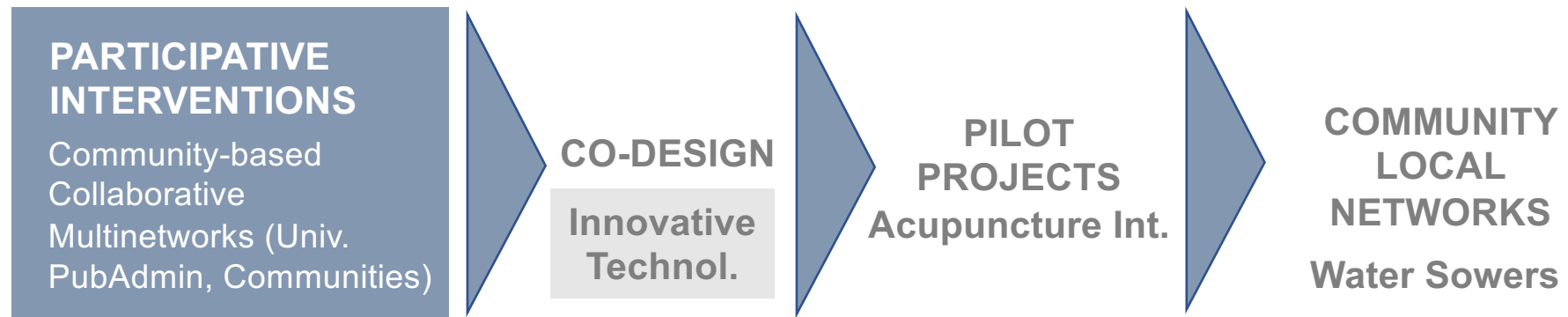


# #Action for Transformation

## CULTIVATING NEW COMMUNITIES

Articulation participative transformation projects  
From Local Capacity Building

To COMMUNITY EMPOWERMENT



Sustainable development of settlements with integrated systems of multifunctional eco-infraestructures and cultivation of participatory networks and social, economic, cultural and environmental networks.



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# SOCIO-ENVIRONMENTAL RESTORATION AT MORAVIA HILL (MEDELLIN)

- 2.224 families = 10.000 hab.
- 1.500.000 Tons garbage
- 7,6 Ha - 42,5 m max height

2004



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# SOCIO-ENVIRONMENTAL RESTORATION AT MORAVIA HILL (MEDELLIN)

0.37 m<sup>2</sup> public space per inhabitant



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# SOCIO-ENVIRONMENTAL RESTORATION AT MORAVIA HILL (MEDELLIN)

## Heavy metals

Lead: 403-489 ppm Pb

Chrome: 166-241 ppm Cr



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# MORAVIA COMMUNITY GARDEN GROUP

Link the inhabitants to the transformation process **through leisure activities around gardening.**

Promote local identity and social cohesion through **participatory activities for environmental transformation and urban recovery of degraded dump area.**



Buffer-strips



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# SOCIO-ENVIRONMENTAL RESTORATION AT MORAVIA HILL (MEDELLIN)



**SOCIAL TRANSFORMATION**  
Community Soc Development  
Cooperative creation  
Communication Component

**URBAN & LANDSCAPE TRANSFORM**  
Art Corridor /Square Design

**ENVIRONMENTAL TRANSFORM**  
Leachate treatment plants  
Phytoremediation &  
Bioremediation plots

**Moravia,  
Medellín  
(2005-2015)**

**10 Ha / 10.000 pop. / 35 m height / 1.5 million Tn Waste**



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# URBAN RUNOFF MANAGEMENT FOR LANDSLIDE RISK CONTROL



## Altos de la Estancia Ciudad Bolivar Bogota.

2.000.000 m<sup>3</sup> displaced material

73 ha.

3.305 Families affected  
(15.000 Population)



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# URBAN RUNOFF MANAGEMENT FOR LANDSLIDE RISK CONTROL

## Selected top 20 risk management projects worldwide (UNDRR, Sendai, 2015)



Restoring eroded and degraded areas  
Phytotechnologies for runoff water management



Urban Runoff Management - Evaporative biofilters



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# URBAN RUNOFF MANAGEMENT FOR LANDSLIDE RISK CONTROL

## Methodology for Participative Social Empowerment

### Survey of Social Initiatives

#### Selection Criteria

Identification of different activities that generate local development & reduce vulnerability

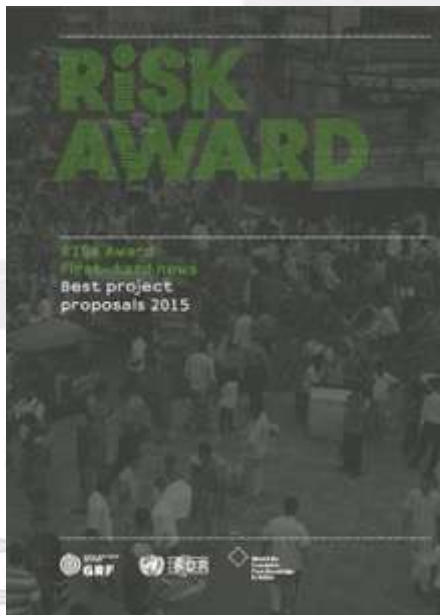
#### Formation

##### Course (140 h.)

Bioengineering  
Landscape  
Water Management  
Urban Agriculture

#### Start-UP Initiatives

- 1) Agroecologic garden
- 2) Bioengineering
- 3) Community Garden
- 4) Ecotourism, paths...



Project selected among the top 20 risk management initiatives worldwide (Sendai, Japan, 2015)





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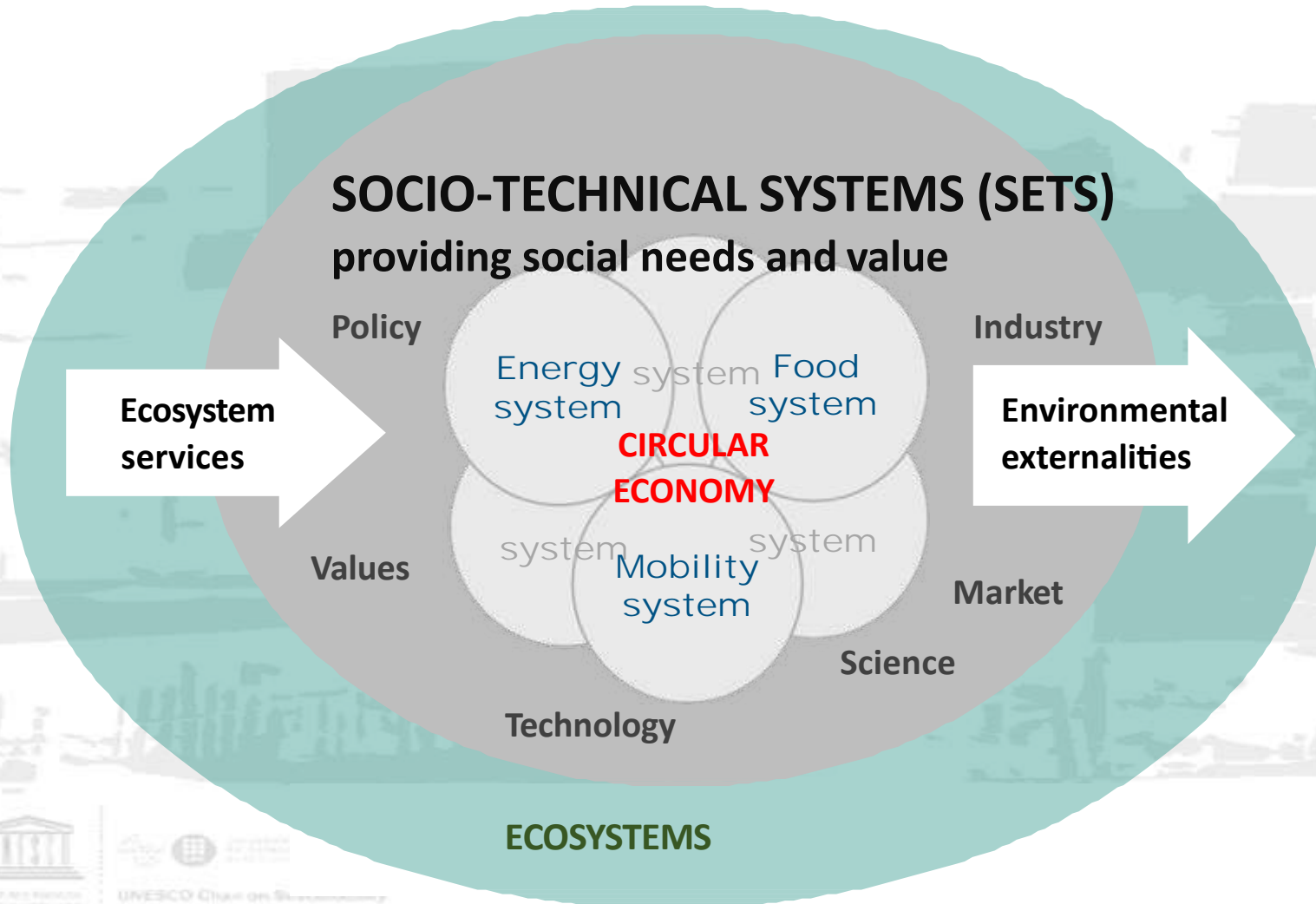


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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE

## CONFIGURE NEW SETS, ORIENTED TO CHANGE / SOLVE MOST TRANSITION ISSUES



Learn to live with change and uncertainty

Feed diversity for reorganization and renewal

Opportunity for self-organization and nexus through scales

Combine different types of knowledge



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## The opportunities to mainstream NBS in DEVELOPING COUNTRIES

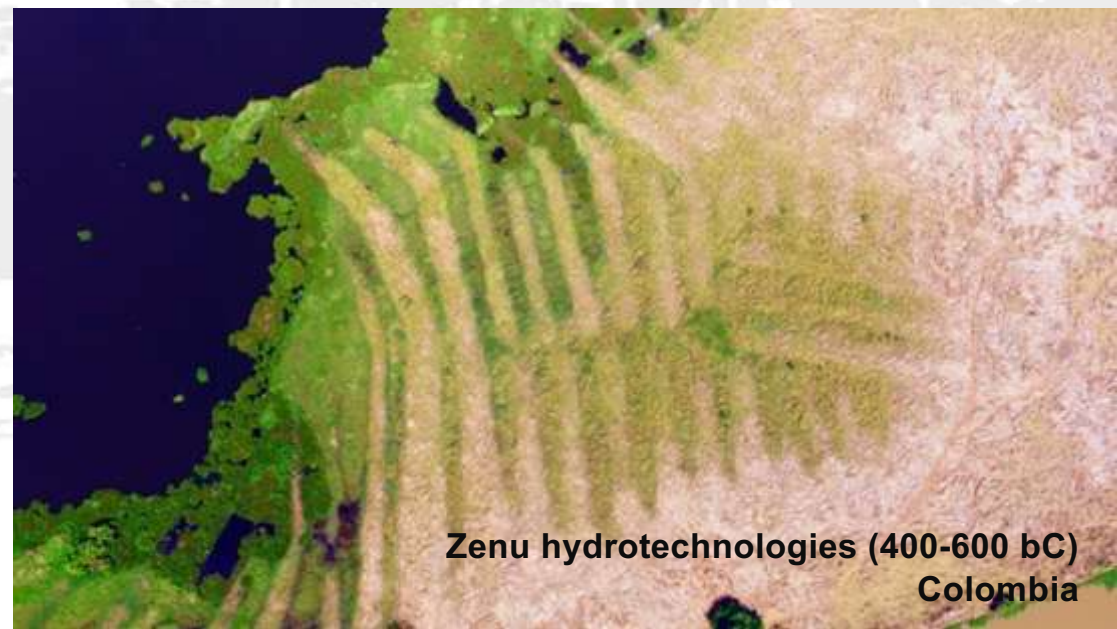
**Natural treatment technologies have high potential for application in developing countries**, particularly by small rural communities.

**Big experience in Participatory Community** approach in many countries, especially from local public administrations (Medellin case, on social urbanism).

**Multiagency involvement**, including local stakeholders, public administrations, international cooperation agencies and climate action funding agencies. **Innovative big national projects to improve conditions in rural areas**, like Produtor de Aguas from ANA in Brazil or AQUARISC in Colombia.

**Improving shared technical and scientific knowledge** for implementing and managing NBS in cities (different LAC networks, 5 editions of Panamerican Conference on Wetland Treatment Systems, April 28-30 2021)

**Traditional/Ancestral Ecological Knowledge and practices** in Mexico, Perú, Colombia (Zenu nexus approach), Brazil...



Zenu hydrotechnologies (400-600 bC)  
Colombia



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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE

## NBS in LAC – Successful examples



Moravia, Medellin, Colombia



Altos de la Estancia, Bogota, Colombia



Rio Las Piedras, Cauca, Colombia



Villatina, Medellin, Colombia



Programa Produtor de Agua  
Baixo Sul da Bahia, Brazil



Ecoducto Rio La Piedad, Ciudad de México



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# ANCESTRAL HYDROTECHNOLOGIES FOR FUTURE RESCUE

## Knowledge generation and dissemination. Transfer of best practices at local and regional level

### Best Practices on Ancestral Hydrotechnologies

Updated: Mar 21

You can now [register](#) for the second event, Good Practices on Ancestral Hydrotechnologies for the climatic, health and food emergency - Case Studies in Ibero-America-, which will be held this coming March 18.



#### Organizan:



#### Colaboran:



*Nature-based solutions for Urban Resilience in the Anthropocene*

The **NATURA** project links 26 networks in Africa, Asia-Pacific, Europe, North and Latin America

[WWW.NATURA-NET.ORG](http://WWW.NATURA-NET.ORG)

Cities and urbanized regions worldwide are exposed to extreme weather events and rising seas. They are at risk because their infrastructure often is in disrepair, no longer appropriate for more intense or frequent extreme events, or unable to keep up with rapid urban population growth. Traditional engineered infrastructure, such as stormwater drainage systems or sea walls, is usually designed for only one purpose and seldom can adapt to changing conditions. Solutions that are based on nature—preserving protective ecosystems, incorporating ecological elements or even mimicking nature in built infrastructure, offer flexibility in the face of changing conditions and provide multiple benefits to society, often at relatively low cost.

As an important part of knowledge sharing, researchers and practitioners will work together on applications of nature-based solutions (NBS) in a wide range of social, ecological, and technological contexts addressing five gaps:

- Synergistic benefits of bundles of NBS for urban resilience
- Role of social-cultural (S) context in NBS outcomes
- Role of ecological-biophysical (E) context in NBS outcomes
- Role of technological-infrastructure (T) context in NBS outcomes
- Role of SET interactions in NBS outcomes

The Nature-based solutions for Urban Resilience in the Anthropocene (NATURA) project links 26 networks in Africa, Asia-Pacific, Europe, North and Latin America, and globally to enhance connectivity among the world's scholars and practitioners and improve the prospects for global urban sustainability.

NATURA exchanges knowledge, shares data, and enhances communication among research disciplines and across the research-practice divide to advance urban resilience in face of growing threats of extreme weather events.

Through all-hands meetings, thematic working groups, regional nodes, and synthesis writing workshops, NATURA will accomplish the goals of synthesis and data sharing, and network coordination. Early-career researchers and practitioners will be sponsored by NATURA to pay five-week visits to network partners. Further, NATURA will train postdoctoral scholars and graduate students through learning exchanges to networks around the globe. Through collaboration with partners, international students will be invited to participate in these exchanges, hosted by US networks.

For more information please contact Nancy Grimm at [ngrimm@asu.edu](mailto:ngrimm@asu.edu) or Timon McPherson [timon.mcpherson@newschool.edu](mailto:timon.mcpherson@newschool.edu)





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