CONEXUS

Monitoring NbS together for greater uptake and upscaling

Successful implementation and mainstreaming of Nature-based solutions (NbS) require understanding how their benefits are perceived within society and businesses. To build support and collaboration in evaluating NbS benefits, the CONEXUS project has developed an assessment frame, including a stepwise approach to conduct monitoring and assessment with all stakeholders.

Evidence of NbS performance is necessary to demonstrate their contribution to addressing different sustainability challenges as well as to make business cases for market development. Many NbS pilots have been successfully implemented, but continuation of pilots and mainstreaming to other sites and scales remains challenging. By improving data and knowledge of environmental and socio-economic benefits, along with advanced metrics, NbS monitoring and assessment can help to overcome some of these challenges and mainstream NbS in cities. A well-structured monitoring and assessment framework contributes to inventory-building, improved management, and improved environmental awareness, especially if non-governmental stakeholders are engaged.

Existing frameworks for NbS assessment often lack a participatory component, which could compromise its relevance for stakeholders and its influence on

Key challenges

1. NbS implementation and mainstreaming critically depends on societal support
2. Criterions for success vary across stakeholders
3. Participatory monitoring strengthen the legitimacy of outcomes
4. Limited data on the benefits of NbS impedes their upscaling

Photos by CONEXUS Bogota Life-Lab.

Benefits of participatory assessment

Increased public support for urban NbS as co-produced assessment indicators, based on local knowledge & values, might help to improve NbS designs & management procedures

Increased commitment, local support of projects & shared ownership for promoting ecosystem renaturation

Increased stakeholder commitment to & shared ownership of the monitoring process

Increased sensitivity to communities' values, habits, traditions, and worldviews, especially of the marginalized

Increased organizational learning capacity & institutional effectiveness through evidence-based planning

decision-making. To improve the impact of environmental assessment on decision-making, the CONEXUS project has developed a participatory approach to assess and monitor urban NbS, principled on the idea of collaborative knowledge production. This makes assessment frameworks 'less academic', yet more relevant to the decision-making realities of stakeholders and ensures 'usable science'. Participatory monitoring involves stakeholders, from different actor groups and all policy levels, throughout the different steps in assessment.

A participatory assessment approach could expose fundamental differences in vulnerability, risks, and potential benefits between groups.

Participatory monitoring and assessment of NbS

To ensure relevance and uptake of assessment, participatory approaches should be incorporated into the early stages of developing an assessment framework. Meanwhile, for practitioners, it is often difficult to decide on possible indicators without knowing what they can choose from, and how specific topics (e.g. socio-economic benefits of NbS or tackling heat-island effects) could be translated into indicators. To accommodate this, the CONEXUS participatory assessment framework focuses on a stepwise approach to make important decisions with all relevant stakeholders in all phases of the monitoring process; from defining shared monitoring goals

and objectives, to participatory indicator selection, data collection, and data analysis and evaluation.

The following three components make up the CONEXUS-assessment framework:

1. **A portfolio of science-driven indicators on NbS performance** with information on scale of application, level of expertise required, and scope for participation in assessment, e.g., relationship with Challenge Areas (and SDGs).
2. **A comprehensive yet simple set of indicators for NbS governance** relevant for monitoring and understanding how NbS can become part of the urban governance processes.
3. **Guidance on participatory indicator selection and assessment** provides a stepwise approach guiding cities in the participatory and inclusive development of a NbS monitoring system, including a set of context-sensitive indicators with high potential impact.

The framework focuses on a step-by-step approach to design participatory monitoring as an iterative process between scientific partners, policy officials, and societal stakeholders, including marginalized voices. The aim is to ensure that indicators align with the knowledge, working routines, and dynamics of the social network to which the assessment is relevant and the policy frameworks the indicators will feed into.

Decision-makers ask for simpler, easy-to-use, and understandable decision-support tools that can be readily incorporated into scientific-policy processes.

Criteria for selecting

For the selection and development of the indicators, four criteria are proposed:

- **Credibility** refers to the need for indicators and analytical techniques to be grounded in scientific literature.
- **Salience** concerns the relevance and applied value of information to potential users and other stakeholders, as well as its understandability to various stakeholders.
- **Legitimacy** relates to the process of indicator development and selection, which needs to be fair, unbiased, and inclusive.
- **Feasibility** is the availability of time and resources to adequately carry out the assessment and monitoring process.

The selection of the indicators can be done in five steps:

Step 1. Objectives formulation by stakeholders.

Extensive stakeholder mapping should be undertaken through purposive selection, open calls, systematic selection, snowballing and other methodologies to identify and select the relevant stakeholder groups . The stakeholders should then be engaged – using focus group discussions or workshops – in defining shared monitoring objectives that corresponds to the desired effects of the collaborative project. The objectives should be co-developed with the stakeholders, including local governments and civil society, and should reflect their knowledge needs. Selected objectives should be directly related to the societal challenges that are to be addressed, such as climate resilience building, biodiversity enhancement or addressing social justice concerns.

Step 2. Assembling a credible indicator portfolio.

Based on the selected objectives, scientists can construct a portfolio of possible indicators from existing indicators (see Dumitru and Wendling (2021) for an overview), including descriptive information on required data, measurement procedures, scale of measurement, measurement

5 Steps for indicator selection

units, and scope for citizen science, with indicators clustered based on societal challenge areas. Governmental agencies may suggest complementary indicators based on their understanding of relevant challenges and available data. Indicators of governance opportunities and challenges tend to be crucial for mainstreaming NbS and project success.

Step 3. Making the indicator selection salient, legitimate, and feasible.

Based on the criteria (above), a preselection of indicators can be made from the indicator portfolio. It is important to ensure that each indicator is:

(1) aligned with a locally relevant societal challenge and measurement scale(s),
(2) relevant to the urban context,
(3) suitable for monitoring NbS impacts within the timeframe of the measurement period, and
(4) requires no specialist expertise going beyond the (short- and long-term) organization's resource availability for monitoring and assessment.

Data requirements for indicators should also be considered, including the feasibility for long term measurement engagement. Here, contributions from stakeholders could be considered through citizen science or from existing data collection efforts.

Step 4. Stakeholder appraisal of indicator selection.

A workshop, featuring public institutions, civil society, academia, and the private sector can be organized to seek feedback on the pre-selected indicators. During these workshops it is important to:

(1) have fair representation, including marginalized groups to ensure inclusivity,
(2) discuss the feasibility and salience of the proposed indicators during the workshop (e.g., in break out groups),
(3) have strategic arguments to make indicators resonate with important external actors,
(4) include indicators that are relevant for powerful stakeholders as well as vulnerable groups,
(5) align the indicators with existing monitoring and evaluation practices within the municipality (or other stakeholders), and
(6) include indicators that are capable of adequately measuring environmental justice issues.

It is also critical to make sure that the fair distribution of burdens and benefits of NbS is not evaluated, but instead the inclusion of all relevant stakeholders in the process and recognition of all voices, e.g. non-scientific knowledge and experiences. The importance of these issues may be explicitly discussed with the participants of the workshop.

Step 5. Adding politicized indicators at the aggregate level.

It is important to realize that NbS assessment has value. Any choice of indicators and assessment procedures can significantly impact the type of data that eventually will be presented as successes (or failures) of NbS. As every stakeholder group have their interests, each group is likely to prioritize particular indicators. For instance, biodiversity indicators resonate more with stakeholders who are interested

in the ecological benefits of NbS, such as environmental agencies and non-profits. For local communities, often economic opportunities, possibility for recreational activities and health benefits may be more relevant. Planners may have more varied interests but often are conversant of multi-functionality, regulatory compliance and feasibility (e.g. technical and financial). Therefore, we suggest applying indicators that consider and balance the political context and consequences to secure the utmost support of all stakeholders.

After the design phase of the assessment and monitoring process, some final more practical decisions need to be made before data collection can start, such as the selection of sites, frequency of measurement, data-storage, etc. As interpretation and evaluation can be highly politicized, collaboration with stakeholders needs to continue into the evaluation phase to build or retain trust between actors, safeguard the legitimacy, and impact the uptake of the assessment of NbS benefits.

Lessons learned

1. Inclusion of stakeholders in impact assessment contributes to NbS mainstreaming
2. Assessment indicators should be credible, salient, and legitimate to all stakeholders
3. Citizen science can contribute to long term feasibility of data collection
4. Add politicized indicators for political support and issues
5. Including indicators on governance helps in mainstreaming NbS

This factsheet is based on

VAN DER JAGT, A. P. N. et al. (2022). An action framework for the participatory assessment of nature-based solutions in cities. Ambio. DOI: 10.1007/s13280-022-01772-6.

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