Nature-based Solutions and flood risk management
A perspective from the European Commission

From flood protection to flood risk management

4th EU and US knowledge exchange webinar on flood risk management, 17 January 2023

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In the last decade or so…

- Late 00’s early 2010’s subprime mortgage/financial/Euro crises
- 2015 terror attacks in Europe and 2030 Agenda for Sustainable Development
- 2016 Paris climate agreement
- End-2019 European Commission introduced Green Deal → Climate Law, Adaptation to climate change strategy, Biodiversity strategy, Farm to Fork strategy, Forest strategy, Soil strategy…
- 2020 pandemic
- 2022 invasion of Ukraine
Climate change and environmental degradation: Existential threats to Europe and the world.

To overcome these challenges, the “European Green Deal” aims transforming the EU into a modern, resource-efficient and competitive economy, ensuring:

- **zero net emissions** of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind
The European Green Deal

Transforming the EU's economy for a sustainable future:

- Increasing the EU's Climate ambition for 2030 and 2050
- Supplying clean, affordable and secure energy
- Mobilising industry for a clean and circular economy
- Building and renovating in an energy and resource efficient way

And leave No one behind:

- A zero pollution ambition for a toxic-free environment
- Preserving and restoring ecosystems and biodiversity
- From 'Farm to Fork': a fair, healthy and environmentally friendly food system
- Accelerating the shift to sustainable and smart mobility

Financing the transition

Leave no one behind (Just Transition)

The EU as a global leader

A European Climate Pact
The European Green Deal

Transforming the EU's economy for a sustainable future

And leave No one behind

The EU as a global leader

The European Green Deal

Climate Adaptation Strategy
Energy systems integration strategy
Methane strategy
Circular Economy Action Plan 2.0
Renovation wave

Increasing the EU's Climate ambition for 2030 and 2050
Supplying clean, affordable and secure energy
Mobilising industry for a clean and circular economy
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Leaving no one behind (Just Transition)

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Mobilising research and fostering innovation

Mobilising research and fostering innovation

Zero Pollution Action Plan for air, water & soil
Integrated Nutrient Management Action Plan
Plastics Strategy
Biodiversity Strategy
Farm to Fork Strategy
Chemicals Strategy
Pharmaceuticals Strategy
A European Climate Pact

Horizon2020 + ICT4Water
Strategic Approach to Pharma in the environment
New policy landscape (public and private sector)

- EU Taxonomy, an EU classification system for sustainable investments;
- Commission proposal “Corporate Sustainability Reporting Directive”;
- Climate Law (net zero emissions by 2050) and proposal for Nature Restoration Law;
- Regulation “Governance Energy Union and Climate Action” (Member States report on their national climate change adaptation);
- “Union Civil Protection Mechanism Regulation” (MS improve the collection of disaster loss data at national level);
- Commission proposal “Critical Entities Resilience Directive” (MS identify critical entities, devise a strategy for ensuring their resilience and carry out national risk assessment)
Europe on track to become the first climate-neutral continent by 2050, and also protect our natural environment.

For instance, Europe will:

- improve water quality in our rivers and seas, reduce waste and plastic litter, plant billions of trees, and bring back the bees!
- create green spaces in our cities and increase the use of renewable energy
- make farming more environmentally-friendly so our food is healthier

Funding? NextGenerationEU recovery plan
More systemic adaptation

- Improving adaptation strategies and plans
- Fostering local, individual, and just resilience
- Integrating climate resilience in macro-fiscal policy
- Promoting nature-based solutions for adaptation

Using nature-based solutions inland, including the restoration of the sponge-like function of soils, will boost the supply of clean, fresh water and reduce risk of flooding. In coastal and marine areas, nature-based solutions will enhance coastal defence and reduce risk of algal blooms.
History

- Urban planning and landscape architecture, sustainable farming
- Green infrastructure (e.g. sustainable urban drainage, eco-bridges, fish ladders)
- Late 2000’s enter “nature-based solutions”, an umbrella term
  - Includes nature restoration, disaster risk reduction
  - NbS evolved rapidly over the past few years
First multilaterally agreed definition of NbS

In 2022, the United Nations Environment Assembly adopted the first multilaterally agreed definition of Nature-based Solutions, building on earlier definitions adopted by the International Union for Conservation of Nature and the European Union, defined as...

"actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits“

https://cop27.eg/#/presidency/initiative/enact
Water extremes and NBS

- Climate change impacts will most likely worsen. Floods and drought events expected to be more intense and frequent in parts of Europe (IPCC, Joint Research Centre).
  - Managing demand and promoting water efficiency should be prioritised through water saving technologies, instead of increasing supply (esp. for agriculture and industry)
  - Tackle illegal abstractions, review pricing policies, water permits consistent with available sources
  - Nature based solutions can play a supporting role
Advantages of nature based solutions

- **Multiple benefits** through nature’s potential: flood attenuation, carbon sequestration, purification of air, soil erosion control, recreation, food security, biodiversity enhancement, temperature buffering

- **Investments are sustainable and no-regret** (regardless of eventual degree of climate change)

- **Value of investments increases** with time as the ecosystem grows or recovers (contrary to aspects of technical infrastructure)

- **Creation of high skills jobs** (planning, innovation, management and monitoring); but also jobs for less skilled people in implementation

- When local population is engaged, enhances **feeling of responsibility/ownership of citizens** for the area they live in

- **Rehabilitation** of urban/peri-urban areas (incl. with social difficulties)
Nature based solutions and water

• Protection and restoration of ecosystems enhances their resilience and has **beneficial impact on water resources**

• Healthy floodplains and wetlands are **important for water quality** and biodiversity

• They **remove** nitrogen in subsurface flow and **trap** sediments, pesticides and phosphorus in overland flow

• They **slow drainage** from land thereby increasing retention

• As the flow is slowed, **aquifers are recharged** and the **flood peak downstream is reduced**
Likely impacts of climate change

- **PFRAs***: 17 out of 23 Member States assessed considered climate change
- **FHRMs***: 16 out of 27 MS assessed took climate change into account
- **FRMPs***: 10 MS provided strong evidence that climate impacts were considered; 14 MS provided some evidence
- In eight of the 26 MS, all FRMPs assessed referred to national adaptation strategies; in a further six MS – some but not all FRMPs had such references

Note: in six MS, the national adaptation strategy had not yet been approved by late 2015 (when the 1st ever FRMPs were due)

* For abbreviations check the background slides at the end of this stack
NbS-relevant measures in the 1st FRMPs

• **Spatial planning and land use**: The FRMPs of all Member States make reference to spatial planning and land use (the extent of information varies; not all FRMPs include measures)

• The most common action under “spatial planning and land use” are **restrictions or bans on construction in flood-risk areas** (16 MS)

• In seven of the 26 MS, FRMPs include measures to **relocate economic activities and properties away from flood prone zones**
NbS-relevant measures in the 1\textsuperscript{st} FRMP-cont’d

• Nature based solutions, including natural water retention measures (NWRMs): All 26 MS include the notion of nature-based solutions in some or all of their FRMPs
  
  • NWRMs make up about 90\% of Luxembourg’s 813 individual measures

  • NWRMs make up almost 40\% of Slovakia’s 1 413 measures
Challenges (based on 2018/19 evaluation of MS’ 1st FRMPs)

- Measuring distance to achieve the objective (=risk reduction)
- Taking stock of losses from flooding events
- Funding of measures
- More accurate flood forecasting/modelling – flashfloods – urban floods;
- Climate change impacts on flooding
- **Consolidate integration of nature based solutions** (and cost/benefit thereof). We want to see more natural water retention, green roofs, sustainable urban drainage, re-naturalisation of floodplains, “room for the river”…
Are NbS simple or complex?

Are NbS more context specific compared to grey infrastructure?

- All one-off projects are context specific. Civil engineers grow up learning that each project is unique, and it is. This is one reason why cost and time overruns are not unusual. What is also true is that civil engineering structures have been researched, taught, designed, constructed and studied since “time immemorial” and so it is better known how to design, procure and build them – and, therefore, more authorities and companies are involved in this trade.

- As a result, we still see more “civil” engineering and less “green” engineering.
Simple or complex, cont’d

• Sometimes traditional civil engineering (“grey infrastructure”) is the only way

• But we want to increase, whenever possible, the application of NbS

• From the conception (very start) of a project, or during maintenance, or upgrading we should ask that either NbS are employed extensively, or that traditional civil engineering and NbS are blended (i.e. that NbS are not a mere afterthought or an embellishment)
Nature-based Solutions


- New publication: What Nature-Based Solutions can do for us | European Commission (europa.eu) (research-based, including flood mitigation and coastal resilience)


- UN world water development report 2018: nature-based solutions for water https://unesdoc.unesco.org/ark:/48223/pf0000261424


- www.nwrm.eu
Evaluating the impact of Nature-based Solutions: a handbook for practitioners

- Enormous collaborative effort of 17 EU Horizon 2020 projects
- Provides practitioners with a comprehensive Nature-based Solutions impact assessment framework, and
- A robust set of indicators and methodologies to assess impacts of NBS

Evaluating the impact of nature-based solutions - A handbook for practitioners
Evaluating the impact of nature-based solutions - Appendix of methods
Background: the Floods Directive

EUR-Lex - 32007L0060 - EN - EUR-Lex (europa.eu)
The fundamentals of the Floods Directive/FD

- Introduced in 2007

- **Purpose**: establish a framework (incl. governance and measures) for the assessment and management of flood risks

- **Aim**: reduction of adverse consequences associated with floods for human health, the environment, cultural heritage and economic activity

- **Approach**: textbook, “identify-evaluate-react to risk**” in (6-yearly) cycles, to account for various uncertainties

**risk defined as impact x likelihood

The risk management cycle vs. the FD’s cycle

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<td>Identify risk</td>
<td>Preliminary Flood Risk Assessments</td>
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<td>Evaluate risk</td>
<td>Flood Hazard and Risk Maps</td>
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<td>React to risk</td>
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- First FD cycle 2009-2015*
- Second FD cycle 2016-2021, etc. (there is no sunset clause)
  - 2nd PFRAs by December 2018 (reporting to the Commission by March 2019)
  - 2nd FHRMs by December 2019 (reporting by March 2020)
  - 2nd FRMPs by December 2021 (reporting by March 2022)

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EU Spotify
Thank you!

http://ec.europa.eu/environment/water