



Building with Nature for flood resilience

A policy brief by the EU Interreg North Sea
Region project Building with Nature



Introduction

This policy brief gives an overview of the needs and key policy requirements for the wider dissemination and adoption of Building with Nature (BwN). Although BwN is used in different fields, we focus here on the benefits of BwN for flood resilience in the North Sea Region, while enhancing ecosystem services and creating other co-benefits.

It's time to act now

Flooding is a major global challenge. Depending on the rise in temperature, the annual economic damage caused by climate change is expected to increase by 20 to 65 billion euros. Between 2002 and 2012, flooding accounted for 40% of climate-induced damage and involved half of the total population affected by natural disasters in Europe.

The broad, multi-disciplinary approach of BwN is key to addressing flood risk in a more sustainable way at both coastal and catchment levels. BwN creates multiple co-benefits that improve the quality of life of citizens. It also restores degraded aquatic and marine ecosystems to ensure their integrity and the long-term availability of their natural resources.

For these reasons, since 2013 the EU has actively promoted BwN solutions (also known as nature-based solutions) through various policies and actions such as the EU Water Framework Directive, the EU Strategy on Adaptation to Climate Action, and the EU Floods Directive. The importance of ensuring the integrity of ecosystems is also one of the core messages of the Paris Agreement (Article 7).

However, the widespread adoption of such measures has not kept pace with policy promotion. Despite the huge potential of BwN solutions, they remain under-used both outside and inside the European Union. BwN projects still often take the form of pilot projects, operating outside or at a distance from the current policy regime, although with extra capacity (in terms of finance, time and expertise) in order to provide space for innovation and experiments. In some countries, the EU directives and regulations have contributed to momentum, such as in the Netherlands (for coasts and catchments) and Scotland (for catchments) but, overall, more needs to be done.

The challenges

Although every country bordering the North Sea is different, there are challenges that can be recognized by all of them. The partners in this project have identified four key barriers to implementing BwN in the North Sea Region – barriers that hamper the wider adoption of these solutions:

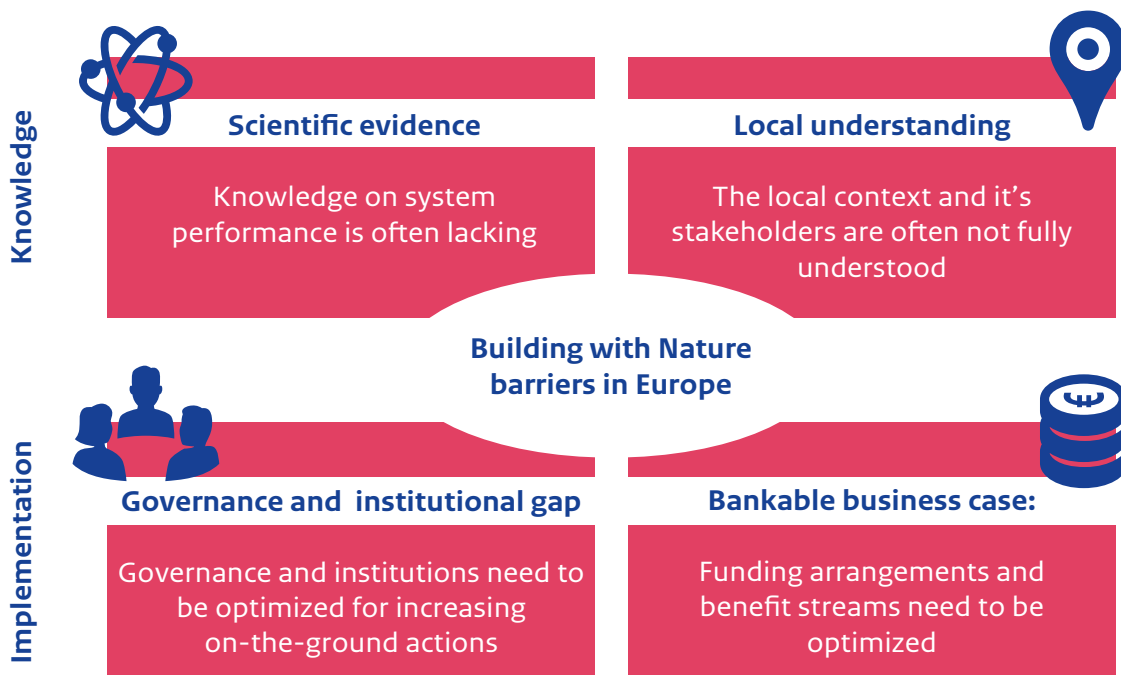
1. Scientific evidence: There is a frequent lack of knowledge on system performance, (especially in extreme conditions) and how best to select Key Performance Indicators for monitoring after implementation.
2. Local context: Local stakeholder involvement and alignment are more crucial for BwN solutions than for grey solutions, but stakeholders' expertise and knowledge remain under-used.
3. Bankable business case: The benefits of BwN solutions cover many different disciplines (e.g. flood risk reduction, health, environment), but funding is often still based on one discipline. It is essential to move out of this 'financial silo' in order to make BwN bankable.
4. Governance gap: The gap between major global and European ambitions and the relatively small amount of on-the-ground action needs to be bridged. We need extra financial resources and a supportive (local) legislative and regulatory framework to achieve this.

These barriers and gaps are all interrelated. The barriers generally result from a need to correctly compare BwN with traditional measures (e.g. strengthening sea walls or dikes). It is crucially important to identify why, when and how a BwN solution - or a hybrid solution - could be a better option than conventional flood risk measures.

By working together on the concept of BwN, the partners and the project's Policy Learning Group have come up with four recommendations for overcoming these barriers and fostering the implementation of BwN in the European Union.

Policy recommendations

- Recommendation 1: Create a solid performance evidence base and a BwN assessment framework
- Recommendation 2: Involve and align (local) stakeholders from the initial phase onwards
- Recommendation 3: Agree on how to value multiple benefits and functions
- Recommendation 4: Support member states in implementing BwN in national regulations.



Recommendation 1

Create a solid performance evidence base and a BwN assessment framework

The challenge: In a dynamic system, the long-term environmental benefits and performance in extreme conditions are often unclear.

The key to overcoming this challenge is to create performance indicators for BwN solutions that match existing standards for traditional grey solutions. The performance of BwN solutions changes over time, and depends more on the local physical and ecological conditions than does the grey infrastructure. However, there is currently no practical, meaningful set of performance indicators for measuring and understanding this variable performance.

There must be long-term monitoring and evaluation of BwN measures (also beyond the end of the project) in order to build a performance evidence base. This is the key to increasing our understanding of the performance of BwN (also under more extreme conditions) and will eventually reduce uncertainty. Only when there is a better understanding of how BwN functions under different conditions can the approach be made bankable and mainstream.

Illustrative example

Monitoring the effectiveness of nourishments along the Dutch coast

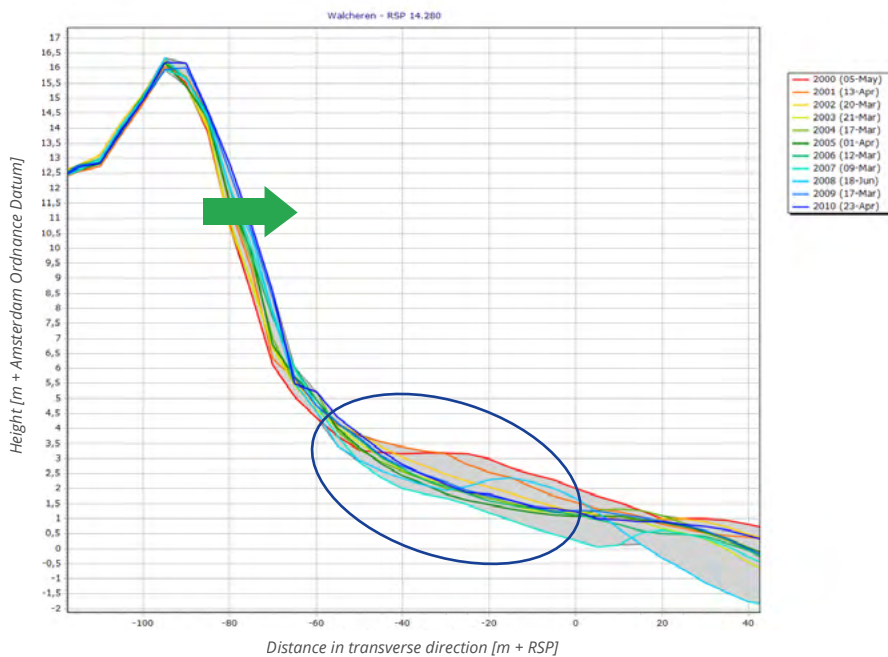
Over the last decades, various nourishments have been used to maintain the coastline at its current position and provide flood protection. This has been

done directly by nourishing the beach that maintains the coastline, but also indirectly by nourishing the shoreface. Long-term monitoring of the whole coast has shown that the nourishments (both beach and shoreface) compensate for chronic erosion in a natural way and stabilize the coastline. However, this does not stop natural erosion. The consequence of this – coastal retreat – is stopped because new sediments compensate for sediment losses in the area. It has been observed that areas which are not nourished also benefit from the nourishments. For example, a lot of dune growth has been observed in and near the nourished areas, but the dunes themselves were not directly nourished. They benefit from the additional volume of sediment available at the coast. An example of this process is given in the figure below for a transect of the dunes at the town of Domburg.

Overall, we have observed that this strategy allows the coast to remain a sandy nature-based system with associated habitat, while providing flood risk protection by preserving dune strength, preventing coastal retreat, and providing sustainable space for activities in the coastal zone.

Trailing suction hopper dredger is nourishing sand at the coast between Ter Heijde and Kijkduin by rainbowing (construction sand engine)





Development of the dune front at a coastal profile at the town of Domburg (Walcheren - the Netherlands). The beach nourishments applied here (see the shift in profile between 2008 and 2009 within the blue circle – shift from light blue profile to dark blue profile) indirectly led to a seaward extension of the dune front (green arrow) and thereby increased the flood risk protection level.

Recommendation 2

Involve and align (local) stakeholders from the initial phase onwards

The challenge: local stakeholder involvement and alignment is more crucial for BwN solutions than for grey solutions

The conclusions drawn from the case studies stress how important it is to continuously involve local communities and stakeholders in both the planning and design phase, and the implementation and maintenance phase. As BwN projects are often larger and involve more disciplines than grey solutions, more stakeholders will typically be involved in all project phases. Because stakeholders may differ in their interests and authority, it can be a challenge to align them all satisfactorily.

Local communities and stakeholders provide local knowledge, can be involved in community-based maintenance, and play a vital role in identifying and evaluating multiple functions. Drawing up a relevant cost-benefit analysis (CBA) means involving the different stakeholders in all project phases. This has been proven to be crucial for the success of a BwN solution.





Illustrative example

The effectiveness of natural flood management measures in Scotland

The Eddleston Water Project is the Scottish BwN catchment laboratory case study. This is a long-term research study of the cost-effectiveness of natural flood management measures in reducing flood risk and improving the habitat at Eddleston Water. The project is a good example of stakeholder alignment and engagement, as collaboration has been sought with the local communities of Peebles and Eddleston, the local primary and high schools, the council, the regulatory agencies and, most importantly, the forestry and farming communities. Work has taken place on over 20 separate farm units and involves re-meandering, planting over 320,000 trees, building more than 100 log structures and creating 28 new wetlands or run-off attenuation features. Some early results from monitoring indicate that certain measures are lowering and delaying the flood peak, but the project has also led to real improvements to instream and riparian habitats. Understanding the local context and those living and working in the catchment has been found to be crucial for these measures.

Re-meandering being executed for Eddleston Water project

Recommendation 3

Agree on how to value multiple benefits and functions

The challenge: BwN solutions provide multiple benefits that are often not taken into account in traditional cost-benefit analysis.

The effective adoption of BwN calls for business case tools that can appraise the full range of co-benefits (such as ecosystem services and flexibility) while taking into account the negative environmental damage frequently observed in grey infrastructures. National and local governments, financiers, engineers and other stakeholders should therefore adopt an integrated and more multi-disciplinary approach to evaluating infrastructure.

The multiple functions and benefits could then be included in a quantitative appraisal framework that can value co-benefits such as flexibility and ecosystem services across the whole flood protection system in the long-term. Traditional financing mechanisms should be optimized to make use of these wide benefits, as the beneficiaries can often be a source of funding. So besides funds suitable for financing BwN (e.g. the Green Climate Fund, the European Fund for Strategic Investments, the Global Environment Facility), funding can be sought from direct and indirect beneficiaries. Creating a compelling business case means taking these multiple funders and beneficiaries into account.

Illustrative example

Multilayer water safety stimulated by the Government of Flanders

The case study of the Flanders Environment Agency is looking for an integral application of BwN techniques for flood control and river restoration along the Kleine Nete river while taking into account current economic activities near the river. There are three recreational areas that are visited by lots of people. In the project, our aim is to convince the economic sector that they are vulnerable to the consequences of climate change (i.e. increased flood risk). We also want to stress that we are offering them added value as well, like improving the landscape and therefore more interaction with water and green areas for their visitors. By taking these co-benefits into account, we are trying to make these BwN solutions more attractive for the economic sector.

Impression: This is an artist's impression of the new recreational area in Herentals, where the value of the river valley is combined with economic aspects.





Lussebäcken is a tributary of Råån where BwN now allows the stream to flood the City upstream. Source Photo: Municipality of Helsingborg.

Illustrative example

Coordination for management of catchments in Sweden (Länsstyrelsen Skåne)

In Skåne, suitable areas for retaining water have to be identified and designated from a catchment area perspective. The municipalities also want to integrate storm water management into flood management and climate adaptation. However, legislation governing drainage companies does not match the demands of climate adaptation or the Water Framework Directive, so permits need to be modified to meet environmental conditions. Moreover, changes in the traditional agricultural policy should be encouraged as a paradigm shift towards sustainable land use, and to allow more climate adaptation in future.

Recommendation 4

Support member states in implementing BwN in national regulations

In order to ensure the sustainable management of water resources, BwN measures should be implemented by a broad, multi-disciplinary range of decision and policy makers at several institutional levels (i.e. locally, regionally and nationally). Generally, there is insufficient local governance of the water management, agriculture and forestry sectors from the perspective of river catchment management and climate adaptation.

From this perspective, municipalities must sufficiently implement flood management and climate action plans in local or national legislation as part of their spatial planning. They also need to integrate storm water management into flood management and climate adaptation. These local regulations and legislation will bridge the gap between global and European ambitions and local actions for BwN.

Next steps

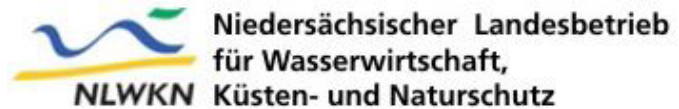
The recommendations made in this policy brief and the products delivered by the BwN project will help organizations and governments to compare BwN measures with traditional ones. BwN certainly should be central in their approach to climate change adaptation, and will continuously expand its evidence base. We hope that global and European ambitions will soon be translated into supportive national legislation and regulations, eventually leading to mainstream adoption of BwN at grass roots level. This can only be achieved by engaging stakeholders from the start, and by creating a compelling business case that takes flexibility and co-benefits into account.

These factors will be crucial for the mainstream adoption of BwN solutions for flood resilience across the North Sea Region and beyond. Discussions of Interreg BwN will focus on the potential of existing EU instruments, and those of the Member States, to further consolidate the knowledge and evidence base for this promising approach to climate adaptation.

Partners

The following partners share knowledge and provide critical mass for the uptake of the Building with Nature philosophy:

FLANDERS
ENVIRONMENT AGENCY





With thanks to

This policy brief has been made possible through the ongoing feedback and support of the Policy Learning Group of the Building with Nature Interreg project.

Further reading

The partner organizations in this project have written policy briefs focusing on their national situations. The Policy Learning Group contributed to these briefs, which can be found on the [Building with Nature website](#).

Contact

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