

# Connecting Nature Framework Guidebook



Bringing Cities to Life,  
Bringing Life into Cities

# Acknowledgments

## The Connecting Nature Framework: facilitating and connecting innovations for the large-scale implementation of nature-based solutions

This guidebook introduces the Connecting Nature Framework. The Framework supports the planning, delivery and stewardship of nature-based solutions on a large scale in cities and communities. It provides a comprehensive toolkit for urban practitioners who want to develop nature-based solutions and in this way foster urban resilience, increase citizen health and wellbeing, support innovation and promote empowerment. This guidebook is intended for a wide audience of practitioners, from urban planners at local authorities to community groups, entrepreneurs and non-governmental organisations.

The Connecting Nature Framework is co-produced by scientific partners and cities. This generates innovative solutions for science and practice. It supports Europe to become a global leader in the innovation and implementation of nature-based solutions.

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# 1 Introduction

## What are Nature Based Solutions?

The European Commission defines nature-based solutions as solutions to societal change 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.”*

Nature-Based Solutions benefit biodiversity and support the delivery of a range of ecosystem services.

## What is the Connecting Nature Framework?

Designing and implementing Nature-Based Solutions on a scale that delivers economic, environmental and social co-benefits, while also building resilience and benefiting biodiversity is complex with many different issues to consider.

Many questions arise and need answers.

What is the best solution for the area?

Who will manage it?

How will it be financed?

Who needs to be involved in the planning, delivery and stewardship?

Will it support innovation and generate jobs?

How to measure the economic, environmental and social impact?

How can we manage change?

Even identifying where to start can often be a challenge!

In response to this uncertainty, Connecting Nature has developed a process tool to help cities and other organisations navigate the path towards implementation of Nature-Based Solutions on a large scale: the **Connecting Nature Framework**. The Framework identifies **three distinct phases of development** for a nature-based solution: planning, delivery and stewardship.

Throughout each phase there are **seven separate elements** that cities and other entities need to consider when shaping their individual nature-based solution: technical solutions, governance, **impact assessment**, **finance**, **entrepreneurship**, **co-production** and **reflexive monitoring**.

Cities may choose to start with any element of the Framework process and consider the others in the order that suits their context. What emerges from the Framework process is a comprehensive 360° overview of each stage of development of the nature-based solution.

## Guidebooks

To assist you in developing your nature-based solution, Connecting Nature has produced a series of guidebooks. The overall Connecting Nature Framework Guidebook is a good starting point. There is also a guidebook for each element of the framework process describing the implementation steps and providing case studies to show how it works in practice. A step-by-step how-to manual on the Connecting Nature Framework process is also available.

All the Connecting Nature guidebooks and the manual may be downloaded from [www.connectingnature.eu](http://www.connectingnature.eu).

# 2 | What is the Connecting Nature Framework?

The Connecting Nature Framework is a holistic approach to creating nature-based solutions that is characterised by three concepts:

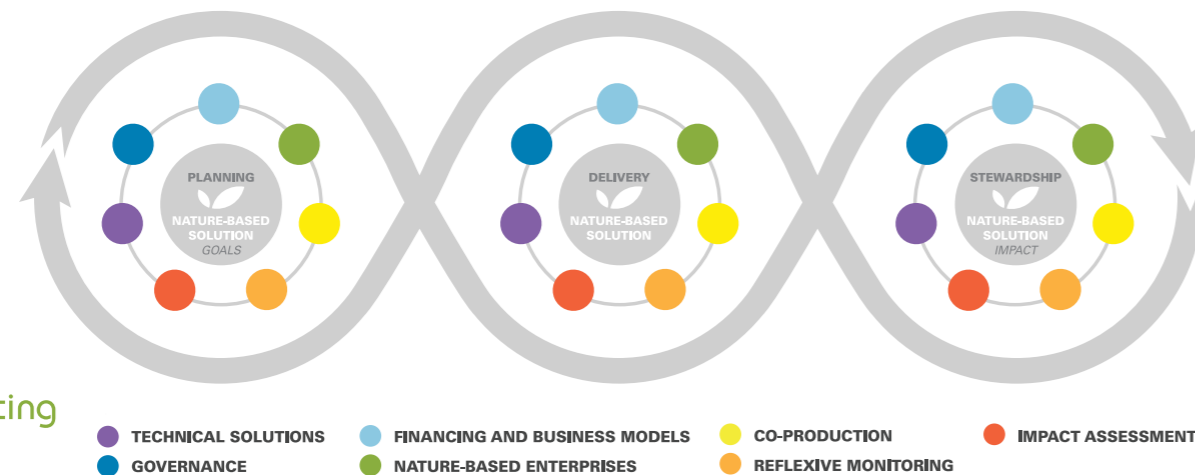
- The process is iterative
- Co-production is best
- The ongoing monitoring of goals and impacts is critical

The Connecting Nature Framework takes as its starting point the assumption that nature-based solutions generate many benefits for cities and their citizens. The goals and impacts of nature-based solutions are diverse, encompassing climate adaptation, biodiversity protection and improving health and wellbeing. It is important that the goals be defined at the start, but progress towards these goals needs to be monitored and assessed on an ongoing basis. Goals may need to be revisited and may be reformulated if necessary.

*Nature-based solutions can be transformative. They generate many benefits for cities and their citizens. They also bring new ways of place-making in their contexts.*

### Not a step-by-step guide

The Framework encapsulates the many steps that need to take place to support the governance, financing, technical design and monitoring of nature-based solutions. Whilst there is a direction of travel involved in moving from the current status to rolling out nature-based solutions on a city or community-wide scale, the steps involved in this journey are interrelated and non-linear. The Framework is therefore not meant as a linear trajectory with each step leading to the next; instead, the starting points and order of steps are determined by the city's or community's contexts and needs.



Connecting Nature Framework



# How does the Connecting Nature Framework help when it comes to the large-scale implementation of nature-based solutions?

The benefits of using the Connecting Nature Framework for the design, delivery and stewardship of nature-based solutions are numerous and fulfil many functions for cities and communities. The Framework...

### Encourages a multifunctional technical design that balances local needs and local landscape context

The Framework takes a systemic approach to the design of nature-based solutions in that it considers social, environmental and economic benefits, needs and trade-offs. This helps generate knowledge about local needs and the local context. It also considers impacts, synergies and trade-offs across scales and time. The result is a better, more sustainable design.

### Links nature-based solutions to overarching city visions and agendas and it bursts silos

Nature-based solutions contribute to many strategic objectives which fall under the responsibilities of various city departments. When this is acknowledged, pooling resources and finding synergies is easier. The Connecting Nature Framework fosters strategic connections and organisational innovations to find resources and synergies for the implementation of nature-based solutions.

### Results in new mechanisms for long-term and collaborative financing

Identifying all the possible benefits – social, environmental and economic – for nature-based solutions helps to identify and secure new financing partners. It also supports the development of new business models.

### Uncovers new sources of financing for long-term nature-based solution sustainability

In providing tools to help cities, communities and business partners come together to identify the wider benefits of nature-based solutions and work out who is prepared to pay for these benefits, the Connecting Nature Framework can help uncover alternative sources of financing and governance structures to secure the long term sustainability of nature-based solutions.

### Explores the potential for nature-based entrepreneurship

The Framework provides city partners with guidance on how to explore and stimulate the potential for nature-based enterprises to contribute to local economic development. Connecting Nature provides nature-based solution developers with an online platform to identify enterprises who can help them plan, deliver and manage nature-based solutions from conception through to sustainability.

### Takes a collaborative approach to joint city-making and empowerment

Co-production is a key concept in the Framework. Co-production brings together diverse actors and their knowhow, fostering new partnerships. It also empowers actors for the implementation and long-term stewardship of nature-based solutions. Co-production ultimately makes urban decision-making a more open-ended, collaborative and trusting process.

### Encourages real-time adaptations to be made to the planning process as a result of new knowledge and realises the multiple benefits of nature-based solutions

The Framework calls for continuous monitoring and evaluation during the process (known as reflexive monitoring in the Framework), which gives insights into the multiple social, economic and environmental benefits of nature-based solutions. Reflexive monitoring supports adaptation in real-time. It also shows the novel governance processes underpinning their development. In this way, cities can easily communicate the value of nature-based solutions. The collaborative defining and monitoring of diverse impacts helps to track progress.

**Stewardship: The stewardship of a nature-based solution describes the ongoing participatory management and maintenance of the nature-based solution. Stewardship includes the monitoring and evaluation of the nature-based solutions, which enables the making of adaptations that ensure long-term sustainability and resilience.**

# 3 | How to Translate the Connecting Nature Framework into Urban Practice

## The seven elements in the making of a nature-based solution

At every phase of development, attention needs to be paid to these seven elements.

### Technical Solutions

*The design, delivery and stewardship of multi-functional and fit-to-context nature-based solutions*

While you might expect that technical solutions would be a factor in the technical design and the delivery phases of nature-based solutions, it comes into play in the stewardship phase as well. It is critical that the technical solution put forward be tailored to the character and needs of the location into which it is being introduced. Practical construction aspects are also part of the technical solution. They define how to deliver a solution that takes into consideration the local character and needs in relation to questions such as: “What kind of technical solution will work here? Where exactly should it be? How big should it be? Which plants should be part of it? What additional infrastructure is needed? And – this is where stewardship comes in – how will it be maintained?”

## Why the technical aspects of nature-based solutions should be considered

To have successful nature-based solutions, that is solutions which deliver the range of benefits provided by nature-based solutions right throughout their lifetimes, it is essential to feed appropriate technical information into the planning, delivery and stewardship stages. This will maximise the return on investment of nature-based solutions. It will also ensure that trade-offs or negative experiences of nature-based solutions are avoided. If the technical aspects of the nature-based solution are not considered, the result may be generic nature-based solutions that are rolled-out across cities, which do not deliver multiple benefits nor do they meet the needs of users, neighbouring communities or biodiversity. Typically, such solutions lack the necessary social acceptance and stewardship to deliver the full range of long-term environmental, social and economic benefits. They may also miss financing mechanisms for delivery and stewardship.

## How to plan, deliver and maintain a multi-functional nature-based solution that is attuned to the local context

The non-linear nature of the Connecting Nature Framework means that there can be several starting points for upscaling nature-based solutions. Think for example of an open co-production process, an enterprise/opportunity-based approach or a policy-embedding approach; the starting point could be different in all three. Whatever the starting point, there is a need to identify a specific location for the intervention, a scale of implementation, a design that will deliver the benefits, and a plan for how these benefits will be sustained. The following steps will ensure that no matter what the starting point, the result will be a successful nature-based solution.

### Step 1: Define the nature-based solution

In the first step, determine the location and scale of the nature-based solution. Is it one solution in one location, or multiple solutions in a number of locations for example? This step could include a basic proposal for the type of nature-based solution and an idea for a design.

### Some examples:

The location is an underused public open space with opportunity for redevelopment. The idea is a design for a green roof; the scale is one solution for a specific location.

The location is a site with a surface water flooding problem. The idea is a design for a Sustainable Drainage System; the scale is one solution for a specific location. The location is a redevelopment opportunity tasked with delivering biodiversity net-gain. The idea is a design for a grow-your-own project, or a series of pocket parks; the scale is several solutions for a number of locations

### Step 2: Develop an understanding of the landscape context and the ecosystem service needs

Once you have chosen the location and the scale, the next step is to explore the natural landscape in the location. This can include everything from a catchment scale (ie larger than the city) to locally typical habitats or habitats of local conservation importance. It should include consideration of geology, landform, habitats and species. Applying this knowledge to the process ensures that the nature-based solution makes a positive impact on local biodiversity.

In addition to developing an understanding of the natural landscape, it is also vital to understand what the people of the area need in terms of the benefits that nature can provide; these are known as ecosystem services. An important part of step 2 is therefore finding out the social, economic and environmental needs of the people living in or using the area and inputting this information into the design. Incorporating these community needs leads to a much more bespoke and holistic nature-based solution. The impacts list provided in the Impact Assessment element of the Framework provides

a guide to the holistic ecosystem service benefits that nature-based solutions can deliver.

This understanding of social, economic and environmental needs should be developed through an in-depth understanding of place and should encompass different scales of influence: from a landscape ecosystem scale, through a city strategic scale, down to the immediate locality.

With such a potentially wide range of research findings and information coming up during this phase of step 2, it is important to establish a clear rationale for how the local context can be fed into the design. This rationale should be based on the targeted benefits, co-benefits and an understanding of the trade-offs.

Evidence to underpin this can be assembled in a variety of ways, from large-scale mapping and remote sensing down to local community engagement and co-production activities. An effective method for delivering, managing, and sharing all this data is through the development of a centralised spatial dataset portal that combines all available datasets (eg flood maps, air pollution, access to green space, crime, unemployment, etc) into a single searchable portal.

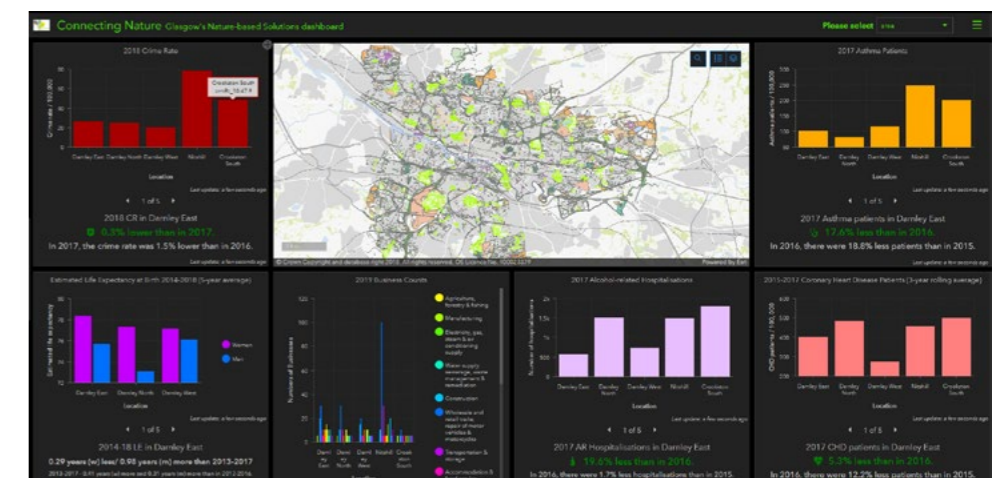


Figure 1. Prototype example of the Glasgow Nature-based Solution Dashboard.

**Step 3: Feed understanding into design, delivery and stewardship**

This step involves feeding the knowledge developed in steps 1 and 2 into the design, delivery and stewardship of the nature-based solution. It is where multifunctional benefits, based on the locality's unique needs, can be locked into the design and when decisions regarding trade-offs need to be made.

It is at this stage that the type of nature-based solution will be finalised. Now is when the technical design will be completed in relation to scale, needs and available capacity of the design. This step also represents the transition from technical planning to technical delivery of the nature-based solution.

**Step 4: Iterative monitoring and evaluation**

Nature-based solutions are not one-off projects undertaken at a moment in time. Once the solution has been put in place, evaluation is of central importance to effective management and maintenance. Iterative monitoring and evaluation can support this process. This step of the Technical Solutions element, like other steps, should be undertaken with an eye to the other Framework elements, for example Finance and Business Models (to ensure that appropriate resources are available to secure a sustainable legacy); Co-production (to support community ownership and stewardship);

and Governance (in relation to engaging different departments for shared responsibility in terms of delivery of benefits).

Of central importance to all of these processes is evaluation. There is a need to assess how the provision of ecosystem services changes over time. This is a critical consideration in relation to understanding the management required to keep the designed-for benefits and secondly in adapting the nature-based solution to changing needs over time (local/city/landscape-scale). In step 4, you need to consider how to continually assess the nature-based solution in a way that will best suit it. You also need to think of how knowledge from the monitoring and evaluation will be fed back into the delivery and management.

**Step 5: Iterative learning for city-wide scaling of nature-based solutions**

Step 5 involves using the learning from steps 1 to 4 to strengthen the development of nature-based solutions for all communities so that they are delivering benefits at a city-scale. In this way, they support the aspiration of achieving sustainable and just cities. By sharing successes and failures about delivering technical solutions for local needs, you can raise awareness and engage others involved in city-making processes to adopt similar approaches.

For more information, contact Stuart Connop (s.p.connop@uel.ac.uk).



**Governance**

*Our vision is to embed nature-based solutions across cities. What does that mean for governance approaches?*

Embedding a nature-based solutions approach at the city level will mean bringing together all the relevant people, communities and organisations to co-create a clear vision for how the city could be. It means ensuring that nature-based solutions become widely adopted because they are effective at delivering multiple benefits for this vision, and that they can be delivered at many different scales across a city to be most effective. Underlying this embedding of nature-based solutions is the creation of governance conditions to coordinate nature-based solutions implementation across the city and to collaborate with diverse actors in the process.

The aim of this section is to outline key stages for re-thinking governance. Governance is broader than government. It covers the legal frameworks, the formal and informal networks and organisations and the rules and policies related to the thing being governed. Governments change; governance continues and evolves. Governance rests on the recognition that nature-based solutions are better developed when people and organisations collaborate. This is because nature-based solutions are ultimately for everyone – and developing them together makes sure that different needs and interests are considered, and local opportunities are mobilised. Collaboration also supports the long-term stewarding of a nature-based solution. Governance is also about the coordination of people and organisations so that all their activities contribute to the desired multiple benefits of nature-based solutions.

Collaborative governance can take many forms. In essence, collaborative governance means that the public sector, private sector and formal and informal community institutions, private organisations and groups work together to achieve a common vision, and their combined efforts create a beneficial outcome that no one actor alone could achieve. Because a collaborative governance approach is adaptable over time, it can accommodate the different phases of a nature-based solution, that is the planning, delivery and then the ongoing stewardship required to ensure the nature-based solution makes a positive contribution in the long term.



Figure 2. The steps to develop a collaborative governance process.



## Making the case: aligning nature-based solutions with the wider goals of a city

Nature-based solutions deliver multiple benefits and therefore cannot be separated from city priorities such as mobility, health, climate resilience etc. However, this represents a challenge to 'business as usual' for most city governments and other organisations as it requires alignment with broader social, political and business priorities and goals of your city. As well as these local priorities, it is also useful to show how your nature-based solution delivers on multiple global themes, such as the UN Sustainable Development Goals and emerging nature-based solutions categories. This will help you build the case and communicate how your idea can generate wider benefit. In turn, this will help you build alliances with different partners who have different interests.

## Where will the nature-based solution be? Identify the current use, ownership and management of where you want to implement your nature-based solution.

Whatever the type and scale of nature-based solution, there are certain factors that must be identified at the very start, whether you are a community group, a city government, a local governmental department, a business or a third sector organisation. Identifying who owns, uses and manages the space or spaces for implementing nature-based solutions is an essential first step, and the space(s) can be used, owned and managed by many different people. Therefore, this is an essential first step and often reveals complexity.

## Who are the partners: identify all relevant partners and bring everyone together to co-create a vision and goals for the nature-based solution

Once you have identified all partners, you will need to think about the best way to bring together all these people and organisations so that you can each share your interest in the place and / or the proposed outcome. The co-production section will help you with ideas on how to bring these people together and to co-produce a (new) vision for the space. Whilst the different people and organisations will have their own aims, wishes and plans, agreeing a shared vision for your chosen space will be essential to aligning your interests and being clear about such things as goals, timeframes, management and stewardship.

## How will you work together: develop and agree a collaborative governance framework so that the different partners work together effectively, sharing roles and responsibilities

Once all the partners have agreed the vision, the next step is to identify how you will work together. This is where the adaptability of collaborative governance is so useful. Each partner has their own governance framework within which they operate – for city governments that will be formal, for local community groups that will be less formal – and these differences need to be clear from the start so that everyone contributes as best fits their area of expertise or sphere of activity.

## What will you need to succeed: identify conditions, skills and capacities to ensure ongoing success

This new form of governance brings with it the challenge of developing the organisational conditions and skills to create and manage collaborative governance. These conditions and skills are related to leadership and support, knowledge, trust and communication. Therefore, partners will need to be open to learn and build knowledge, effective communication, mutual respect and trust in order to co-produce effective collaborative governance.

Figure 3. Business Model Canvas workshop in Glasgow. Source: Sean Kelly.



## Financing and Business Models

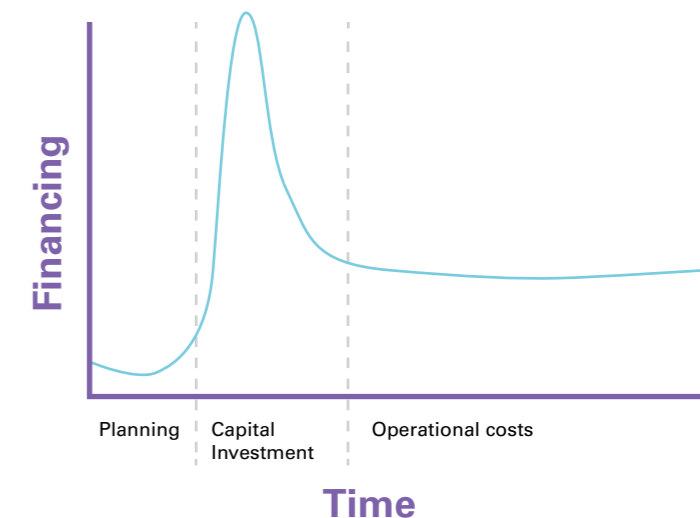
*Mobilising resources for implementation and long-term sustainability.*

Up-front financing and long-term sustainability of nature-based solutions are critical elements of nature-based solution delivery. Raising finance for a nature-based solution comprises of three phases, which may reoccur many times over the lifetime of a nature-based solution:

- **Phase 1:** financing costs associated with planning and design
- **Phase 2:** financing initial set-up and delivery (capital expenditure costs)
- **Phase 3:** financing ongoing costs of operation, maintenance, management and evaluation

To date, much attention has been focused on securing financing for phases 1 and 2. The lack of planning for phase 3 leads to difficulties in the long term. It then becomes difficult to sustain nature-based solutions. This is particularly relevant for small-scale projects such as community initiatives.

Figure 4. Phases of nature-based solutions financing.



## Why do we need new financing and business models for nature-based solutions?

There are many different sources for nature-based solutions financing yet, to date, the public sector has played a lead role in financing nature-based solutions, contributing to over 70% of financing through public budgets or direct subsidies. Increasingly, the public and private sector collaborate; philanthropic and community groups co-finance and co-manage nature-based solutions. New financing and business models can help to reduce the increased pressure on public sector resources. They also increase private and community organisation engagement and ownership of nature-based solutions. Small-scale urban agriculture projects such as community gardens may have a higher proportion of community funding, sometimes secured through instruments like crowd-funding. Larger-scale projects can access financial instruments such as the Natural Capital Financing Fund (NCFF).

## How to support new financing and business models

The Connecting Nature Business Model Canvas helps organisations to identify the benefits and beneficiaries of their nature-based solution from environmental, social and economic perspectives. By identifying these, organisations may be able to discover public, private, philanthropic or community groups who value these benefits and which may be prepared to help finance them – either directly or through joint initiatives.

For more information, please see the guidebook on Financing and Business Models which provides more detailed information on the process, tools and links to further resources such as the Nature-based Solutions Business Model Canvas guidebook.

## Nature-Based Entrepreneurship

*Engaging enterprises in the planning, delivery and stewardship of nature-based solutions.*

Our working definition of a nature-based enterprise is 'an enterprise using nature directly as a core element of their product/ service offering or indirectly by contributing to the planning, delivery or stewardship of a nature-based solution'.

Nature-based enterprises may be for-profit or not-for-profit. Enterprises using nature directly are often involved in the delivery of nature-based solutions; community garden groups, constructed wetlands companies or enterprises delivering green roof or wall solutions would be examples of this category of enterprise. Examples of enterprises indirectly supporting nature-based solutions are a landscape architect whose core business is the design and planning of nature-based solutions, or a technology company monitoring the quality and performance of nature-based solutions.

### Why is nature-based entrepreneurship important?

Nature-based enterprises can help to deliver the social, economic and environmental benefits of nature-based solutions in that they have:

**Social value:** nature-based enterprises often contribute to environmental education. They help to change attitudes towards the environment; community-owned nature-based enterprises can contribute to community empowerment; they support an improved sense of place attachment and increased social capital; nature-based enterprises can lead to better health and well-being.



**Environmental value:** nature-based enterprises contribute to better quality green space, increased biodiversity and water quality.

**Economic value:** nature-based enterprise lead to new skills development and knowledge creation; they create sustainable jobs in local economies and help to maintain existing jobs.

### How is Connecting Nature supporting nature-based entrepreneurship?

The concept of nature-based entrepreneurship is emerging and the sector is very fragmented in Europe. There is a lack of clarity about what forms a nature-based enterprise and what value it brings. Connecting Nature is helping to raise the profile of the sector and highlight the important value nature-based enterprises can deliver. The Connecting Nature Enterprise Platform helps cities and private developers identify nature-based enterprises that may help them in the planning, delivery and stewardship of nature-based solutions. Connecting Nature cities are implementing strategies to support local nature-based enterprises contributing to local economic development and society.

For more information, contact Siobhan McQuaid (siobhan.mcquaid@tcd.ie).

## Co-production

*Collaborating with and mobilising diverse actors for nature-based solutions.*

Co-production is a novel form of collaborative governance. Co-production democratises urban governance. In co-producing nature-based solutions, diverse actors (for example policymakers, citizens, practitioners, researchers, entrepreneurs, engineers, ecologists, landscape architects) collectively define problems and priorities, produce and combine knowledge and put that knowledge into action to design, implement and steward nature-based solutions.

The goal of co-production is to generate shared outputs. These outputs can be new problem definitions, visions or solutions. By bringing diverse actors together, co-production also results in new relationships between them, and it can mobilise and empower participants to engage in creating better and greener cities.

## Why co-produce nature-based solutions?

Nature-based solutions address complex urban problems with no quick fix. This complexity means that we can't predict what a nature-based solution will look like or how a particular community wants to use it. Thus, a diverse set of urban actors is needed to collaboratively design a good nature-based solution.

## How do we co-produce nature-based solutions?

### Step 1: Define the goals of the co-production process

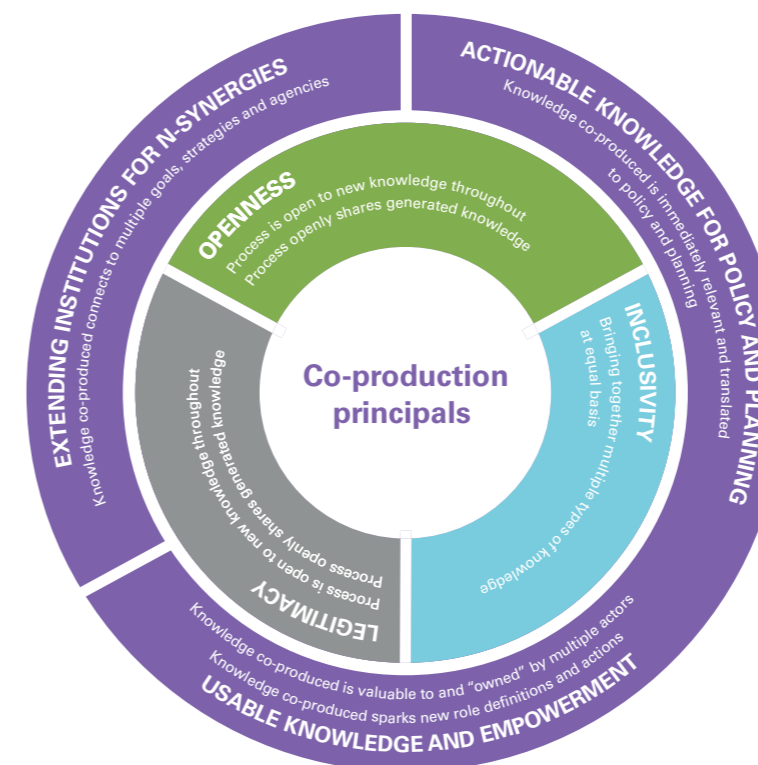
In addition to concrete solutions, goals may include the development of new visions and strategies, developing networks or partnerships and the empowerment of citizens. The goals influence which actors should be involved and which steps and tools are appropriate.

### Step 2: Use the design principles to flesh out the co-production goals and structure

The design principles highlight key considerations for the co-production process. This helps to clarify how you approach the process. For example, who you want to involve, what type of knowledge you need and what kind of results you seek. The principles also help you to reflect on the process and results.

Define how you approach the principles in your co-production process. For example, looking at inclusivity, who will you involve and who will you not involve, and why? Also describe how you will meet the design principles during the co-production process. For example, how do you ensure that co-production processes are inclusive, legitimate and open? How can you facilitate empowerment of the actors?

Figure 5. The co-production design principles.





**Step 3: Plan the co-production activities**

In the figure, we highlight different activities that are possible in a co-production process. Each of these activities helps to achieve different – intermediate – process goals. It is important to identify the concrete co-production activities with a timeline of when these are going to happen. This is not meant as a blueprint – it is likely that the process will need to change and adapt.

**Step 4: Select the co-production tools**

Specific co-production tools facilitate each activity in the process towards achieving desired goals. The choice of tools depends on the goals of the co-production process, on the specific co-production activity and on the type of actors involved.

After selecting the co-production tools, it is important to identify the materials, skills and other requirements needed to implement the tool, for example of the space/ room, atmosphere and time needed.

**Step 5: Reflect on the co-production process and results**

Co-production processes are never set in stone. They ‘go with the flow’ of the participants’ ideas and needs. This requires continuous reflexivity. Reflexivity helps to identify lessons learned and to adapt the process in light of (changing) objectives. Which goals does the process aim to achieve? Is the process on the way to achieve these, or do we need adaptations?

More information about the tools that support the above steps can be found in the guidebook on Co-production (2020). For further information, contact Katharina Hölscher (holscher@drift.eur.nl).



Figure 6. Co-production activities.



**Reflexive Monitoring**

*Iterative learning to adapt the planning process in real-time.*

**What is reflexive monitoring?**

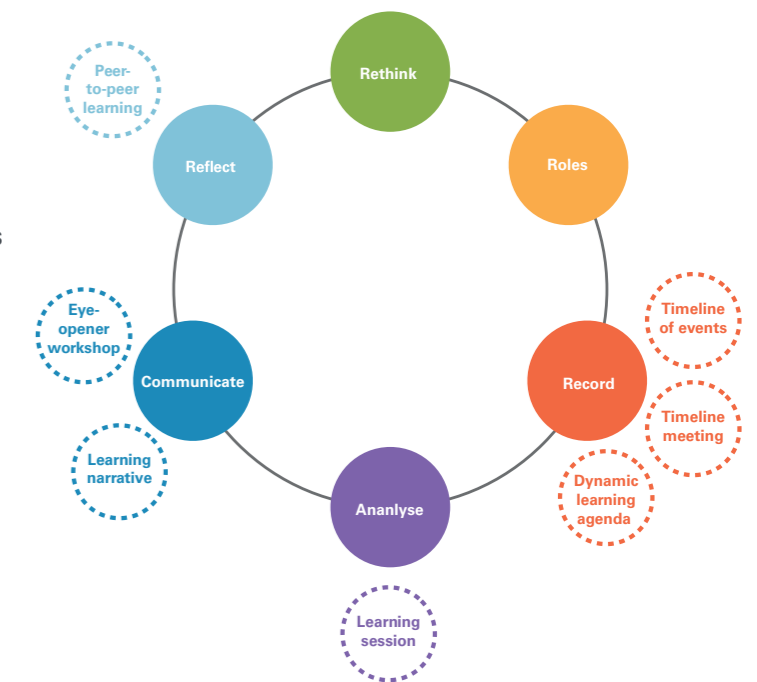
Reflexive monitoring is an innovative monitoring and evaluation method. It aligns daily activities with long-term ambitions and the impact of a project. The method enables urban practitioners to gain insight into the progress and direction of their project in real time. Reflexive monitoring helps to evaluate day-to-day activities and to respond to them while considering the bigger picture. This is especially helpful when addressing complex challenges.

**Why apply reflexive monitoring to nature-based solutions?**

Traditionally, monitoring and evaluation are carried out after implementation or completion. This means that insights on the progress and direction of a project are gained retrospectively only. It also means that there is a lack of flexibility or space for the participation of different actors. In reflexive monitoring, the process is not tied to predefined outcomes with impacts. This means that innovations can emerge in the process and be integrated in the project to improve the nature-based solution. Reflexive monitoring reveals the complexities of the problem and solution context. It prompts practitioners to find pro-active ways forward. It helps to identify barriers for desired structural change and to define actions for addressing those barriers. In this way, monitoring becomes an instrument for learning that is translated into action.

**How to apply reflexive monitoring?**

A six-step procedure was developed to implement the reflexive monitoring process.



**Step 1: Rethink what you need to learn for implementing nature-based solutions**

In reflexive monitoring, it is important to continuously redefine the goals of your nature-based solution. At the start of the process, you write down the goals and what you need to learn to achieve those goals. For example: “How do we collaborate with colleagues from other departments?” This approach means the goals are linked to learning questions, the answers to which will help to achieve the goals. This process is repeated throughout the entire design and implementation process of the nature-based solution.



### Step 2: Define the roles within the process

In reflexive monitoring, there are roles for different actors in the design, implementation and stewardship of the nature-based solution. These roles are taken up by the actors who closely collaborate in this process and meet on a regular basis. All actors will be involved in the reflexive monitoring process, but their level of involvement will depend on the steps in the process.

### Step 3: Start recording important events in your dynamic learning agenda

In this step, you start to record all events that occur during this period on a timeline. The goal is to trace important moments, insights, events, etc. that influence the nature-based solution process. The timeline is then discussed with your collaborators in a timeline meeting to distil the critical turning points. Critical turning points are important moments in time where something changed that helped or hindered the realisation of the nature-based solution. Formulating these points helps to reflect on the main events of the previous month(s). It also helps to clarify in what way they influenced your work, for example by making you think or act differently. Finally, the events and critical turning points are added to the dynamic learning agenda. For every critical turning point, learning questions and follow-up actions are added. This allows for a

collective reflection on the essence and difficulty of the challenges as well as how to organise a follow-up.

### Step 4: Discuss dynamic learning agenda and analyse learning outcomes

Organise learning sessions to discuss the dynamic learning agenda per newly added item. By participating in learning sessions, you will get a better understanding of how to apply the reflexive monitoring tools and learn how to formulate critical turning points and learning questions. A reflexive monitoring expert and the participants together formulate how the critical turning points contribute to innovation. We call these lessons learning outcomes. Learning outcomes describe the innovations that help to adjust the planning process to align with the co-production process as well as scaling and implementation of nature-based solutions.

### Step 5: Communicate the reflexive monitoring process to peers and project outsiders

The reflexive monitoring process itself is a novel governance process. It therefore also is a learning process for urban practitioners who are just starting to work with the method. Sharing lessons, tips and tricks with other actors who use the method can be valuable. We selected three different tools to support this exchange: the eye-opener workshop, the learning history narrative and

the reflexivity alignment timeline. They are described in the Reflexive Monitoring guidebook (2020).

### Step 6: Reflect upon reflexive monitoring as a method for knowledge generation: showing the many benefits of nature-based solutions and adapting the planning process in real-time

The last step is to organise sessions on a regular basis in which the participants involved share their experiences with other practitioners who apply the method in their daily practice. Learning outcomes can be exchanged and what these could mean for others can be discussed. This contributes to increasing the reflexivity of the participants involved. The sessions can also be used to reflect upon the effectiveness of the reflexive monitoring method itself. Urban practitioners can share their experience in working with the different steps and tools of the method, which may be adapted based on the changing needs.

More information about the tools that support the above steps can be found in the guidebook on Reflexive Monitoring (2020). General information about the tools can also be found in Van Mierlo et. Al (2010) via: <http://edepot.wur.nl/149471>. For further information, contact Marleen Lodder ([lodder@drift.eur.nl](mailto:lodder@drift.eur.nl)).

## Impact Assessment

*Assessing the baseline and the transformation achieved*

To reveal and communicate the many benefits provided by nature-based solutions, cities and communities can develop an impact evaluation framework. The choice of appropriate indicators to capture impacts across several categories and good methods for monitoring and evaluation are key to developing an effective evaluation framework.

### Why monitor and evaluate nature-based solutions?

Monitoring and evaluation of the benefits of nature-based solutions allows cities and communities to assess the strengths and weaknesses of specific interventions. It also helps them to see how they are doing on achieving strategic city or area goals and allows them to make adaptations in real time.

Monitoring and evaluation also support cities in building the case for investment in nature-based solutions. Monitoring and evaluation provide evidence on the types of benefits they are able to deliver.

## How to develop a set of indicators for impact monitoring and assessment

### Step 1: Structured reflection on outcomes pathways and trade-offs

In the first step, cities and communities need to reflect on which strategic objectives they want to achieve with their nature-based solutions. They can specify expected outcomes, identify the appropriate scale of implementation and create an overview of how nature-based solutions are expected to generate particular impacts. It is also important to highlight likely trade-offs between impact categories and across social groups. City or area strategic objectives are normally defined at a general level. Nature-based solutions are by definition multifunctional, delivering various impacts such as increased health and wellbeing for residents, increased social cohesion, new economic opportunities or environmental impacts such as increased biodiversity. However, nature-based solutions do not necessarily deliver all these benefits per se. Making assumptions explicit helps to identify what might be missing in their design. For example, if a city designs a network of urban gardens, how exactly they would support physical and mental health would need to be thought through. Would it be through an increase in physical activity? Through increase in social interactions? Through learning about and eating more food that is organic or cooked with raw produce? Through all of the above? Also, what kinds of improvements in physical and mental health do we expect to see? Answering these questions helps set up appropriate ways of monitoring and evaluation.

## Step 2: Choosing appropriate indicators

The second step entails choosing appropriate indicators that will form a coherent impact evaluation framework. Appropriate indicators should be context- and solution-specific to assess the impacts identified in step 1. If step 1 is carried out thoroughly, choosing appropriate indicators is easy. Cities or communities should give priority to a set of core indicators across different categories of impact. Expert support is helpful at this stage. When choosing indicators, it is important to consider several factors such as scientific soundness; the scale of the nature-based solution, both in geographical and timescale terms; the monetary and human costs required in their application; possibilities for longer-term or ongoing evaluation; as well as opportunities for participatory processes in monitoring and assessment.

Connecting Nature had identified a series of core indicators that fulfil these criteria. Additionally, other indicators in each category of impacts have been collected which can be used for the assessment of particular types of impacts. They should be considered when the core indicators do not cover some of the important pathways and outcomes identified in step 1.

## Step 3: Identify and collect data sources

Step 3 focuses on identifying existing data already being collected and planning for additional data

collection. It is important to go beyond simple descriptive measures (for example number of people using a particular nature-based solution) to evaluating the outcomes for different social groups. This often entails contacting different departments and agencies in charge of managing different sources of data. Don't forget regional, national or European statistical offices. Although mapping existing data can be very time intensive at the beginning, these existing data sources will support evaluation. Integrating different data sources in interactive databases or maps can also inform decision-making in that it facilitates the consideration of several objectives when designing nature-based solutions, it provides visual representations of impacts and it also informs the choice of scale or location of nature-based solutions.

## Step 4: Plan what, when and how to measure

In developing and implementing monitoring and evaluation plans you need to ask what, when and how to measure specific impacts. First, existing data identified in the previous step is matched to chosen indicators. Knowing when the data was collected, and its level of geographical detail or granularity is important in understanding for what baseline the data can be used. This will also make clear what data is not available and how the missing data can be captured. The design of procedures for data collection requires scientific expertise. Priority should be given

to methods that can be maintained over time. Where appropriate, the use of participatory and citizen science approaches is recommended because they have the extra benefits of engaging communities in nature-based solutions.

## Step 5: Feeding evidence into policy planning

The evidence produced will then be processed and fed into the policy planning process. Good evidence will allow decision-makers to understand what works and what does not when it comes to the design of nature-based solutions. The main challenge with feeding evidence into the policy process relates to the integration of data and knowledge on different categories of impacts. Different types of impacts need different monitoring and evaluation methods, and different types of data are generated. Integrating these in policy-readable results is a challenge for most cities. In Connecting Nature we are experimenting with the creation of interactive dashboards that integrate different sources of data and can be geographically represented, to help decision-making. Through reflexive monitoring, cities can discover how the evidence of the indicators helps them to convince their colleagues or change the planning processes and in what way this helps or hinders their work.

More information about the tools that support the above steps can be found in the guidebook on Impact Assessment (2020). For more information, contact Adina Dumitru (adina.dumitru@udc.es).

# 4 | Additional Resources

The guidebooks on each of the seven elements making up the Connecting Nature Framework along with a step-by-step how-to manual on the Framework are available to download on [www.connectingnature.eu/resources](http://www.connectingnature.eu/resources).

For more information on Connecting Nature, visit: [www.connectingnature.eu](http://www.connectingnature.eu)

**And the Connecting Nature YouTube channel:**  
<https://www.youtube.com/channel/UCI24BLyUnvxq7aehGu-XMLkw/videos>

