NATURE 4 CITIES

Be Part of the Green Transition

# «Nature-based Solutions» Workshop Sustainable Places 2018

Aix-les-Bains, 27-29 Juin

# Presentation plan

1. Nature4Cities
2. The concept of « Nature-based Solutions »
   - Definition & classification
   - Quiz
3. Pioneer experiences
4. Expected impacts and co-benefits
5. The concept of « NBS Implementation Model»
6. Implementation Model Database

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730468

# 1. Nature4Cities

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# The project

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Horizon 2020 EU-funded Reasearch & Innovation project

Aim to create a **comprehensive reference Platform for Nature Based Solutions (NBS) :**

- offering technical solutions, methods and tools to empower urban planning decision making.
- addressing the contemporary environmental, social and economic challenges that face European Cities.

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Whish to bring Nature back into innovation, planning and implementation driven thinking : New collaborative models

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# The partners

## 27 partners from 9 countries

| | | | |
|---|---|---|---|
| RTO | NOBATEK-INEF4 (FR) | GREEN4CITIES (AU) | SME |
| | TECNALIA (ES) | R2M SOLUTION (IT) | |
| | LIST (LU) | EKODENGE (TR) | |
| | EURECAT (ES) | ARGEDOR (TR) | |
| | CARTIF (ES) | COLOUREE (IT) | |
| | CEREMA (FR) | INNOVA INTEGRA (UK) | |
| UNI | SZEGED UNIVERSITY (HU) | TERRANIS (FR) | |
| | AGROCAMPUS OUEST (FR) | DUNEWORKS (NL) | |
| | METU (TR) | GRÜNSTATTGRAU (AU) | |
| | NANTES UNIVERSITY (FR) | PLANTE & CITE (FR) | CLU |
| LIO | ACC (ES) | MUTK (HU) | |
| | RINA (IT) | CITTA MTROPOLITANA DI MILANO (IT) | CITY |
| | | ÇANKAYA MUNICIPALITY (TR) | |
| | | SZEGED MUNICIPALITY (HU) | |
| | | ALCALA DE HENARES MUNICIPALITY (ES) | |

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# Objectives

- Improve the Integration of NBS in urban and spatial planning
- Build a new and active community network around NBS
- Offer high quality decision-support tools for re-naturing cities
- Build a holistic assessment framework for NBS
- Develop a reference knowledgebase on NBS and Best Practice sharing
- Propose new governance, business and financial models for NBS implementation

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# The platform

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## Access to NBS-related knowledge

- NBS Database
- NBS Projects Observatory
- Implementation Models Database
- Geocluster4NBS
- Pre-Selection Tools

## Access to local participation processes and NBS community

- Citizens' Say Tool

## Assess the benefits, co-benefits and costs of your NBS projects

- Simplified Urban Assessment Tool
- Environmental Impact Assessment Tool
- Socio-Economic Assessment Tool

Municipality

Expert

Citizen

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# Platform test and validation

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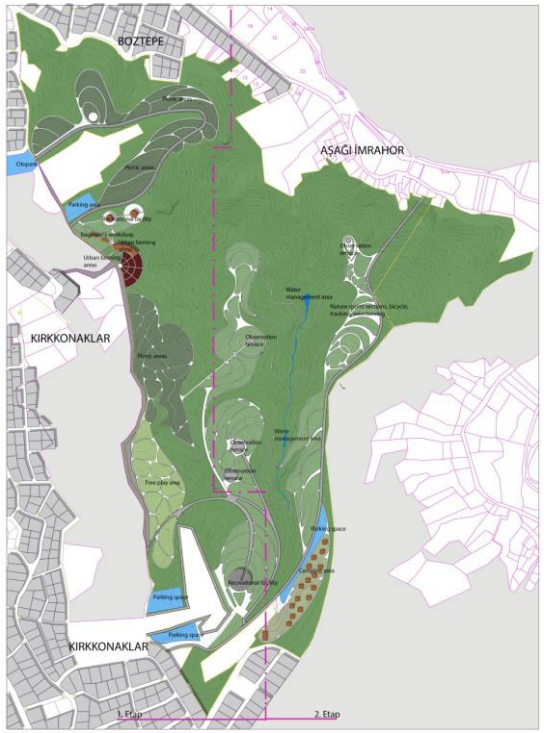
## N4C platform and tools to be tested and validated on a variety of urban projects

### Partner cities

ALCALÁ DE HENARES AYUNTAMIENTO

Çankaya BELEDİYESİ

Città metropolitana di Milano




Large urban recreation area

Downtown rehabilitation


Quarry renaturalisation

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# Join the community

The tools will be developed during the project.
If you want to take part in these developments or be informed, **we invite you to**

**Join the community**

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# 2. Definition & classification

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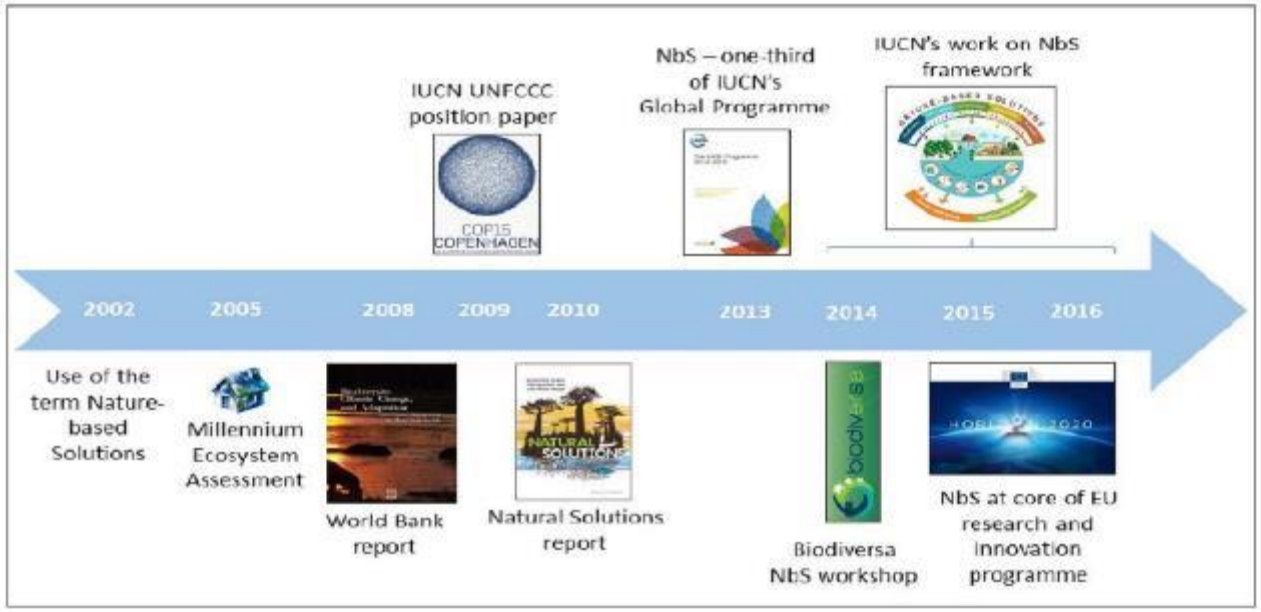
# NBS concept

**An emerging concept:**

- Multiple definitions are coexisting (IUCN, EU). They are closed in many ways, but they can not be merged
- The concept of NBS is recent, its components are still much debated
- A very large frame (the concept is not specific to urban issues)




(Cohen-Shacham et al. 2016)

Timeline of the NBS concept

**A concept that must be clarified**

Two ongoing Eu funded projects (2016-2020)

NATURVATION

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# Overview of N4C framework regarding the NBS concept

## Exploration of the conceptual framework of the NBS

- **Main principles of the concept**
- **Relation with neighbour concepts (ES, GI and Sustainable urban development)**
- **Comparison of the different definitions and their variants**
- **N4C's NBS definition**

## Exploration of the analytical framework of the NBS

- **Urban challenge addressed**
- **Urban spatial scales**
- **Temporal scales**
- **Gradient of level of human intervention**
- **Land cover/environment of the implementation**

=> NBS definition, typology & associated database

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# Definition proposal

A proposal rewriting version of the EU definition (2015) rewriting in N4C:

NBS are **positive responses** to societal challenges, and can have the potential **to simultaneously meet environmental, social and economic objectives**. They recognize the importance to develop a systemic approach and at the same time to adapt interventions to the local context. They also integrate the temporal factor to meet the challenge of durability.

They are **actions inspired by, supported by or copied from nature**. Such solutions bring more, and more diverse, nature and natural features and processes into cities. **They are living solutions**, and as much as possible they take part in complex and functional ecosystems.

NBS use the features and complex system processes of nature. By using the natural flows of matters and energy, these are low-input solutions. If these solutions are conceived and implemented in a good way, low-maintenance, cost savings, energy and resources efficiency are expected. NBS also benefit from the malleability of nature (capacity to evolve and to adapt) and are thus more resilient to changes.

They both use and enhance existing solutions to challenges, as well as explore more novel solutions.

GMO, and other solutions that artificially alter nature are excluded

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# Key points of the concept

**A systemic approach**

- Multiple and simultaneously addressed challenges : environment, social and economy
- Multiple and interconnected scales (space and time)
- A shared concept -from its origin- between scientists, politicians and practitioners

**An operational concept**

- A necessary positive response
- Compatible with technology and human intervention

“NBS are actions” : protection – restoration – management (IUCN) + design of new ecosystems (EU)

- Cost-effective
- NBS imply political choices (trade-off) => at the opposite of the idea of a calculated optimum
- NBS concept is compatible and complete existing concepts such as ES, GI

**Natural and living features at the core of the solution**

- NBS are based on ecosystems (or/ and) are “living solutions”
- NBS use physical features and processes of nature.

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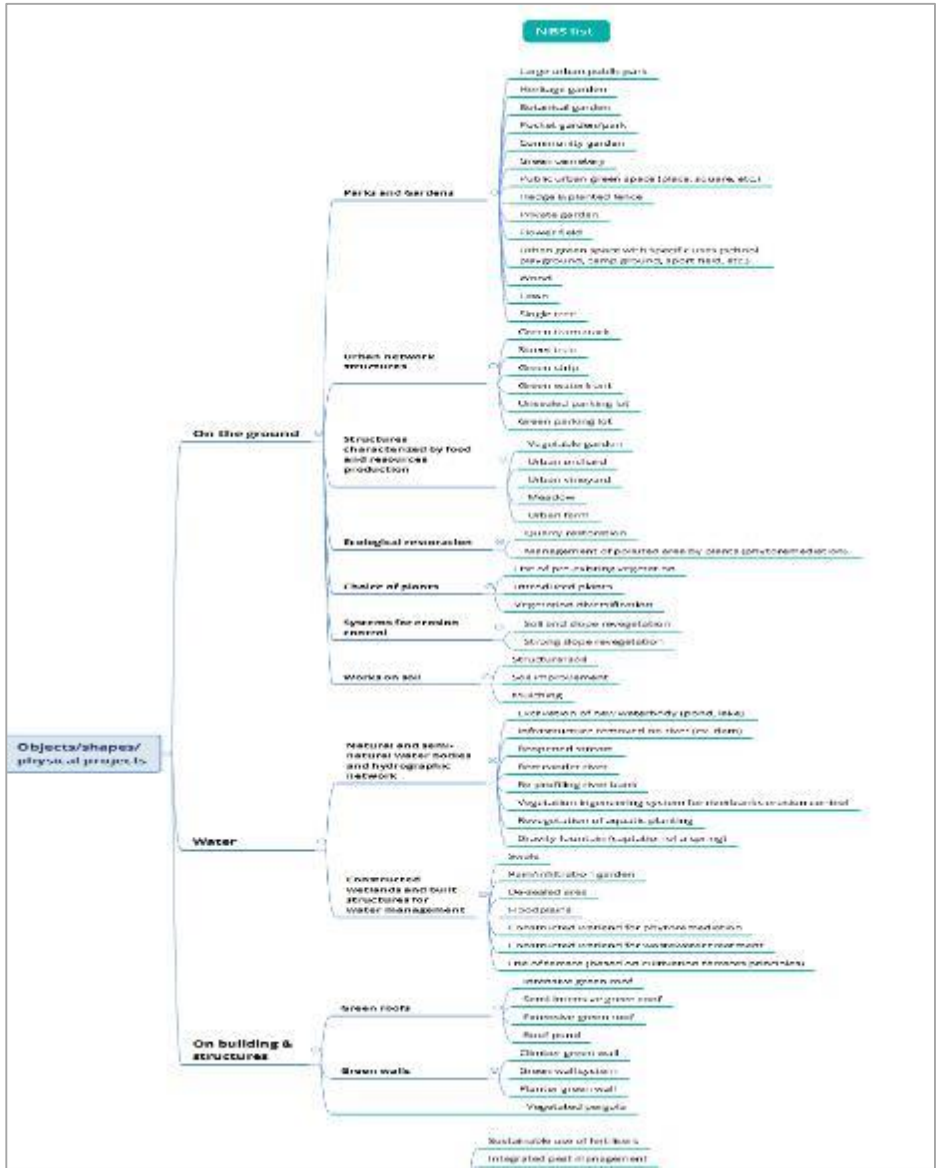
# NBS classification

| Categories | Sub-Categories | Classes | Types |
|---|---|---|---|
| Objects/shapes/physical projects/construction | On the ground | Parks and gardens | Large urban public park |
| Actions and strategies | Water | Structures associated with urban networks | Wood |
| | on the buildings | Structures characterized by food and resources production | Urban orchard |
| | Urban management | Ecological restoration | Soil and slope revegetation |
| | Waste management | Choice of plants | Structural soil |
| | Protection and conservation strategies | Systems for erosion control | Reopened stream |
| | Urban planning strategies | | Etc. |

The 4 levels of the NBS classification

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# Quiz

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# NBS or not NBS?

**1. Vegetated parking lot**


**2. Sheeps used for green space management**

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# NBS or not NBS?

**3. Urban farm and social reinsertion**

**4. Wild animal passages based on heavy civil engineering structures**

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# NBS or not NBS?

**5. Bio-sourced materials**

**6. A defensive hedge**

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# NBS or not NBS?

**7. Combination of a green wall and solar panels**

**8. Intensive green roof**

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# NBS or not NBS?


**9. A urban master plan implementing vegetation**

**10.**

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# Quiz solutions

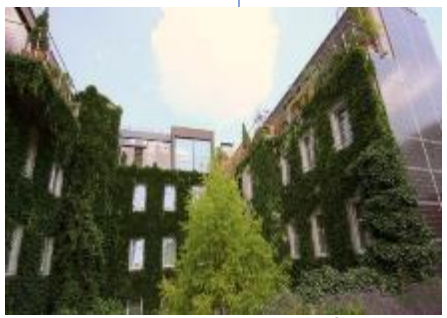
## NBS






## Not NBS





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# 3. Pioneer experiences

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# Pioneers database

| | | | | |
|---|---|---|---|---|
| **Title** | **Saida school** | | | |
| **A short description of the NBS** | A school refurbishment in an ecological and participatory approach. Implementation of an ecological building (low-energy building) favorable for biodiversity, partial impervious pavement release, green spaces and vegetable gardens creation. This project is also notable for children and educational community consultation in its conception, making them as full stakeholders. The design reinforce the ecological networks at the district scale. | | | |
| **Ref. photos** | FR 14 1<br>  <br>Photo: Paris municipality | | | |
| **NBS Types** | Objects Shapes | On the ground | Parks and gardens | Urban green spaces with specific uses (school playgrounds, camp grounds, sport fields, etc.) |
| | Objects Shapes | On the ground | Structures characterized by food and resource production | Vegetable gardens |


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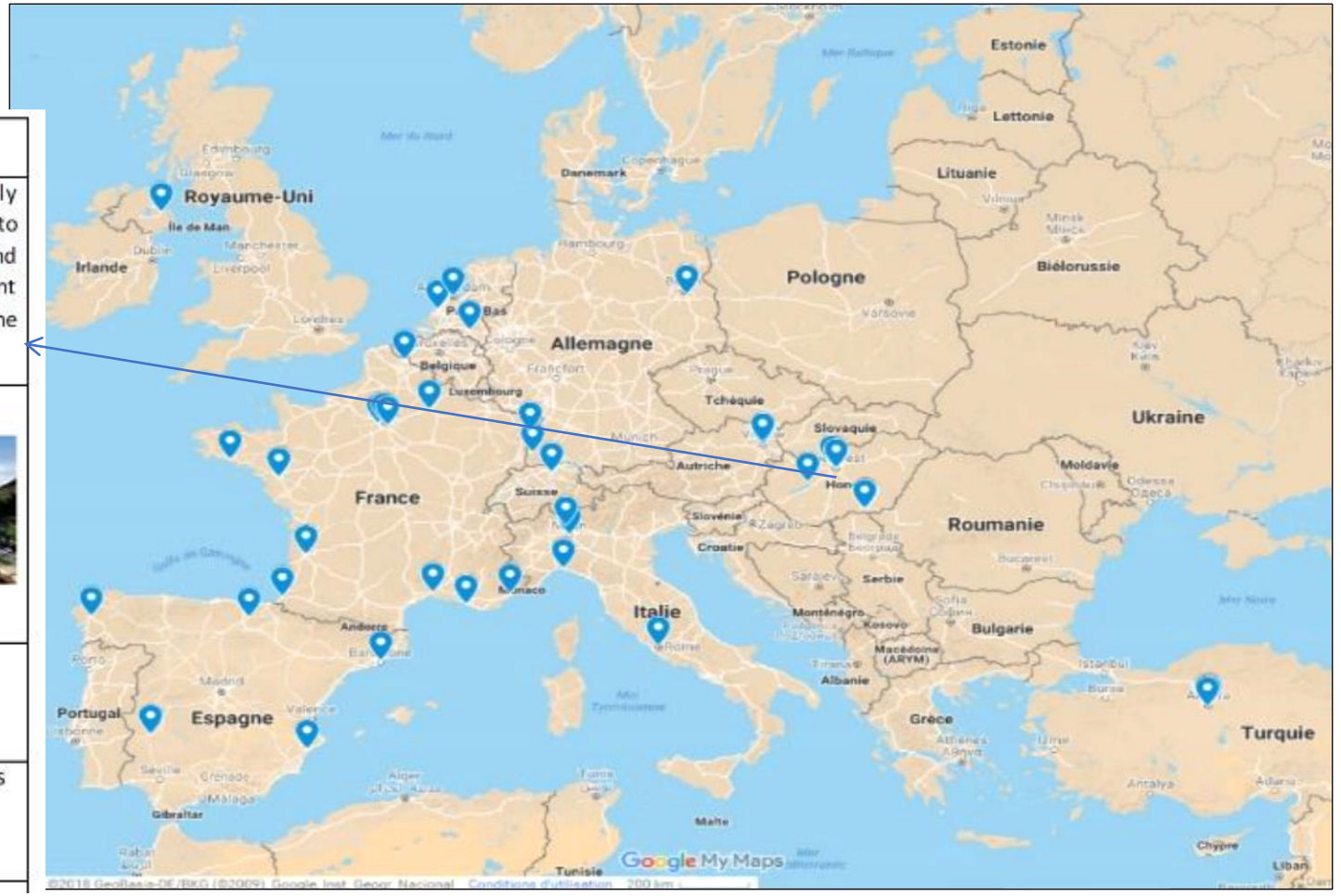
# Pioneers database

| | | | | |
|---|---|---|---|---|
| **Title** | **Urban Public Space Refurbishment, Szeged** | | | |
| **A short description of the NBS** | Szeged is a mid-size historic city in the south of Hungary, the temperature is usually higher than in other similar -sized cities in the coutry. The goal of this project was to reduce the effects of the urban heat island in a very busy street with a lot of cars and shops. The idea was to increase the green area, plant trees, creating a more pleasant space for the pedestrians. The project has a significant effect which stimulated the economy as well. | | | |
| **Ref. photos** | HU 6 1  | HU 6 2  | HU 6 3  | |
| **NBS Types** | Objects Shapes | On the ground | Structures associated with urban networks | Street trees |
| | Objects Shapes | On the ground | Structures associated with urban networks | Planted car parks |

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# Pioneers database

| | | | | |
|---|---|---|---|---|
| **Title** | **Adlershof Berlin** | | | |
| **A short description of the NBS** | The building of the Institute of physics of the Humboldt university in Berlin is the result of combining decentralised rainwater management, building greening and elements for cooling and ventilation. All necessary factors, like water and energy consumption, temperature, radiation, etc., are monitored, evaluated, optimised and documented to gain information about basic conditions for the longterm implementation and further development of innovative and economic technologies. This project gives needed information about benefits of façade greening. The results and experiences of the concept model were integrated into the "Rainwater Management Concepts – Greening building, cooling buildings – Planning, Construction, Operation and Maintance Guidelines" developed by the Senate for Urban development of the City Berlin. | | | |
| **Ref. photos** | DE 2 1  | | | |
| **NBS Types** | Objects Shapes | On building structures | Vertical structures Green walls facades | Climber green walls |
| | Objects Shapes | On building structures | Vertical structures Green walls facades | Build or attached planter systems (including green balconies) |


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# Pioneers database

| Title | LEAFSKIN® Green shady structure |
|---|---|
| A short description of the NBS | SINGULAR GREEN is a Spanish company specializing in landscape architecture. They integrate nature and architecture using vertical gardens, green roofs or other tools. They have relevant projects like a vertical garden in London: a garden located in the interior of a famous Nando's restaurant. The green wall, of approximately 30m2 , is located in the dining area. Because of their work, they are involved in the H2020 project URBAN GreenUP, where they study, design, budget and construction of NBS like green noise barriers, green covering shelters with vertical gardens, green roof and vegetable structures.<br>LEAFSKIN® is a green shady structure with several benefits designed by SINGULAR GREEN. This green infrastructure consists in an ultralight vertical garden system with a pitch between 30º and 90º, it is destined for the planting and growth of plants, including irrigation and water drainage system.<br>LEAFSKIN® allows to place advertising on the bottom of the infrastructure as an additional financial support.<br>This NBS is something like a green roof but over the streets, it is an horizontal solution to create shadow areas in urban spaces as pedestrian streets or squares. |
| Ref. photos | ES 4 1  ES 4 2  ES 4 3  |
| NBS Types | Objects Shapes / On building structures / Green roofs / Extensive green roofs |


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# 4. Expected impacts and co-benefits

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# Urban challenges and sub-challenges

| TOPICS | URBAN CHALLENGES (UC) | URBAN SUB-CHALLENGES (USC) |
|---|---|---|
| CLIMATE | 1 \| Climate Issues | 1.1 \| Climate mitigation |
| | | 1.2 \| Climate adaption |
| | 2 \| Water Management | 2.1 \| Urban water management and quality |
| | | 2.2 \| Flood management |
| ENVIRONMENT | 3 \| Air Quality | 3.1 \| Air quality at district/city scale |
| | | 3.2 \| Air quality locally |
| | 4 \| Green Space and Biodiversity | 4.1 \| Biodiversity |
| | | 4.2 \| Urban space development and regeneration |
| | 5 \| Urban Regeneration and Soil | 5.1 \| Soil management and quality |
| RESOURCE | 6 \| Resource Efficiency | 6.1 \| Food, energy and water |
| | | 6.2 \| Raw Material |
| | | 6.3 \| Waste |
| | | 6.4 \| Recycling |
| SOCIAL | 7 \| Public Health and Well-being | 7.1 \| Acoustics |
| | | 7.2 \| Quality of Life |
| | | 7.3 \| Health |
| | 8 \| Environmental Justice and Social Cohesion | 8.1 \| Environmental justice |
| | | 8.2 \| Social cohesion |
| | 9 \| Urban Planning and Governance | 9.1 \| Urban planning and form |
| | | 9.2 \| Governance in planning |
| | 10 \| People Security | 10.1 \| Control of crime |
| | | 10.2 \| Control of extraordinary events |
| ECONOMY | 11 \| Green Economy | 11.1 \| Circular economy |
| | | 11.2 \| Bioeconomy activities |
| | | 11.3 \| Direct economic value of NBS |

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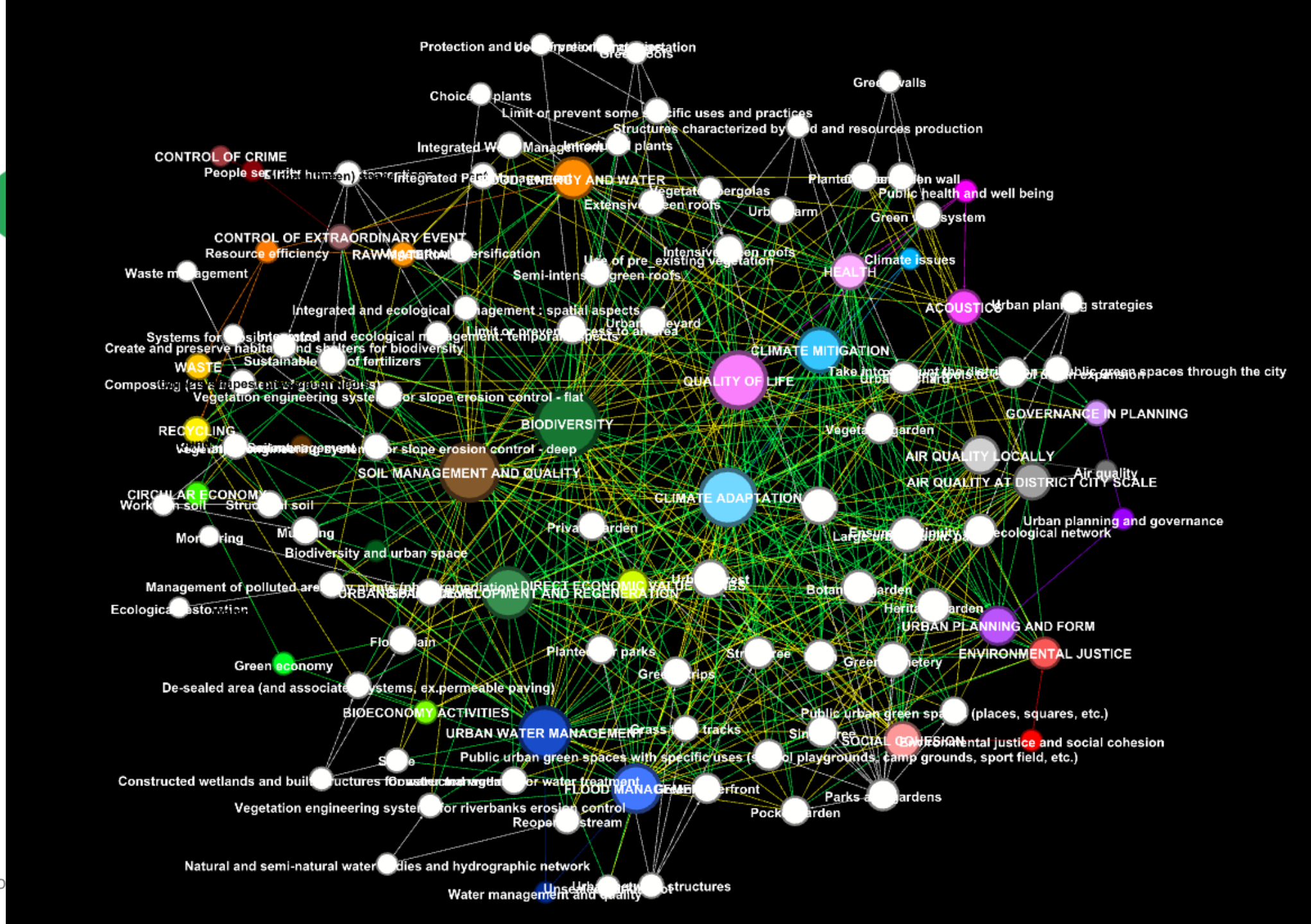
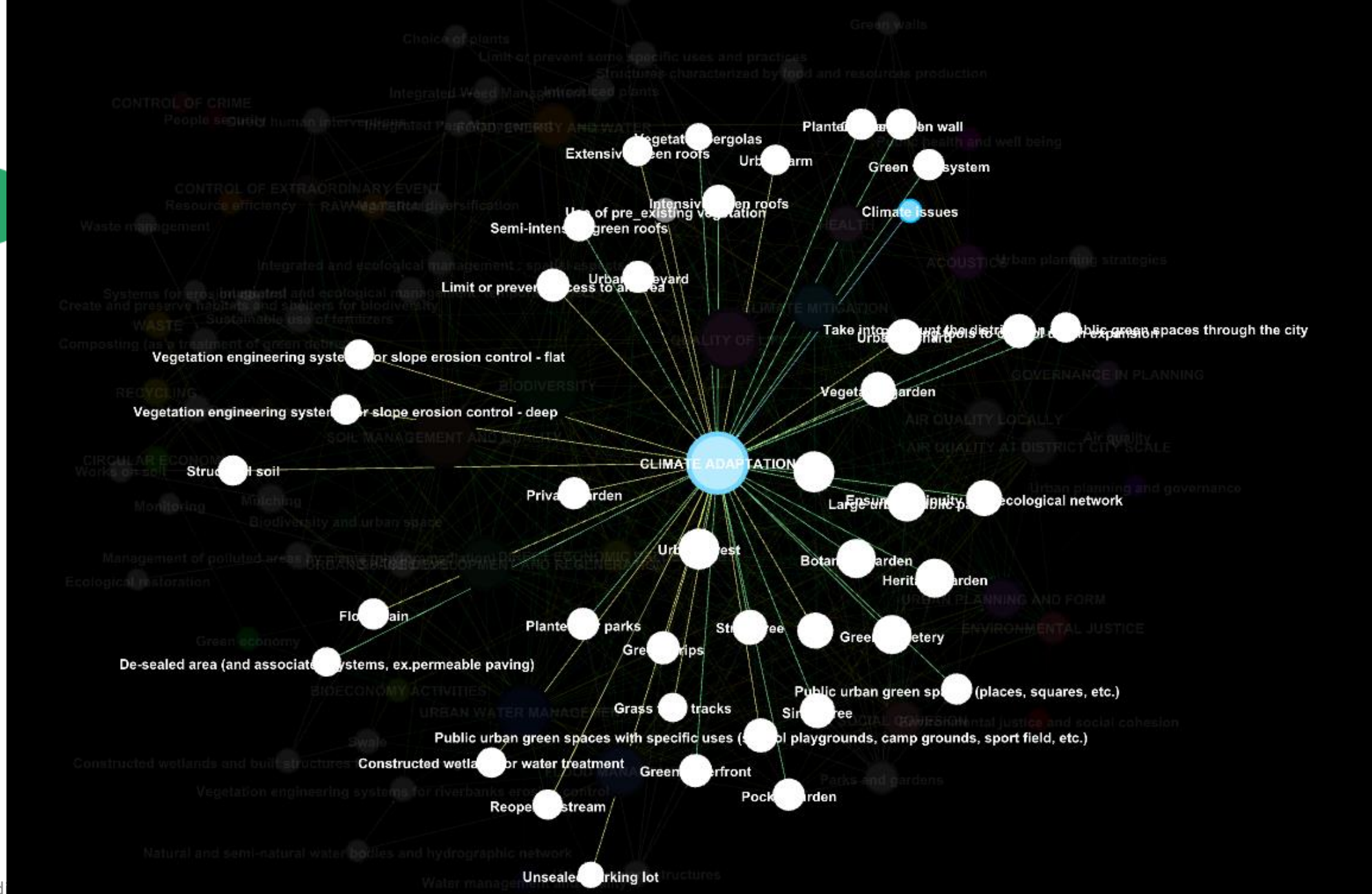
# Mapping NBS – USC links




This project has received funding fro

# NBS addressing QOL USC

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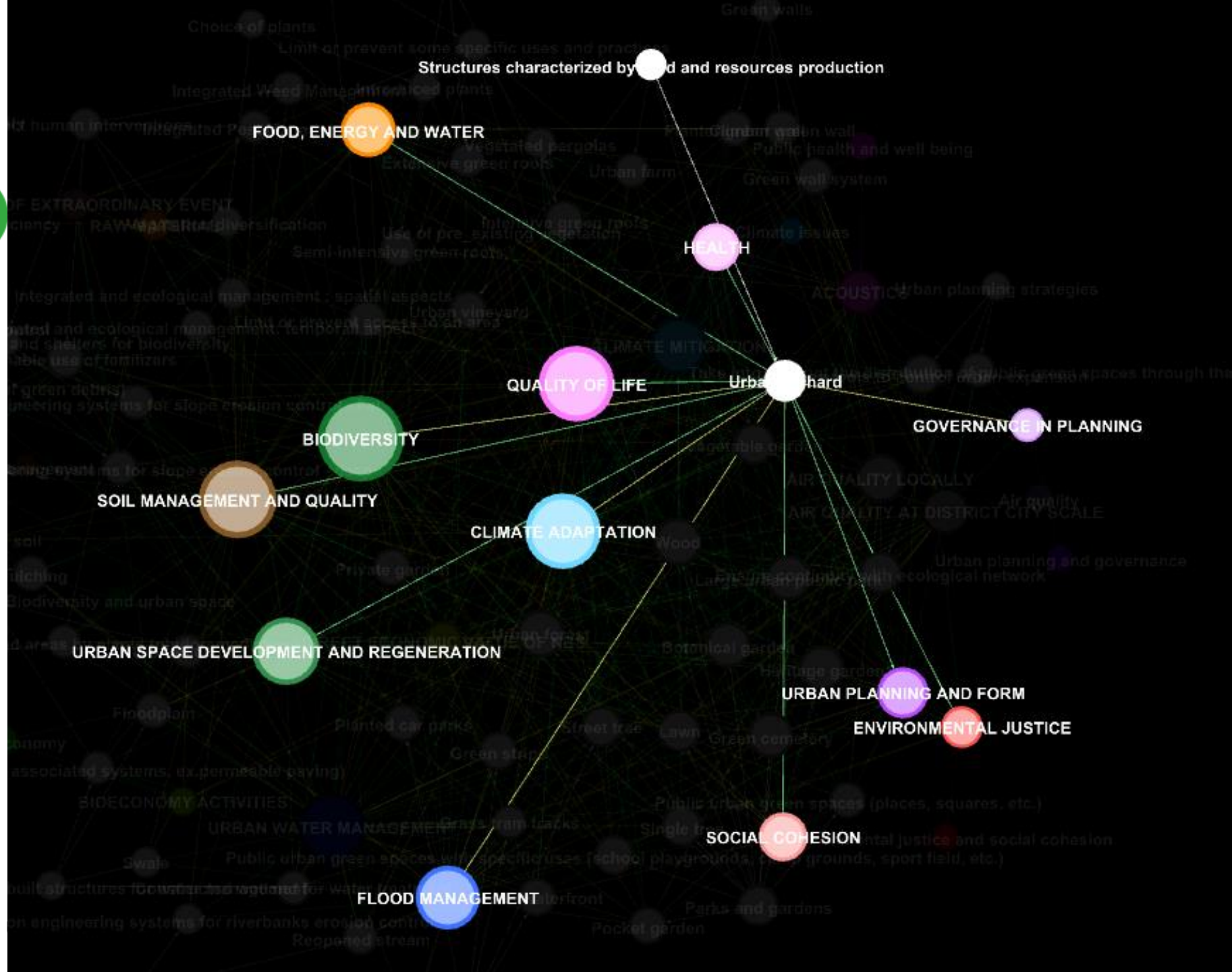
# USC addressed by the NBS “Urban Orchard”

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# Energy and NBS : your opinion

NBS impacts on Energy production and on Energy demand reduction

**Ressources : energy production**
**-> R**

**Climate issues : climate mitigation**
**-> C**

UC for Urban Challenge
Co for co-benefit

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# 5. NBS Implementation Model

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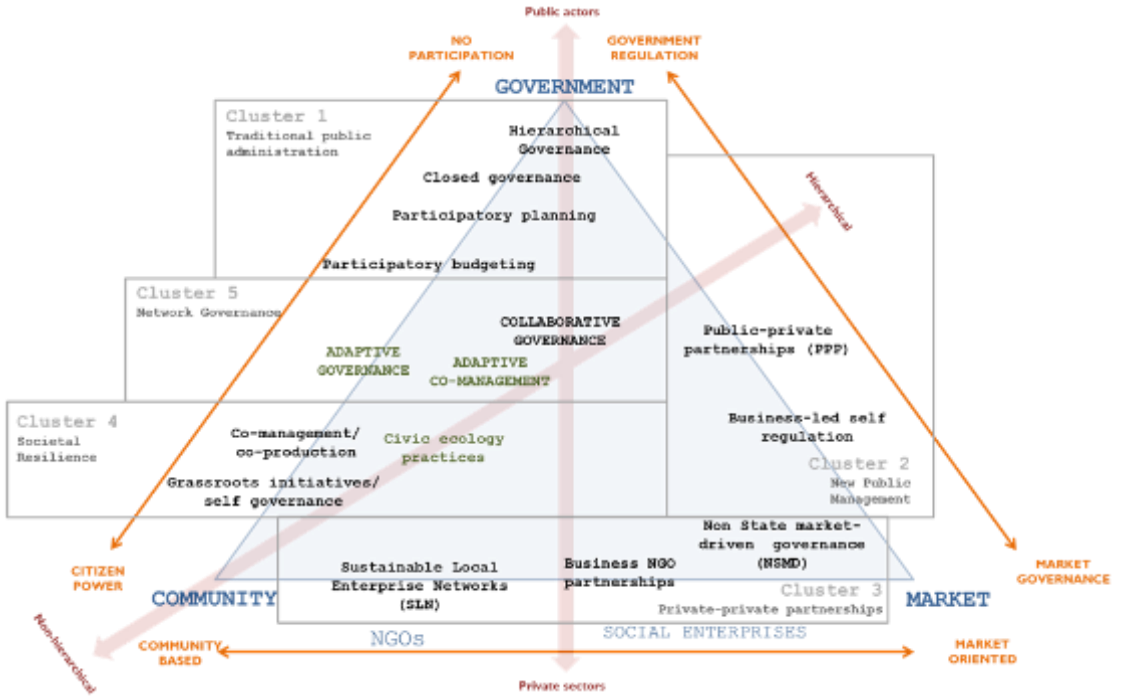
# NBS Implementation Models Concept

“

The different urban and environmental governance models that can be found in literature cannot be packed in clearly delimited boxes

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# NBS Implementation Models Concept

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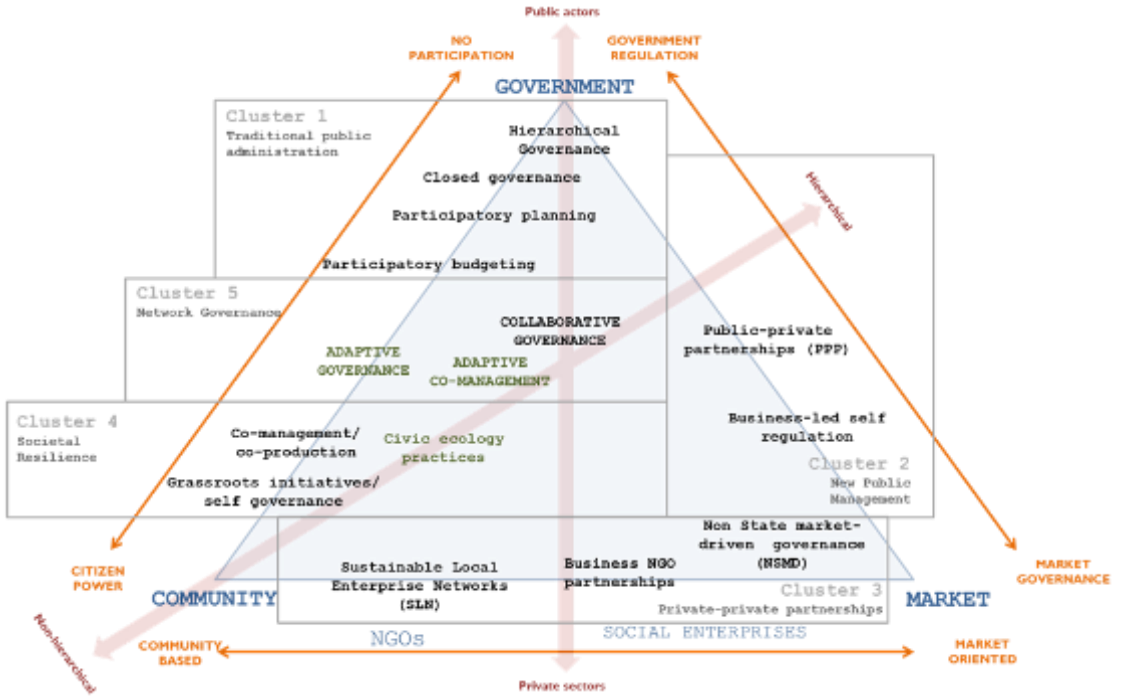
“

In general for implementing a NBS many aspects should be taken into consideration. All aspects that in such a way help us to implement our green / social idea




**Governance**

**Financial mechanism**

**Business Model**

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# NBS Implementation Models Concept

## Governance

- CLUSTER 1: Traditional public administration
- CLUSTER 2: New Public Management
- CLUSTER 3: Private-private partnerships
- CLUSTER 4: Societal Resilience
- CLUSTER 5: Network Governance


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# NBS Implementation Models Concept

## Financing Mechanism

- CLUSTER 1: Public
- CLUSTER 2: Financial Institutions Instruments
- CLUSTER 3: Citizen inclusive financing instruments
- CLUSTER 4: Public-private

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# NBS Implementation Models Concept

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## Business Model

"There is not only one option to get a NBS Business archetype. This is due to the heterogeneity of the possible Nature Based Solution to be implemented

- CLUSTER 1: Technological
- CLUSTER 2: Social
- CLUSTER 3: Organizational

"**OBJECTIVES:**

- Create competitive advantage
- Improve the quality of human life
- align the interests of all stakeholder groups, and explicitly consider the environment and society as key stakeholders

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# 6. NBS Implementation Database

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# N4C Implementation Models Database

A Database has been developed within the Nature4Cities project. The purpose of the Implementation Models Database (IM-DB) is to collect, map and systematically categorize Implementation Models (IMs) for urban projects, across multiple dimensions: governance, business and financing models.

The main aim was to have a catalogue with a reasonable number of examples for each Governance Model, Financing Mechanism and Business Model.

**“The database now comprehends 56 detailed examples”**

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# N4C Implementation Models Database

## “What’s results from the Database?”

- The aim of this database is to give the possibility to users to consult the list crossing different variables (features or characteristics) and building further levels of knowledge about NBS.

## “New point of view”

It is particularly relevant the organization of the information that have been considered: all the existing databases (i.e. the already cited EEA database, Naturvation database and others) are based on the description of NBS classification, scale, and dimension of the expected effects and not on the way in which they can be realized and carried out as full projects.

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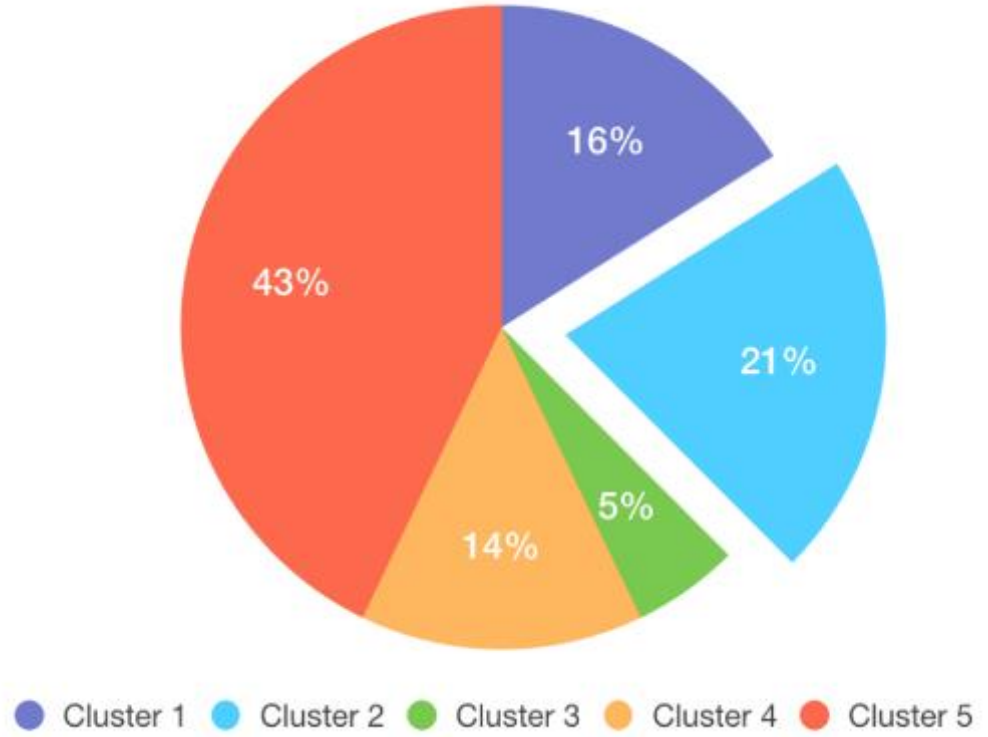
# NBS Implementation Models Database

NATURE 4 CITIES

## Governance

- CLUSTER 1: Traditional public administration
- CLUSTER 2: New Public Management
- CLUSTER 3: Private-private partnerships
- CLUSTER 4: Societal Resilience
- CLUSTER 5: Network Governance




Network Governance is decisively prevalent as compared to the other Governance Models. Considering the basic definition of NBS, this result demonstrates that the collaborative and adaptive governance together with the scale-crossing borders are relevant aspects and play a crucial role in the regulatory and decision-making framework when it comes to NBS implementation in urban contexts.

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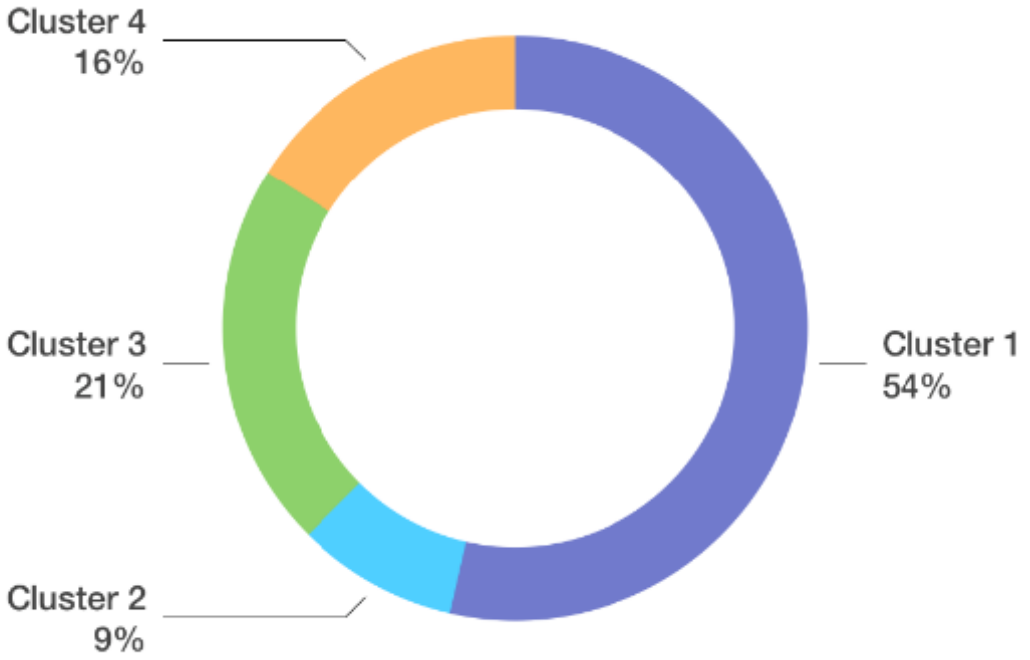
# NBS Implementation Models Database

## Financing Mechanism

- CLUSTER 1: Public Financing
- CLUSTER 2: Financial Institutions Instruments
- CLUSTER 3: Citizen inclusive financing instruments
- CLUSTER 4: Public-private




About the Financing mechanisms the Cluster 1 – “Public Financing” is extremely relevant. It was expected to have such results considering that the NBS that have been recorded were designed in the NBS “launching phase”, and that in regard to the actual knowledge the economical positive effects are recognizable to be more public and collective than private and individual.

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# NBS Implementation Models Database

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## Business Model

- CLUSTER 1: Technological
- CLUSTER 2: Social
- CLUSTER 3: Organizational

About the Business Model, the typologies are not defined as exclusive parameters, but they are inclusive, so that different typologies can characterize the same example.

**“Difficult to categorize the IMs from Business Model prospective”**

1. **involvement of citizen** beyond the official institutions and in cooperation with them is necessary
2. the creation of citizen’s networks together with the **rising of the general awareness** about the problem is an effective feedback process
3. From the economical point of view, this typology of people’s involvement is related **to self-financing and self-management** that are emerging in a significant number of examples
4. **The government support in economical issues** is another good enabler

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# NBS Implementation Models Database

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## Lesson Learned

"Working with nature, rather than against it, can further pave the way towards a more resource efficient, competitive and greener economy. It can also help to create new jobs and economic growth, through the manufacture and delivery of new products and services, which enhance the natural capital rather than deplete it."

Mr. Kurt Vandenberghe
Director for Directorate Climate action and resource efficiency, Directorate-General for Research and Innovation, European Commission

## Increase public awareness is essential

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# Thank you for your attention!

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