

Implementation of NBS in neighborhoods An opportunity for protection of open urban soils?

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Introduction

Challenge of a **dual aspiration** in urban areas

A pleasant **living environment** close to the **amenities** for citizens



Reducing the **urban sprawl** by the community

Environmental considerations including water protection and biodiversity conservation should be integrated into planning decisions relating to land use so that they are made more sustainable, with a view to making progress towards the objective of **'no net land take', by 2050**. (Decision No 1386/2013/EU)

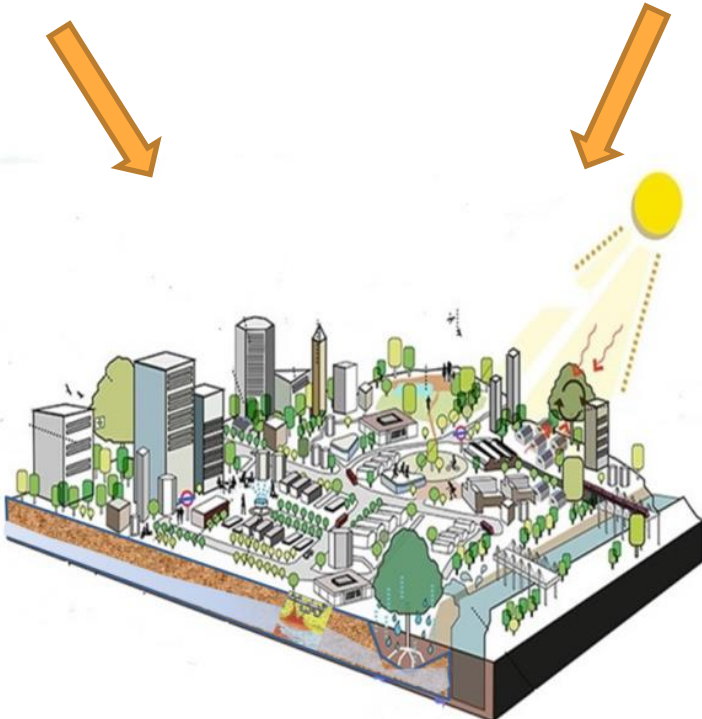
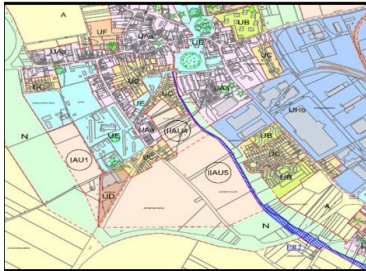


Soils as a key interface in urban management



Introduction

From a **single surficial vision** of **soils** in urban planning



.....to a **dual vision** including the **soil** as a **natural resource** ensuring essential services for life



A new park in city (@Beaudet L.)

Introduction

Solutions to resolve the duality

City scale
Integration of soil
functions in urban
planning documents

Local scale
De-sealing
interventions

Implementation of
**Nature-Based
Solutions** in urban
plans



**NBS as an opportunity to protect/restore
the open urban soils?**



© IUCN

Figure 1 "Nature-based Solutions are actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits" (IUCN, 2016)

Methodology

EC definition of NBS :

Solutions 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. Nature-based solutions must **benefit biodiversity** and **support the delivery of a range of ecosystem services**.

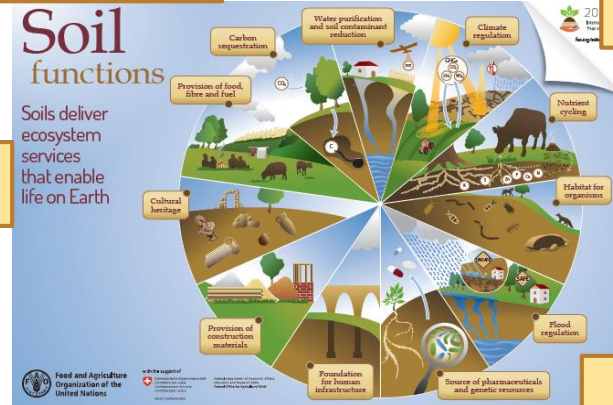
Soil ecosystems
services



Provision of food

Carbon
sequestration

Nutrient&water
&support
for vegetation



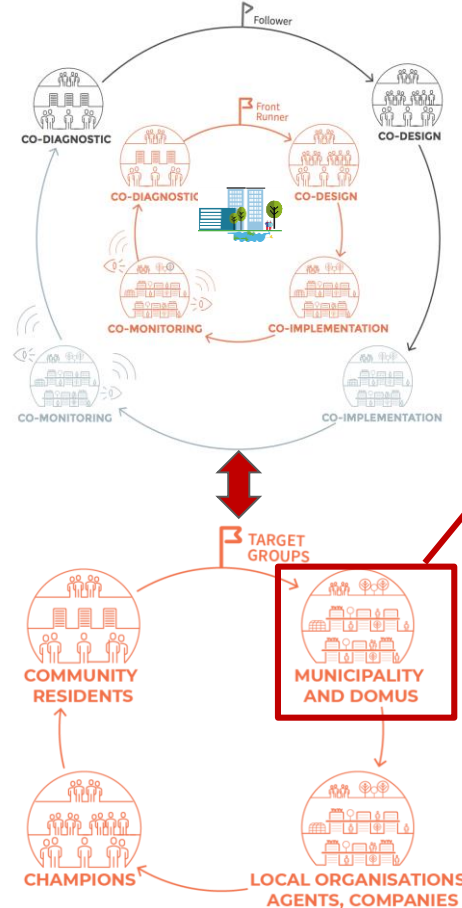
Habitat for
organisms

Flood regulation

Methodology

URBiNAT

Healthy corridors as drivers for regeneration of social housing neighbourhoods through co-creation of social, environmental and marketable NBS



- Development of a healthy corridor (cluster of NBS) in 3 frontrunner cities : Nantes, Porto, Sofia
- Diagnostic before co-design of NBS and urban plan
- Expected opportunities of NBS to protect/restore the soil functions
- Implementation/planning of NBS
- Difficulties, limits, constraints

Healthy corridors in deprived outskirts of cities

NANTES



PORTO



SOFIA



The Healthy corridors before implementation of NBS

Non qualitative green areas



Sealed areas



Fragmentation of urban spaces



Non-qualitative footways



Nantes - HC : the Green Loop and linked-activities



Soil issues

NANTES NORD CHALLENGES in Urbinat

HEALTH as a transversal challenge

PHYSICAL ACTIVITY & SPORT

- Physical exercises for health
- Technical support for sport practise

NATURE & FOOD PRODUCTION

- Access to healthy food
- Social cohesion (especially single elderly person and single parent family)

EDUCATION

- Education - develop awareness of the nature and nature benefits in the district
- Fruits and vegetables

PUBLIC SPACES

- Accessibility & connectivities (within the district and with neighbor districts)
- Places favorable for social interactions

SOCIAL & SOLIDARITY ECONOMY

- Economic development and job opportunities

Nantes - Soil functions protection and constraints

Urban gardening



Positive effects of NBS on soil quality

Improvement of the agronomic and physical properties

Limits and constraints

Backfilling materials

Geogenic and anthropic contamination

Sport and children playgrounds



De-sealing/increase water infiltration and nutrient cycling

Stabilised grounds for activities and mobility

Connection between parks and other public spaces

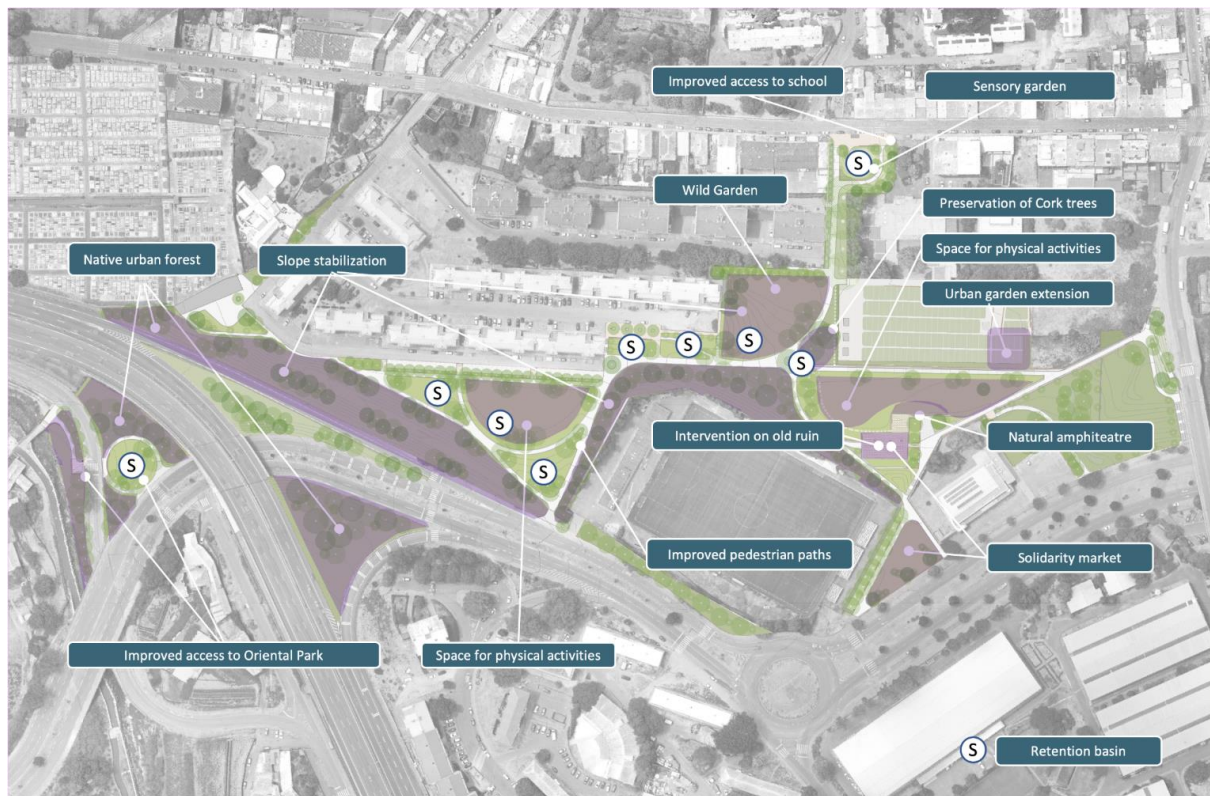


Provision of food

Nutrient&water&support
for vegetation

Carbon sequestration

Porto - HC : a multifunctional urban park



Soil issues

Porto challenges in Urbinat

ACCESSIBILITY AND
MOBILITY ISSUES

MONOFUNCTIONALITY
AND LACK OF URBAN
FURNITURE

LACK OF DIGNITY IN
OUTDOOR SPACES

FEAR AND LACK OF
SECURITY

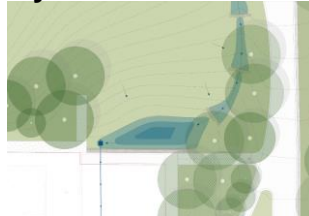
WATER MANAGEMENT

Porto - Soil functions protection and constraints

Slope stabilization



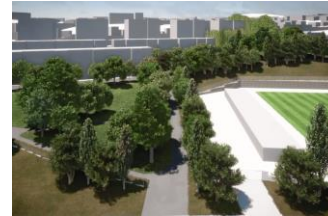
Natural water retention systems



Wild garden



Autochthonous urban forest



Brownfield naturalization



Positive effects of NBS on soil quality

Reduction of soil erosion
Better soil development

Increase in soil humidity
Reduction of soil erosion
Less irrigation
More biodiversity

More biodiversity
Better water retention

More biodiversity
Long-term increase in soil structure and organic matter
Less irrigation
Reduction of soil erosion

Increase in water infiltration
More biodiversity

Limits and constraints

Backfilling materials
Anthropic contamination

Flood regulation

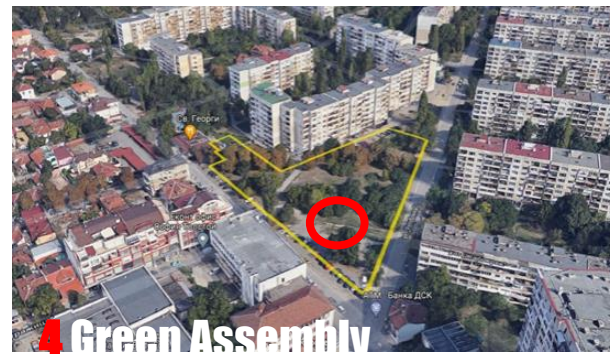
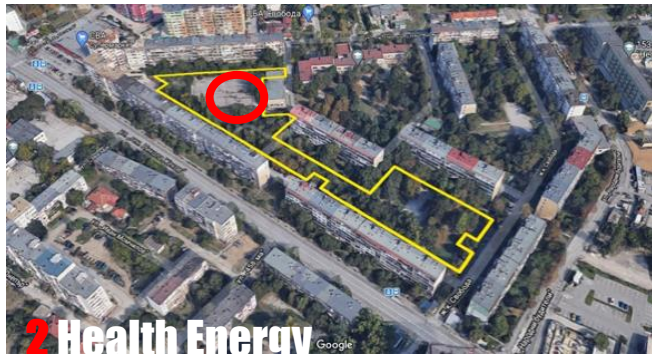
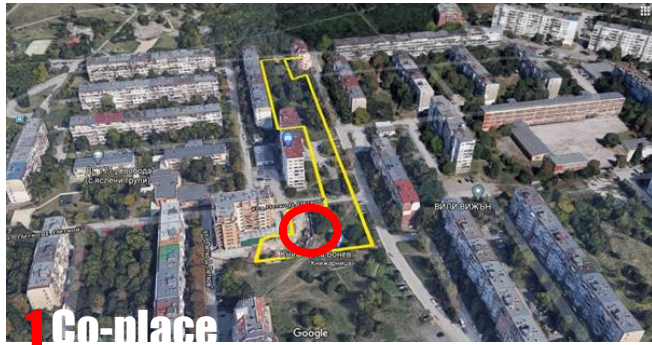
Habitat for organisms

Carbon sequestration

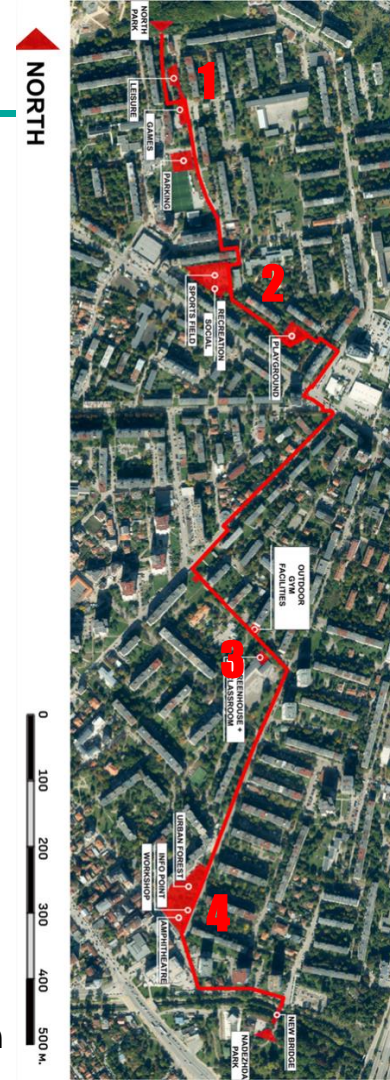
Nutrient&water&support for vegetation

Sofia - HC : reconnection to nature and health

Zones of intervention(yellow). Areas for de-sealing(in red)



Healthy corridor urban plan



Sofia - Soil functions protection and constraints

1 Co-place

Green parking De-sealing

Increase in water infiltration
More biodiversity
Provision of green parking -
prevention of parking over
the green areas



2 Health Energy

Playgrounds and green areas - free access

De-sealing
Increase in water infiltration
More biodiversity
Stabilised grounds for
activities



4 Green Assembly

Urban forest

More biodiversity
Long-term increase in soil structure
and organic matter
Less irrigation; Perméable pavements

Green amphitheatre

De-sealing
Stabilised grounds for activities



3 Aqua vita

De-sealing

Stabilised grounds for
activities

Habitat for
organisms

Carbon sequestration

Nutrient&water&support
for vegetation

Conclusions and perspectives

NBS as an opportunity to protect/restore the open urban soils?

Yes !

Carbon sequestration

Nutrient&water
&support
for vegetation

Habitat for
organisms

Flood regulation

Provision of food

- NBS and HC solutions for sustainable urban planning including soil conservation
- Healthy corridors : opportunity of large scale of intervention and to offer new amenities
- Help to reduce the gap between urban planners, stakeholders and soil scientists

But...

- Issues of soil quality : physico-chemical properties, contamination...

Next step : implementation and evaluation

“Simplified performance assessment methodology for addressing soil quality of nature-based solutions » Bouzouidja et al. JSS, 2020



Thank You!



“Le débitumeur” (the de-sealer) by Jean Jullien
Le Voyage à Nantes, 2022 edition
(Outdoor modern art festival in Nantes)