

# Planning and developing sustainable river landscapes with nature-based solutions



## Recommendations of the PlanSmart research group

Planners and decision-makers should increase the uptake of nature-based solutions in planning and implementing sustainable river landscapes.

### Success factors for planning with nature-based solutions:

- implement context-specific, adaptive, and reflexive planning
- spearhead creative solutions, including unconventional approaches
- integrate latest scientific findings and practical expertise
- systematically consider all relevant views and interests

### Key approaches to support the implementation of nature-based solutions:

- promoting transformative changes in the use of land and water resources for the benefit of human and nature
- using coordinated governance and planning instruments
- encouraging communication and cooperation across different sectors and hierarchical levels of public and private decision-making



## Challenges

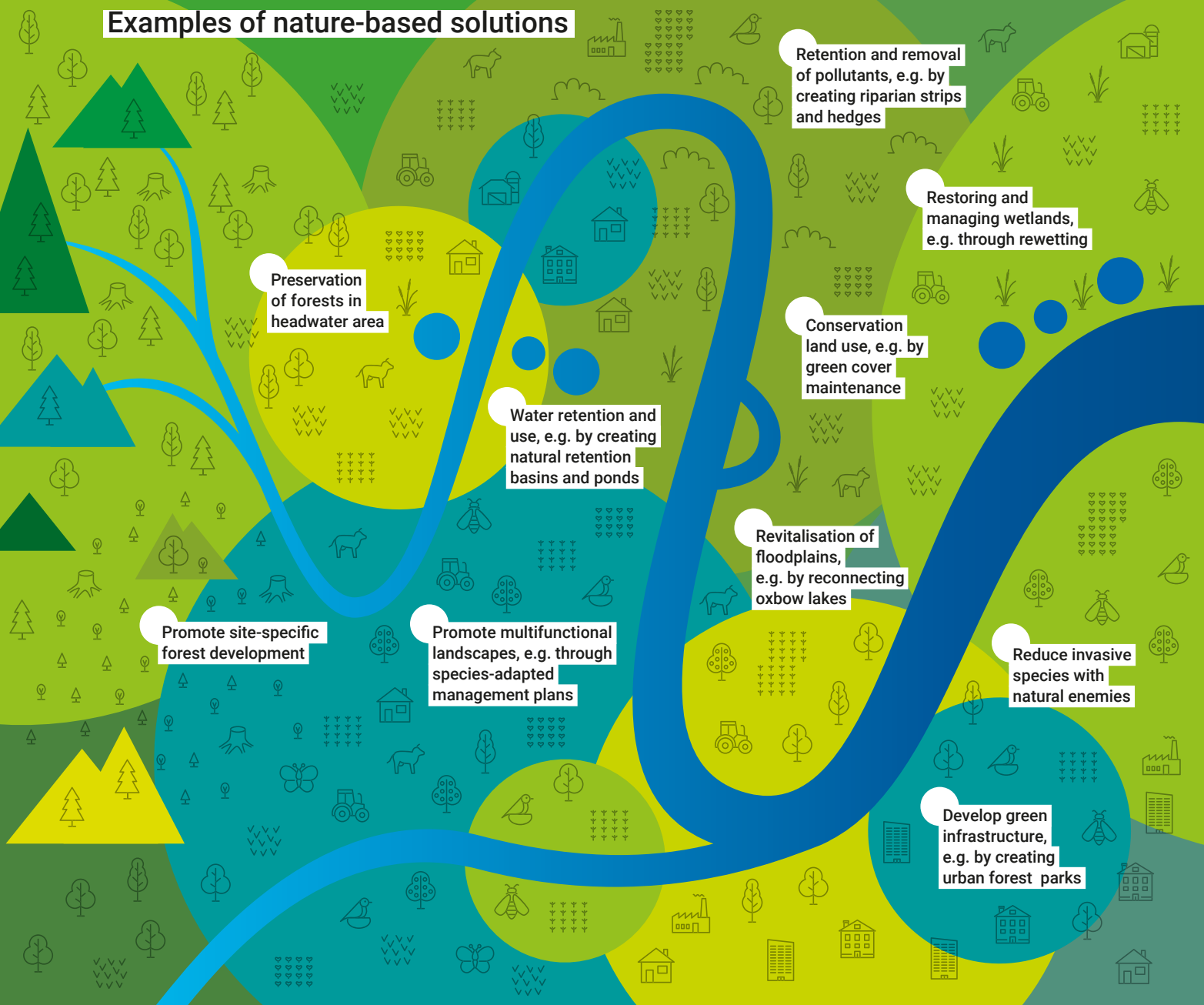
More than half of Germany's rivers have experienced dramatic anthropogenic transformations. Until today, two thirds of the natural floodplains (about 15,000 square kilometres) have been cut off from natural flooding dynamics of rivers and can no longer regulate major flooding events. Circa 76% of the remaining floodplains provide space for agriculture, housing, transport, and commerce, and only about 10% are developing in a natural way. In addition, climate change increases the risk of droughts and floods.

Sustainable river landscapes meet these challenges and consider the diverse requirements of both humans and nature. Nature-based solutions can play a crucial role in efforts to plan and implement sustainable river landscapes.

## What are nature-based solutions?

Nature-based solutions make use of ecological structures and processes to overcome societal challenges. One example is the revitalisation of floodplains which can help to reduce flood peaks. Nature-based solutions can also generate additional benefits, for instance, when restored floodplains contribute to nature conservation and increase the landscape's attractiveness for recreational visitors. Compared to technical measures, nature-based solutions often have a better cost-benefit ratio for society.

### Examples of nature-based solutions



# Steps and methods

## for nature-based solutions



Challenge-orientation



Ecosystem process utilization



Practical viability

### Criteria

1

2

3

### Co-define setting

Core objectives of the cooperation as well as planning procedures are discussed and jointly decided in close collaboration with key decision-makers and stakeholders.

#### Exemplary methods

Stakeholder analyses for characterizing interest groups and their objectives.

Focus group discussions as well as in-depth interviews for capturing attitudes and interests.

Social network analyses for understanding cooperative relations between actors.

Independent facilitators help to shape participatory processes for successful outcomes.

### Understand challenges

A multidimensional evaluation of the overall situation helps to understand the respective societal challenges, taking into account social, legal, and environmental factors as well as their spatial and temporal dynamics.

#### Exemplary methods

Systematic documentary analyses for revealing existing conflicts of interest and legal issues.

Spatial assessments of biodiversity and ecosystem services to provide insights into the environmental and spatial dimensions of challenges.

Participatory (Geographical Information System) surveys to better understand human-environment relations.

### Create visions and scenarios

Actors involved in the planning process define a common vision and goals for the river landscape. Scenarios help to identify, discuss, and spatially locate solutions within the context of the particular landscape.

#### Exemplary methods

Modelling to demonstrate opportunities for developing nature-based solutions.

Geodesign to enable spatial visualization of solutions.

Participatory processes to enrich scenario and vision development.

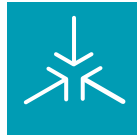
Behavioral economics experiments to reveal different preferences.



Place-specificity



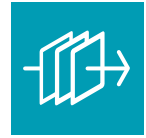
Evidence base



Integration



Equity



Trans-disciplinarity

## Planning principles



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### Assess potential impacts

The potential environmental, social, and economic costs and benefits of existing and planned nature-based solutions are assessed to support decisions regarding alternative actions.

#### Exemplary methods

Spatial surveys and ecosystem services assessments to reveal the spectrum of benefits.

Geodesign for providing a visual illustration of the solutions' impact and for facilitating information exchange.

Multi-criteria analyses contribute to a balanced appraisal of different solution options.

Participatory methods support discussion and decision-making.

### Develop solution strategies

Governance and business models are developed for the implementation of nature-based solutions. Actors involved in the planning process discuss alternative options for realization.

#### Exemplary methods

SWOT analyses of existing case studies to highlight strengths and weaknesses.

Design-thinking workshops to support a creative and collaborative development of governance and business models.

Pilot projects to enable the testing of new approaches.

Stakeholder networks for promoting exchange and collaborative learning.

### Realize and monitor

Implementation should prioritize measures that are easy to realize and may serve as role models. Monitoring the effectiveness of the measures is the basis for agile and adapted management.

#### Exemplary methods

Assessing ecosystem services at different points in time for evaluating realized measures.

Participatory (Geographical Information System) surveys to reveal changes in human-environment relations.

# What we can do to support the planning of nature-based solutions for sustainable river landscapes

## Experiences and ideas are fundamental!

Visitors can experience restored river landscapes and discover their many benefits in person, inspire others to do the same, and introduce some of the ideas they encountered when returning home.

## Evidence-based planning promotes effective implementation!

Local policy makers can initiate and promote vision development for sustainable river landscape in their towns and municipalities. Ideally, actors should make decisions based on empirically proven effects.

## Equity in planning processes increases acceptance!

Planners can substantially support implementation by assessing the impact of solution strategies, also regarding equity issues, and by ensuring that all relevant interests are considered.

## Integration helps to take diverse interests into account!

All relevant sectors and government levels should cooperate from early onwards to develop coordinated regulations and joint funding programmes.

## Local conditions play an important role!

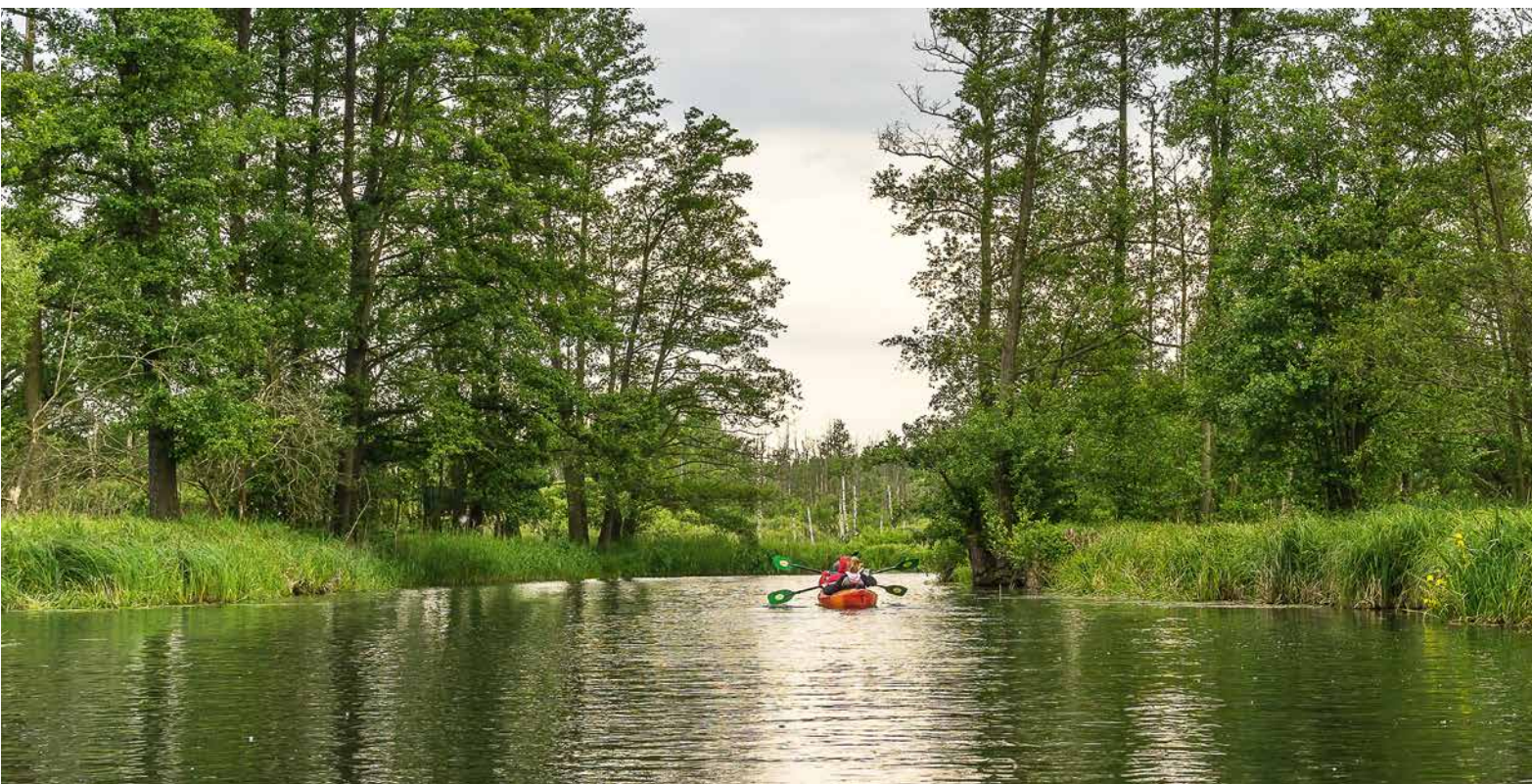
Associations can offer their practical expertise and residents can contribute local knowledge to highlight peculiarities and synergies in the development of nature-based solutions, to raise awareness for multiple benefits, and to support implementation.

## Funding nature-based solutions requires creative ideas!

Enterprises can be strong partners to develop new business models and finance nature-based solutions, for instance, through agri-environmental and compensation measures.

## Transdisciplinarity enables better planning!

Diverse knowledge holders integrate insights from a variety of scientific disciplines and practice sectors, jointly accompany pilot projects and make their findings accessible to different target groups.





## About PlanSmart

The PlanSmart research group investigates innovative approaches for planning and implementing nature-based solutions for river landscapes. PlanSmart cooperates with practice partners at federal and state levels through the integrated EU-LIFE Project 'LiLa – Living Lahn'.

PlanSmart develops and examines transdisciplinary planning methods and technologies, evaluates ecological, social, and economic aspects of nature-based solutions, investigates different governance and financing models, and analyses processes of knowledge co-generation. The research group leaders are Prof. Dr. Christian Albert of the Ruhr Universität Bochum (RUB), formerly of the Leibniz Universität Hannover (LUH), and Dr. Barbara Schröter of the Leibniz Centre for Agricultural Landscape Research (ZALF) in Müncheberg.

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## Additional resources

Albert et al. (2020): Planning Nature-based Solutions: Principles, Steps, and Insights. *Ambio*. DOI: 10.1007/s13280-020-01365-1

Albert et al. (2019): Addressing societal challenges through nature-based solutions. How can landscape planning and governance research contribute? *Landscape and Urban Planning*. DOI: 10.1016/j.landurbplan.2018.10.003

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