



EU Research & Innovation Agenda

Nature-Based Solutions

**Workshop on Implementation of
Nature-based Solutions to tackle climate change**

Marseille, 22 January, 2019

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EASME

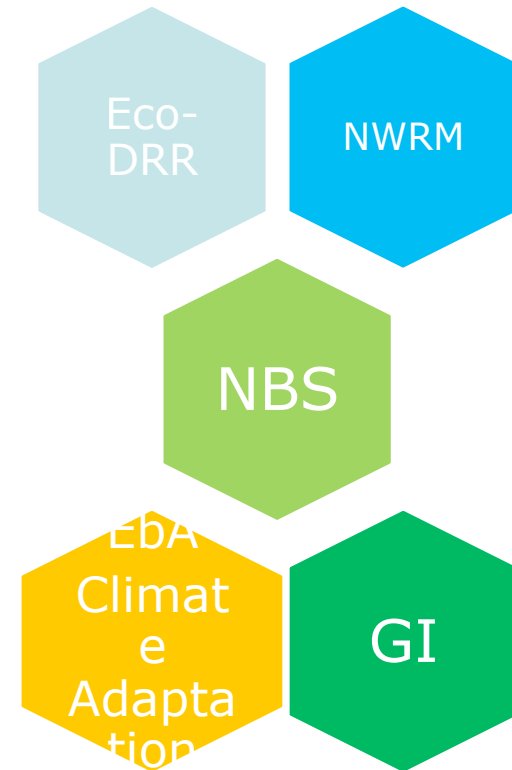
- One of the EC's Executive Agencies
- Working together with the parent DGs
- Managing EU programmes
 - Parts of H2020 →
SC5 Environment and Resources
 - SME-instrument
 - EMFF
 - LIFE
 - COSME



Nature-Based Solutions (NBS) **[the innovative approach]**

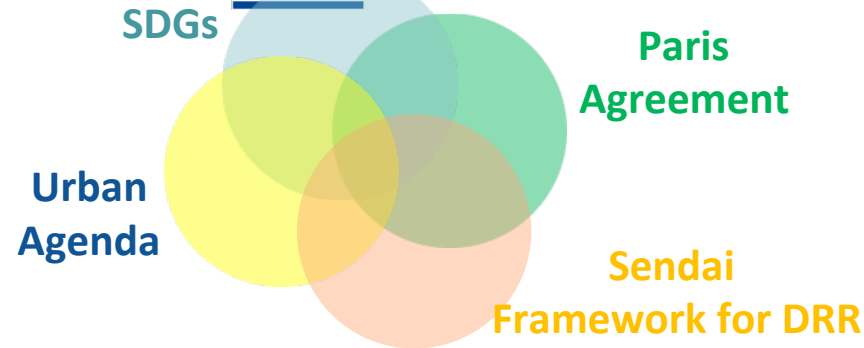
Nature-based solutions to societal challenges are solutions that are inspired and supported by nature, which are cost-effective, **simultaneously** provide **environmental**, **social** and **economic** benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through **locally** adapted, resource-efficient and **systemic interventions**.

https://ec.europa.eu/research/environment/index_en.cfm?pg=nature-based-solutions





European
Commission



Global

Instruments

'Cohesion Policy' Funds

Horizon 2020

LIFE Programme

EU

Policies

EU Biodiversity* and
Green Infrastructure
Strategy

EU Action Plan on Sendai
Framework for DRR

Action Plan for
Nature, People and the
Economy

EU Climate Adaptation
Strategy*

Upcoming GHG
decarbonisation strategy

EU Strategy for
Heating and
Cooling

Nature Directives
(Habitats and
Birds)

Water Framework Directive*
and Floods Directive

EU Urban
Agenda

Initiatives

Climate-ADAPT
platform

DRMKC platform

EIP on Water

Natural Water Retention
Measures Platform and
Policy Document

1. Enhance the framework conditions for NBS at EU **policy** level
2. Develop a European **community of innovators** through awareness and engagement
3. Provide the **evidence and knowledge base** for nature-based solutions
4. Advance the development, uptake and upscale of innovative nature-based solutions through systemic innovation and co-design, co-development, co-implementation of solutions and leverage of funding (large demos)
5. Mainstream nature-based solutions within the international R&I agenda.





Nature-based solutions use natural resources and processes to improve urban and natural areas. They simultaneously benefit human society, the economy and nature. They are sustainability-orientated, so they help solve problems now, but also strengthen and protect our future world.

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or organisation

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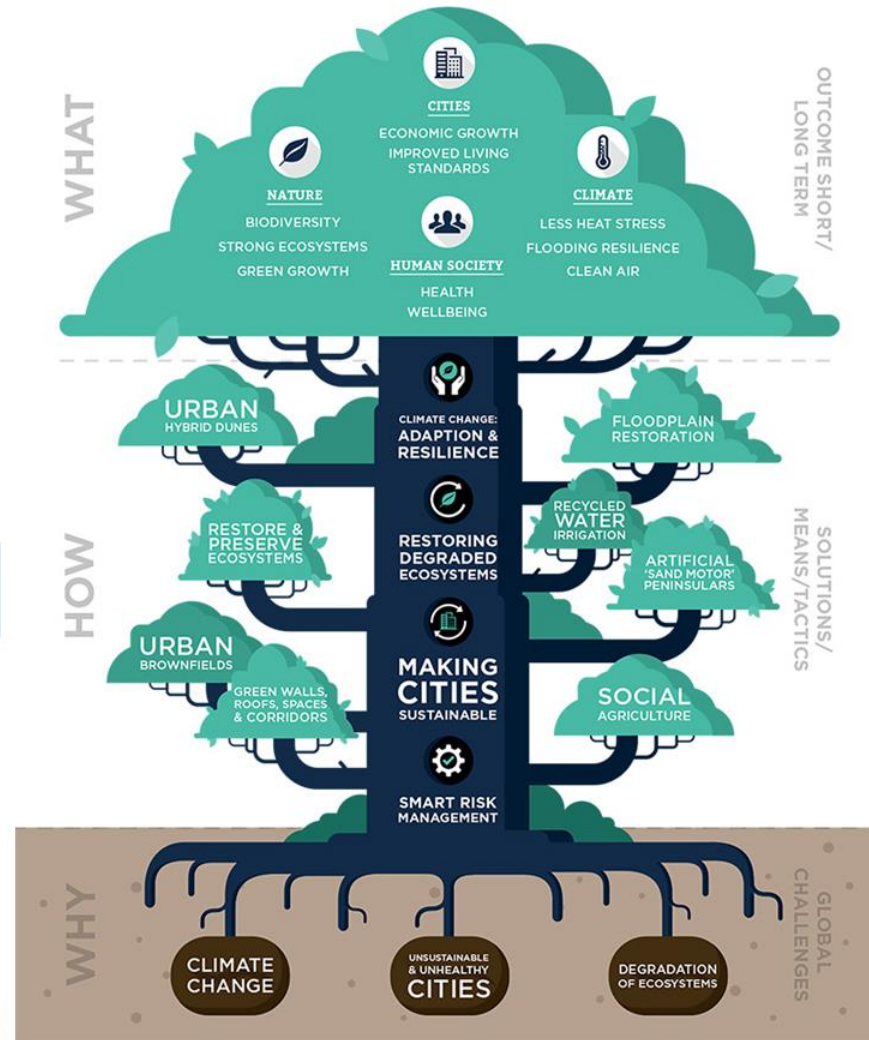


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Edinburgh - NBS enhancing health, wealth and sustainability



Genk - NBS bridging green and industrial heritage



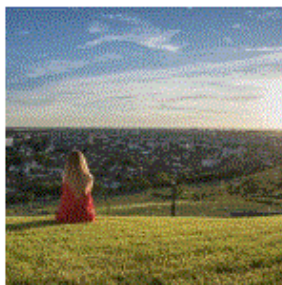
Linz - NBS as a motor for urban growth



London - NBS for a leading sustainable city



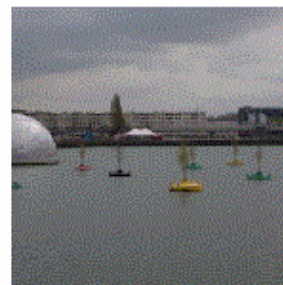
Milan - NBS for urban regeneration



Oradea - Improving quality of life with NBS



Poznań - NBS for a friendly, mobile city



Rotterdam - NBS for building a waterproof city

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- Aim: identify NBS actions in European cities, and highlight best practices
- These include NBS as such but also other actions considered as enabling the implementation of NBS
- The case studies provide examples of the multiple benefits delivered by different kinds of NBS implemented in EU cities

Opportunity to increase uptake of results

✓ Interoperable with other platforms (BISE, Climate Adapt, etc...)

SCC-02-2016/2017: Demonstrating innovative nature-based solutions in cities (IA)

- ✓ (2016) NBS for water and climate resilience in urban areas (40 M €)
- ✓ (2017) NBS to enhance health, wellbeing and social cohesion through inclusive urban regeneration (44 M €)



2016

www.unalab.eu



www.growgreenproject.eu



www.connectingnature.eu



www.urbangreenup.eu



www.progireg.eu

2017



www.urbinat.eu



clevercities.eu



Cities coverage in H2020-SCC-02-2016-2017



NATURE with :

- Technical innovation
- Social and governance innovation
- Regulatory innovation
- Land-management & urban planning innovation
- Business and finance innovation



SCC-03–2016: Research and Innovation on business, finance and governance models and Economic Impact Assessment (15 M €)

- ✓ *capture the multiple impacts & values of NBS for decision-making, including in spatial planning*
- ✓ *identify promising governance, business/finance and participation models*
- ✓ *leverage of investments and synergies between private and public action*



www.nature4cities.eu



www.naturvation.eu

SC5-09–2016: Operationalizing insurance value of ecosystems (5 M €)

- ✓ *Develop replicable methods for the implementation of nature-based approaches for flood and drought risk*
- ✓ *Evidence base and methods for the quantification, qualification and valuation of the insurance value of ecosystems to enable its full operationalization.*



<http://naiad2020.eu/>

SC5-10–2016: Multi-stakeholder dialogue platform to promote innovation with nature to address societal challenges (CSA) (3 M €)

- ✓ *A multi-stakeholder platform (science-policy-business)*
- ✓ *Continuous dialogue and interaction*
- ✓ *Promoting successful NBS*
- ✓ *Enhancing collaboration*



www.think-nature.eu

SC5-08–2017: Large-scale demonstrators on nature-based solutions for hydro-meteorological risk reduction (29 M €)



www.reconnect.eu



OPERANDUM

OPEn-air laboRAtories for Nature baseD
solUtions to Manage hydro-meteo risks

operandum-project.eu



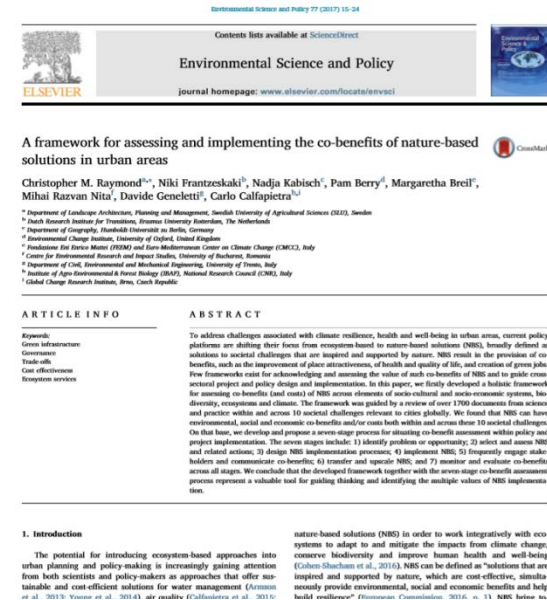
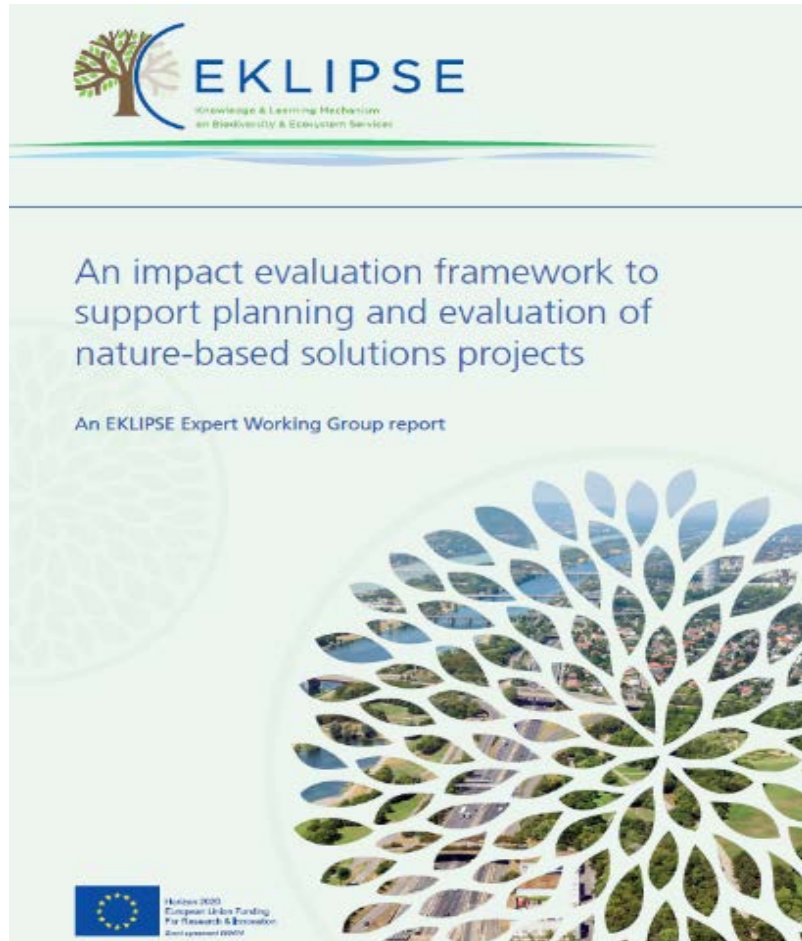
phusicos.eu



Horizon 2020 Calls 2018-2019

- **SC5-03–2018: Demonstrating systemic urban development for circular and regenerative cities 39 Meur**
- **SC5-13–2018: Strengthening international cooperation on sustainable urbanization: China 10 Meur**
- **SC5-14–2019: Visionary and integrated solutions to improve well being and health in cities 43 Meur**
- **SC5-13–2019: Strengthening international cooperation on sustainable urbanization: CELAC 10 Meur**
- **Total: ± 243 Meur**

Common NBS impact evaluation framework



Co-chairs: Carlo Calfapietra, Niki Frantzeskaki and Christopher Raymond
Members: Pam Berry, Margaretha Breil, Mihai R. Nita, Nadja Kabisch , Mark de Bel, Vera Enzi, Niki Frantzeskaki, Davide Geneletti, Marco Cardinaletti, Leor Lovinger, Corina Basnou, Ana Monteiro, Holger Robrecht, Gregorio Sgrigna, Laura Munari

[Link!](#)

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- The diagram illustrates the NBS (Nature-Based Solutions) framework, centered around 'NBS (Objectives & Actions)'. The framework is organized into concentric layers and radial sectors.
- Central Core:** NBS (Objectives & Actions)
 - Inner Ring (Impacts):** A green ring surrounding the core, divided into eight segments corresponding to the sectors.
 - Middle Ring (Indicators):** A light blue ring surrounding the inner ring, also divided into eight segments.
 - Outer Ring (Methods):** A dark blue ring at the top, containing three main categories: 'Economic Opps. & Green Jobs', 'Climate Mitigation & Adaptation', and 'Water Management'.
 - Sectors (Radial Segments):** Eight sectors are defined by dashed lines radiating from the center:
 - Public Health & Well-being
 - Social Justice & Social Cohesion
 - Participatory Planning & Governance
 - Urban Regeneration
 - Air Quality
 - Green Space Management
 - Coastal Resilience
 - Water Management
 - Icons:** Various icons are placed around the diagram to represent different themes:
 - Top left: A person holding a plant, representing environmental health.
 - Top right: A sun and cloud, representing climate.
 - Right: A water drop with a gear, representing water management.
 - Bottom right: A house on a hill, representing coastal resilience.
 - Bottom: A person standing on a patch of grass, representing green space.
 - Bottom left: A factory with smoke, representing air quality.
 - Left: A group of people, representing social justice and cohesion.
 - Top left (inner): A person with a plus sign, representing public health.

Eg: climate mitigation

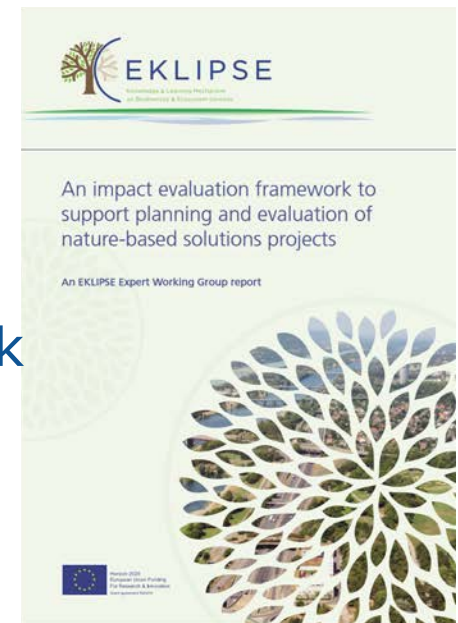


Carbon savings per unit area (environmental, chemical) Carbon storage and sequestration in vegetation and soil (Davies et al., 2011; Demuzere et al., 2014).	Tonnes of carbon removed or stored per unit area per unit time (Zheng et al., 2013), total amount of carbon (tonnes) stored in vegetation (Davies et al., 2011).
	Comparison with calculations of carbon consumption of equivalent non-NBS actions (e.g. through Life Cycle Assessment).
	Allometric forest models of carbon sequestration, developed using proxy data obtained from Lidar data (Giannico et al., 2016).
	Growth rates derived from Forest Inventory Analysis (Zheng et al., 2013).
	Other metrics
Carbon savings per unit area (economic) Value of carbon sequestration by trees (Baró et al., 2014).	Measurements of gross and net carbon sequestration of urban trees based on calculation of the biomass of each measured tree (i-Tree Eco model), translated into avoided social costs of CO2 emissions (USD t-1 carbon).
	Other metrics
Temperature reduction (environmental, physical)	Decrease in mean or peak daytime local temperatures (oC) (Demuzere et al., 2014).
	Measures of human comfort e.g. ENVIMET PET — Physiological Equivalent Temperature, or PMV — Predicted Mean Vote.
	Heatwave risks (number of combined tropical nights (>20oC) and hot days (>35oC)) following Fischer, Schär, 2010, cited by Baró et al. (2015).
	Other metrics
Energy and carbon savings from reduced building energy consumption (environmental, physical)	kWh/y and t C/y saved.
	Other metrics



Objectives:

- Develop and improve IEF Eklipse
- Enhance the usability of the evidence base for NBS by upscaling and meta analyses of the demonstration project's outputs.
- Link and contribute to other EU and Global work on sustainable urban indicators (e.g. MAES, SDG 11 indicators, Eurostat, Urban Agenda, EEA, EC Smart Cities indicators).
- Link these developments with the development of a European reference framework on nature-based solutions – including common protocols.





Climate change adaptation and mitigation

- Carbon savings
 - ✓ Tonnes of carbon removed or stored per unit area per unit and total amount of carbon (tonnes) stored in vegetation
- Temperature reduction
 - ✓ Decrease in mean or peak daytime local temperatures (°C)
 - ✓ Heatwave risks (number of combined tropical nights (≥ 20 °C) and hot days (≥ 35 °C))

Water management

- Physical indicators for flood reduction:
 - ✓ Flood peak reduction. Increase time to peak
 - ✓ Run-off coefficient in relation to precipitation quantities (mm/%)
- Chemical indicators for water quality
 - ✓ Abatement of nutrients (N,P) and metal pollutants (%) in surface water



Green Space Management

- Social indicators
 - ✓ Distribution of public green space – total surface or per capita
 - ✓ Accessibility (measured as distance or time) of urban green spaces for population (Tamosiunas et al., 2014).
- Environmental indicators:
 - ✓ Possibly: connectivity of green infrastructure (changes in the pattern of structural and functional connectivity)

Air Quality

- Environmental
 - ✓ Annual amount of pollutants captured/removed by vegetation
 - ✓ Possibly: Pollutant concentrations (NOX, VOC, O3, PM10, and PM2.5)
- Social
 - ✓ Years of life lost (YLL)



Economic opportunities and green jobs

- ✓ Change in mean or median land and property prices (Forestry Commission, 2005).
- ✓ Possibly: New businesses attracted and additional business rates
- ✓ Possibly: Number of jobs created

Next step:

- To agree on common methodologies, protocols, calculations...



Opportunities for a common NBS Impact Assessment Framework

- Uptake of the framework by the EU R&I Policy Agenda on NBS
- Uptake by the EU Urban Agenda partnership on land use and NBS
- Uptake by local/regional authorities, land managers

Barriers

- Agreement on the indicators progressing slow
- Need to address other challenges



Thank you and...

*An open invitation to work,
together,
with nature!*

EC R&I Nature-Based Solutions

Horizon2020

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