

Spotlight on social equity, finance and scale

Promises and pitfalls of nature-based solutions



SEI brief

June 2021

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About this series: The key levers of change for our seas and coasts revolve around the need for an integrated climate, biodiversity and development agenda. Nature-based solutions (NbS) are increasingly seen as an important piece of the puzzle for delivering upon multiple and sometimes contradictory goals. But beyond the promises of this win-win discourse, what are the potential pitfalls of NbS and what questions should we be looking at to overcome them? This is the first piece in a four-part series critically analyzing NbS.

Introduction

Human activity has modified and deteriorated natural ecosystems in ways that reduce resilience and exacerbate environmental and climate problems. Physical measures to protect, manage and restore these ecosystems that also address societal challenges in sustainable ways and bring biodiversity benefits are sometimes referred to as “nature-based solutions” (NbS). For example, reducing deforestation and restoring forests is a major opportunity for climate mitigation, while protecting or restoring coastal habitats can mitigate damage to coastal areas from natural hazard events, in addition to potentially providing co-benefits related to livelihood, recreation, and biodiversity.

There is now an impetus to shift from engineered (technological or “grey”) solutions, towards greater deployment of NbS. Not only do they offer an alternative to conventional fossil fuel-based or hard infrastructure solutions but, if implemented correctly, they also hold great promise for achieving multiple goals, benefits and synergies. These include climate mitigation and resilience; nature and biodiversity protection; and economic and social gains.

2020 saw an explosion in publications about NbS, which have contributed to filling many of the knowledge gaps that existed around their effectiveness and factors for their success. These publications have also highlighted the knowledge gaps that remain and have revealed a lack of critical reflection on the social and economic sustainability aspects of NbS. Building on these gaps, we decided to launch a mini-series of four briefs – of which this is the first – to provoke a more nuanced discussion that highlights not only the potential benefits, but also the potential risks and tradeoffs of NbS. The purpose is not to downplay the importance of NbS for biodiversity, ecosystems, and coastal mitigation and adaptation, but to ensure that we establish a dialogue about ways to overcome these challenges while leaving no one behind.

The term “nature-based solutions” was first mentioned by the World Bank in 2008. The following year, the International Union for Conservation of Nature (IUCN) promoted NbS as an approach to climate change adaptation and mitigation that could incorporate the dimensions of biodiversity protection and sustainable living through various scales and functions (Eggermont et al. 2015). Since then, various definitions and understandings of the phrase have been brought forward, most notably by the European Union, in an attempt to group various green concept terms such as natural solutions; ecosystem-based adaptation; ecological engineering; green and blue infrastructure; and green spaces (Hanson et al. 2020).

IMAGE (ABOVE): Protected ecological carbon capture mangrove in Everglade City, Florida © MARIE HICKMAN / GETTY

The European Commission expects NbS to facilitate a transition towards a more resource-efficient and competitive economy, to foster economic growth and to create new jobs (Nesshöver et al. 2017). NbS have been an important component of a number of recent EU policies – including the European Green Deal, the Biodiversity Strategy (2030), and the Green Infrastructure Strategy – due to both their potential to contribute to multiple policy goals and their alignment with ideas around green innovation for climate challenges (Fagerberg et al. 2016). They also appeal to policymakers for their potential to reconcile the dichotomy between economic growth and socio-environmental concerns, thus offering a transition path towards a sustainable economy (Maes and Jacobs 2015; Nesshöver et al. 2017).

Definition of NbS by the IUCN: “Actions to protect, sustainably manage and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.” (Cohen-Shacham et al. 2019)

Globally, NbS are now considered a key component for the implementation of several international policies, including the Sendai Framework for Disaster Risk Reduction, the Paris Agreement, the Convention on Biological Diversity (CBD), and the New Urban Agenda (Habitat III). They can also be considered to be supported indirectly by the Sustainable Development Goals (SDGs), as well as the Ramsar Convention, an international treaty for the conservation and sustainable use of wetlands.

Despite increased interest in and a strong push for NbS, there are many challenges and knowledge gaps in their research and implementation (Chausson et al. 2020). For example, studies on NbS have, to date, primarily reported on their environmental benefits; less attention has been directed towards aspects related to their social and economic sustainability (Hanson et al. 2020). In the context of climate change, most NbS-related studies come from high-income countries (Chausson et al. 2020). Very few studies come from lower-income countries and even fewer from Small Island Developing States, despite the vulnerability of these countries to climate change, their high levels of direct dependency on biodiversity and ecosystem services (Yang et al. 2013), and the fact that they place the greatest emphasis on NbS in their Nationally Determined Contributions (Seddon et al. 2020).

Definition of NbS by the European Commission: “... solutions 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.” (European Commission 2020)

These knowledge gaps have also created a void when it comes to more critical discussions of NbS which would properly scrutinize their equity and justice dimensions across scales, and pin down how their costs and benefits are distributed (Cousins 2021). It is not yet clear who gains, who pays, which areas benefit in relation to space and time, and what the tradeoffs from NbS interventions might be (Hanson et al. 2020).

Through a mini-series of four briefs, we engage with what we see as key gaps in critical approaches to the social and economic sustainability of NbS, identified using the authors' collective experience in the field and a review of the most recent literature. In this brief we introduce the three themes – equity, scale, and finance – which we will dwell upon in more depth in the subsequent briefs, each of which examines one of the themes. The aim of these briefs is to encourage discussion of the benefits and risks of NbS, and how they can be formed and implemented while leaving no one behind.

Social equity

Much of the research has adopted a technocentric view when it comes to the implementation of NbS, pointing to their success factors and potential to provide multiple benefits (Frantzeskaki et al. 2019). However, little attention has been given to questioning the sorts of power-knowledge relationships mobilized and reinforced through the propagation and implementation of NbS (Cousins 2021). Research results are presented as knowledge of exemplary practices, often with empirical evidence that might not necessarily be representative of what is envisioned or practiced on the ground or beyond Europe (Kotsila et al. 2020). The portrayal of NbS found in this research

creates a dominating discourse around how to envision and implement urban nature. It fosters a form of urban “greenmentality”, which is problematic for a progressive and just governance of sustainability and nature (Cousins 2021; Kotsila et al. 2020).

The mobilization of a specific understanding of nature through NbS is aided by the ambiguity of the discourse, which turns NbS into easily adaptive, flexible tools that can serve distinct agendas. NbS are intended to produce positive environmental and socio-economic outcomes. Yet, the recognition that solutions will not automatically be equally beneficial for all across geographies, timescales and social groups is seldom made explicit or explored in depth (Kabisch et al. 2017). Unless social equity and justice are well-considered throughout the governance and implementation of NbS, policies and projects will create winners and losers, and likely reinforce existing inequalities and injustices. Today, little is known about how these benefits are delivered to more marginalized communities and how decisions affect the historic distribution of negative or positive impacts across space. Where are NbS most needed and for whom? What measures can be taken to ensure access to their benefits? And are there costs or trade-offs associated with NbS delivery that impact particular groups? Despite the clear links between NbS and equity, there is a gap in the research when it comes to social sustainability (Hanson et al. 2020), particularly on the way in which the allocation of responsibilities and equitable distribution of benefits occurs (Cousins 2021).

Therefore, those promoting and implementing NbS need to account for social contexts, including the historical marginalization and political capabilities of different groups, and proactively seek to contribute to equality goals. Meaningful participation, stakeholder engagement, transparent decision-making and accountability for solutions are important components of such approaches (Toxopeus et al. 2020). Additionally, current geographic imbalances in knowledge around NbS should be addressed. While the reasons for these imbalances are complex and nuanced (e.g., varying research capacity, funding availability, donor priorities, the scope of the problems for which NbS are being proposed), more attention should be given to different contexts, such as in less-developed countries and Small Island Developing States, where for example traditional and Indigenous knowledge around nature, ecosystems and risk may be able to inform more socially equitable NbS policies, as well as their implementation at global and regional levels.

Finance

Justice and equity are elements that are rarely problematized in discussions around the funding and financing of NbS. As discussed in the previous section, the apolitical discourse around NbS fails to consider that they are not inherently socially just and that a range of issues associated with them must be critically evaluated, including how and why they are financed (Haase 2017).

One aspect of finance in need of examination is the fact that the concept is often discursively mobilized in such a way as to privilege quantifiable benefits, profit, quick economic returns and growth within urban nature’s governance (Haase 2017; Kotsila et al. 2020). The material implication of this discourse is that a market-driven governance of NbS tends to prioritize projects that serve high income groups (Toxopeus et al. 2020). For example, more vulnerable segments of populations may be displaced when urban greening projects leads to higher housing rents in the area (Curran and Hamilton 2020; Millington 2015). More vulnerable areas, which are often those most in need of safe green spaces, might not be as attractive for green infrastructure investments – particularly from the private sector – as the better-off or more central areas of the city. Thus, investments in NbS might instead cement or create new demographic inequalities and exacerbate gentrification (Anguelovski et al. 2018). This raises the question of what



Building incorporating nature into the design © ENTIENOU/ GETTY

the appropriate financing mechanisms for enabling “just NbS” might be. We discuss this further in our upcoming Finance brief. For now, we provide an overview of current financial mechanisms.

According to the OECD, climate finance (which is one of the key mechanisms for financing NbS), particularly through bilateral and multilateral funds, has increased, whereas private sector finance has remained flat at 3% since 2016 (OECD 2020). However, these numbers are often inflated or inaccurate (Oxfam 2018). So how much of this financing goes into NbS? Bilateral and multilateral, national and international funds such as the Global Environmental Facility, the Green Climate Fund, and the Adaptation Fund allocate less than 5% of climate finance towards dealing with climate impacts; less than 1% goes to coastal protection, infrastructure and disaster risk management (Buchner et al. 2019). According to the World Resources Institute (2021) between 0.6 and 1.4% of total climate finance flows were allocated to NbS in 2018. But considering the inflation in climate finance numbers, we should also expect some inaccuracy in the percentages destined for NbS. An important question here is the extent to which these funds originate from the same pot of money as the funding for other goals of sustainable development or climate adaptation (for more information and an overview of funds see Cooper and Matthews (2020)). In other words, are NbS primarily channelled through these existing funds, or are there new sources of financing opening up?

Another question is related to the challenges of financing NbS. To explore this, we can look at common challenges that adaptation projects typically face in attracting private sector finance¹, which are also applicable to NbS projects. Namely, these include the small scale of many adaptation-related projects, especially when they are part of mainstreaming efforts, rather than being stand-alone initiatives; short-term mindsets that influence investor awareness; the lack of adaptation-related revenue streams; and the focus on wider societal benefits, which do not accrue as income to the investor (Clark et al. 2018; Pillay, K et al. 2017; Tolliver et al. 2019).

New financial mechanisms, such as green bonds, can enable NbS funding due to their benefits to mitigation and adaptation, as well as the other co-benefits they provide. However, due to the distribution of multiple benefits among many stakeholders, private sector actors may not be sufficiently incentivized to fund the implementation of adaptation solutions such as NbS, unless they themselves receive sufficient benefits or

¹ <https://www.sei.org/perspectives/what-is-holding-back-the-promise-of-nature-based-solutions-for-climate-change-adaptation/>

are guided to prioritize NbS through policies. As regulations and private sector initiatives, such as the Task Force on Climate-related Financial Disclosures (TCFD), push companies to account for their climate-related risks, the monetization of climate risk will increase. To avoid these financial risks, there may be a greater acceptance of adaptation solutions such as NbS, as well as the use of private sector funding solutions such as green bonds² (Tuhkanen 2020). However, this brings us back to the question of whether this type of financing will succeed in generating just and equitable NbS.

Another challenge when it comes to the uptake of NbS is the difficulty of assessing costs and evaluating effectiveness in comparison with grey structures. In fact, there are very few comparative studies contrasting NbS with alternatives (Chausson et al. 2020). Urban development is usually focused on individual assets with identified predictable cash flows. Benefits and services from nature are largely ignored – either because of a lack of knowledge of NbS’ ecosystem services or because of a lack of skills and accessible methodologies for assessing nature’s benefits and costs. The result is that negative impacts on ecosystem services are not internalized into cost benefit assessments. In addition, other economic opportunities related to the potential reduction of impacts on infrastructure from extreme weather events and slow onset events such as sea-level rise, get lost (Thiele et al. 2020).

One business model that has been used to fund NbS is payment for ecosystem services (PES). Work by SEI in Lake Naivasha, Kenya, found that a system set up between downstream private sector actors, Water Resources Users’ Associations (WRUAs) and upstream farmers has incentivized farmers to implement soil conservation measures and deliver good quality water to downstream users who are willing to “pay for this ecosystem service”. However, there are still some major constraints that limit the opportunities for enhancing this PES scheme further by reaching out to all farmers in the upstream hotspot areas. These include the underfunding of the WRUAs, which act as intermediaries in the PES scheme and provide assistance to farmers, and the fact that the WRUAs also have limited capacity in terms of negotiations and the provision of technical services. Additionally, degraded public lands that are not under the PES scheme still impact water quality.

Scale

The example of the upstream-downstream challenges facing WRUAs in Kenya brings us to the third theme: scale. A debate is emerging about extending, linking or merging successful NbS case studies – often described as “scaling-up” (Fastenrath et al. 2020; Ramiller and Schmidt 2018). Despite increasing interest in mainstreaming NbS (Nesshöver et al. 2017; Wamsler et al. 2017), little is known about the mechanisms and conditions necessary for scaling them up in practice. There is also a lack of knowledge as to how upscaling is understood and the optimal scales for application of NbS – both in terms of providing space for nature and, particularly, for ecological processes that confer resilience and promote biodiversity persistence, as well as in terms of the services provided for people and their equitable distribution (Grantham et al. 2020; Nahuelhual et al. 2018).

Misinterpretation of scale can produce suboptimal outcomes for the resilience and sustainability of human-environmental systems (Fastenrath et al. 2020). Particularly challenging are the social scale limits such as adjusting to and/or the introduction of newly-established institutional arrangements to drive and coordinate socio-ecological change (Ramiller and Schmidt 2018). The two main components of scale which are

2 <https://www.sei.org/publications/green-bonds-a-mechanism-for-bridging-the-adaptation-gap/>

mostly emphasized among physical scientists are time and space. Time describes rates, durations and frequencies – which could be daily, seasonal or annual – whereas spatial dimensions describe areas – which could be patches, landscapes, regions or the global scale. The spatio-temporal aspects of NbS are complex, dynamic and difficult to assess in the short-run as it takes years, or even decades, to realize the effectiveness of NbS interventions (Powell et al. 2019)

Beyond space and time, there are a number of other scalar aspects to consider: jurisdictional aspects, which account for administrations at local, provincial, national or international scales; institutional aspects, which account for rules such as operational rules, laws, regulations and constitutions; management aspects, which account for plans such as tasks, projects and strategies; networks, which describe links such as family, kin, society and trans-society; and knowledge, to bridge generalizable understandings produced by formal science and the empirical or practice-based understandings embedded in local knowledge (Cash et al. 2006).

Scale has implications for both finance and equity. Challenges in measuring or predicting the effectiveness of NbS lead to high uncertainty when it comes to their cost-effectiveness compared to alternatives. This in turn can lead to poor financial models and flawed approaches to economic appraisals. The lack of economic models for assessing costs and benefits makes it difficult for cities to plan and budget for NbS, particularly in the context of highly sectoralized forms of governance where grey and engineered interventions are the default approach to tackling many climate adaptation and mitigation barriers (Finewood 2016; OECD 2020; Seddon et al. 2020).

Conclusions

This brief is intended to initiate a discussion about the costs and benefits, and the social and economic sustainability implications of NbS. In response to identified knowledge gaps in the existing literature, the series' overall aim is to critically explore these issues, as well as how to design just NbS that leave no one behind.

However, caution is needed to prevent us from creating yet another hegemonic discourse with little meaning and few mechanisms for implementation. Without clear definitions and principles, there is a risk that NbS will remain a buzzword amenable to different agendas, perhaps even being used to justify investments in projects that are not in the best interests of the communities in which they occur (e.g., by displacing people to make way for “green” infrastructure, or through the commodification of ecosystem services affecting access to green spaces).

Discussions around finance need to better contemplate equity and scalar challenges. Critical approaches to finance are needed to reflect upon the actors and mechanisms that can ensure a more effective implementation of NbS without compromising on social and economic goals.

If NbS are to become a focus for international development work, then we badly need “non-Western” voices and approaches to nature to be given more of a platform and role in shaping the science and practice of them. Awareness also needs to be raised about the fact that the framing of “solutions” and “services” may be downplaying nature’s contributions, values and processes, which are not measured in the same terms by different societies and communities across the “global South” and “global North”.

Keep an eye out for our upcoming briefs where we will put on the spotlight the equity, financial, and scalar dimensions of NbS!

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This series of four briefs critically analyzes nature-based solutions (NbS) by responding to identified gaps in the existing knowledge on NbS, and a lack of critical reflection on their social and economic sustainability. The briefs are intended to spark discussion about the benefits and risks of NbS, as well as how they can be created and implemented without leaving anyone behind.



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