Network Nature

Resource List: Criteria and Requirements for High-Quality Nature-based Solutions

Input to the Network Nature Semester on NBS and Standards

Dora Almassy, PhD

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This review includes a list of selected resources that discuss the criteria and the requirements of high-quality nature-based solutions (NBS). The list consists of resources that offer a comprehensive approach to NBS quality considerations and documents that focus on specific aspects of NBS quality or a particular type of NBS (e.g., green roofs).

Publisher/Author	Title	Year of publication	Focus, Scope or Stakeholder group	Main points
IUCN[1]	NBS principles	2016	General Global	1. NbS embrace nature conservation norms (and principles). 2. NbS can be implemented alone or in an integrated manner with other solutions to societal challenges (e.g., technological and engineering solutions). 3. NbS are determined by site-specific natural and cultural contexts that include traditional, local, and scientific knowledge. 4. NbS produce societal benefits in a fair and equitable way in a manner that promotes transparency and broad participation. 5. NbS maintain biological and cultural diversity and the ability of ecosystems to evolve over time. 6. NbS are applied at a landscape scale.

[1] Also presented in Emmanuelle Cohen-Shacham et al. (2019). Core principles for successfully implementing and upscaling Nature-based Solutions, Environmental Science & Policy, Volume 98, p20-29

				7. NbS recognise and address the trade-offs between the production of a few immediate economic benefits for development and future options for the production of the full range of ecosystem services. 8. NbS are an integral part of the overall design of policies, and measures or actions, to address a specific challenge. (p.2)
IUCN	NBS global standards	2020 (draft)	General Global	1. Address societal challenges 2. Design at scale 3. Biodiversity net-gain 4. Economic feasibility 5. Inclusive governance 6. Balance trade-offs 7. Adaptive management 8. Mainstreaming and feasibility
Network Nature	Concept note on NBS quality	2022	General Global	1. The actual NbS is a good fit based on the local context within the right framework conditions and ascertaining relevant criteria for good practice in which NbS are deployed. 2. NBS should be cost-effective, provide long-term social, environmental, and economic benefits and help build local resilience while being biodiverse. 3. NbS should be constructed, developed, and integrated in the surrounding landscape to help protect, restore and sustainably manage natural and modified ecosystems in the process.

				4. NbS should be multifunctional, if designed and implemented well, to produce several environmental, social, and economic benefits at the same time[2] 5. NbS should be considered in conjunction with decarbonisation actions. 6. NBS should also not be regarded as a means of greenwashing by corporations to keep doing business-as-usual while pledging for NbS to 'offset' carbon emissions. 7. NbS should not lead to green gentrification, muting the voices of local and indigenous communities, or, in the environmental domain, be based on monoculture crops or vegetation.
Barbara Sowińska-Świerkosz, JoanGarcía[3]	What are Nature-based solutions (NBS)? Setting core ideas for concept clarification	2022	A systematic review of NBS definitions	Common characteristics in NBS definitions and exclusion criteria for each characteristic: 1. Actions inspired and powered by nature 1.1. Lack of functioning ecosystems 1.2. Random actions 2. Actions tackling challenges 2.1. Post-implementation goal(s) 2.2. Negative/no impact on biodiversity 3. Actions providing multiple benefits 3.1. Same benefits as grey infrastructure alone 3.2. Unfair distribution of benefits

2 Based on Dushkova, Diana, and Dagmar Haase. 2020. "Not Simply Green: Nature-Based Solutions as a Concept and Practical Approach for Sustainability Studies and Planning Agendas in Cities" Land 9, no. 1: 19.

3 Barbara Sowińska-Świerkosz, Joan García (2022) What are Nature-based solutions (NBS)? Setting core ideas for concept clarification, Nature-Based Solutions, Volume 2.

				4. Actions with a certain level of effectiveness and efficiency 4.1. Copy-paste implementation approach 4.2. Top-down model of governance 4.3. Static management approach 4.4. Financial expenses disproportionate to benefits 4.5.'Point scale' approach
BarbaraSowińska-Świerkosz, JoanGarcía[4]	A new evaluation framework for nature based solutions (NB projects based on th application of performance questions and indicators approach	2021	A systematic review of NBS effectiveness' concepts	Main concepts related to the issue of NBS effectiveness: 1. Stakeholders' participation 2. Policy and management capability (flexible and transparent models of governance) 3. Economic efficiency 4. Ensures synergies and no significant trade-offs 5. Adaptation to local conditions 6. Performance in the long term 7. Adequate spatial scale (relevant size)
Christian Albert, Joachim H. Spangenberg and Barbara Schröter [5]	Nature-based solutions: criteria	2017	General	1. Provide simultaneous benefits for society, the economy, and nature 2. Represent a transdisciplinary umbrella that encompasses experience from existing concepts 3. Introduced gradually to allow careful assessment of its application and further refinement
World Bank	A Catalogue of Nature-based Solutions for Urban Resilience	2021	Urban Global	1. Assess the functions, benefits, costs, and suitability considerations of NBS 2. Apply an integrated systems approach to NBS for resilience in urban landscapes

[4] Barbara Sowińska-Świerkosz, Joan García (2021) A new evaluation framework for nature-based solutions (NBS) projects based on the application of performance questions and indicators approach, Science of The Total Environment, Volume 787.
[5] Albert, C., Spangenberg, J. & Schröter, B. (2017) Nature-based solutions: criteria. Nature 543, 315

				3. Consider the principles of ecosystem conservation by adopting a hierarchy of ecosystem-based approaches 4. Consider the integration of NBS across a range of spatial scales 5. Adopt a multistakeholder and interdisciplinary approach
Nature-based Solutions Initiatives (NbSI) and signatories Research article: Nathalie Seddon et al.[6]	Nature-based Solutions to Climate Change Getting the message right on nature-based solutions to climate change	2020	NBS addressing climate change	1. NbS are not a substitute for the rapid phase-out of fossil fuels and must not delay urgent action to decarbonize our economies. 2. NbS involve the protection, restoration, and/or management of a wide range of natural and semi-natural ecosystems on land and in the sea; the sustainable management of aquatic systems and working lands; or the creation of novel ecosystems in and around cities or across the wider landscape. 3. NbS are designed, implemented, managed, and monitored by or in partnership with Indigenous peoples and local communities through a process that fully respects and champions local rights and knowledge and generates local benefits. 4. NbS support or enhance biodiversity, that is, the diversity of life from the level of the gene to the level of the ecosystem.

[6] Seddon N, Smith A, Smith P, Key I, Chausson A, Girardin C, House J, Srivastava S, Turner B. Getting the message right on nature-based solutions to climate change. Glob Chang Biol. 2021 Apr;27(8):1518-1546.

Danish Institute for International Studies (DIIS)	Right-based approaches to NBS	2022	Right-based approaches to NBS Recommendations for the Danish Development Cooperation	NBS projects should recognize the (1) Rights to access, own and benefit from land, water and other natural resources (substantive rights) and (2) Rights to take part in governing natural resources and access justice for redress (procedural rights). For this, NBS initiatives should: 1. Promote a rights-based approach to nature-based solutions 2. Support community leadership and representation in NBS governance. 3. Facilitate initiatives that secure community rights to benefit from NBS. (p.1)
Carsten Nesshöver et al.[7]	The science, policy and practice of nature-based solutions: An interdisciplinary perspective	2017	NBS implementation	Key elements for the operationalization of NBS: 1. Deals with uncertainties of complex socio-ecological systems via, e.g., adaptive management 2. Involve multiple stakeholders 3. Use multi- and transdisciplinary knowledge 4. Understanding of multifunctional solutions, trade-offs, and natural adaptation 5. Evaluate and monitor for mutual learning (p.1221)

[7] Carsten Nesshöver, Timo Assmuth, Katherine N. Irvine, Graciela M. Rusch, Kerry A. Waylen, Ben Delbaere, Dagmar Haase, Lawrence Jones-Walters, Hans Keune, Eszter Kovacs, Kinga Krauze, Mart Külvik, Freddy Rey, Jiska van Dijk, Odd Inge Vistad, Mark E. Wilkinson, Heidi Wittmer (2017) The science, policy and practice of nature-based solutions: An interdisciplinary perspective, Science of The Total Environment, Volume 579, p. 1215-1227.

NbSI	On the misuse of nature-based carbon offsets	2021	Global with a special focus on the global South	1. NBS should not be misused for greenwashing as carbon 'offsets' while continuing business as usual in fossil fuel use. 2. Well-designed NbS should be combined with dramatic cuts in greenhouse gas emissions. 3. Good quality NBS should not have negative impacts on emissions and on biodiversity. 4. Good quality NBS should be implemented by taking into consideration the legal or customary land use rights of local people. 5. NBS should be implemented with local people and deliver social benefits to ensure that carbon stores are maintained in the long term.
CarbonBrief	Can nature-based solutions help address climate change?	2021	NBS addressing climate change	1. NBS should not be equated with tree plantations, industrial agriculture, land grabs, carbon offsets, biodiversity offsets. 2. NBS should avoid the deliberate and non-deliberate misuse of NBS as carbon offsetting (use as a greenwashing tool)
Friends of Ecosystem-based Adaptation (FEBA)	Making Ecosystem-based Adaptation Effective	2017	Ecosystem-based Adaptation (EbA) approaches	1. EbA helps people adapt to climate change: Criterion 1. Reduces social and environmental vulnerabilities Criterion 2. Generates societal benefits in the context of climate change adaptation 2. EbA makes active use of biodiversity and ecosystem services Criterion 3. Restores, maintains, or improves ecosystem health 3. EbA is part of an overall adaptation strategy

				Criterion 4. Supported by policies at multiple levels Criterion 5. Supports equitable governance and enhances capacities (p.5-6)
World Bank	Implementing nature-based flood protection	2017	NBS addressing flooding problems	1. System-scale perspective: including spatial- and time-scale and considerations regarding the local socio-economic and institutional context 2. Risk and benefit assessment of a full range of solutions, covering risk reduction benefits as well as social and environmental effects 3. Standardized performance evaluation (tested, designed, and evaluated using quantitative criteria) 4. Integration with ecosystem conservation and restoration. 5. Adaptive management based on long-term monitoring to ensure sustainable performance
WWF	Guidance on high-quality NBS	2021	NBS addressing climate change	1. Simultaneously prioritize improvements to livelihoods and human well-being, the protection and enhancement of nature, and the generation of carbon reductions or removals. 2. Implemented at a significant scale or clearly support an integrated landscape or jurisdictional strategy or program. 3. Funders should not make carbon credits a priority when looking to maximize interventions' impacts. 4. Funders should seek out best-in-class interventions that ensure quality, transparency, and equitable benefit sharing. (p.8)

IIED/BOND [8]	Nature-based Solutions in Action: Lessons from the Frontline	2021	NBS addressing poverty, climate change, and biodiversity loss Based on on-the-ground experiences	Key success factors of NBS to address the triple emergency of poverty, climate change, and biodiversity loss 1. Integrated approaches that protect, restore, and sustainably work with nature 2. Landscape-wide approaches that build on long-term multistakeholder partnerships 3. Long-term engagements and planning that combine science with local and traditional knowledge 4. Participatory approaches ensuring strong community ownership 5. Combining short-term and long-term benefits that are secured through sustainable finance strategies. 6. Developing enabling policies that can drive systemic changes on a large scale 7. Action on gender equality (p.57)
ThinkNature[9]	NBS Handbook	2019	Technical innovations for NBS	Requirements for high-quality technical NBS innovations: 1) Use recycled materials 2) Use renewable energy and target energy savings 3) Minimise irrigation or re-used water 4) Avoid plastics and other materials with a potential heavy environmental footprint 5) Target simple systems 6) Do not use invasive species - favour local native ones

8 Hou-Jones, X, Roe, D and Holland, E (2021) Nature-based Solutions in Action: Lessons from the Frontline. London. Bond.

9 Somarakis, G., Stagakis, S., & Chrysoulakis, N. (Eds.). (2019). ThinkNature Nature-Based Solutions Handbook. ThinkNature project funded by the EU Horizon 2020 research and innovation programme under grant agreement No. 730338.

				7) Use local materials 8) Combine NBS with solar panels 9) Make sure irrigation is available at installation 10) Install fire breaks where needed 11) Install safety railings and fall prevention devices for installation and maintenance (p103)
Hai-Ying Liu, Marion Jay, and Xianwen Chen [10]	The Role of Nature-Based Solutions for Improving Environmental Quality, Health, and Well-Being	2021	Design of NBS delivering environmental quality and health/well-being improvements	Sustainable Design of Nature-Based Solutions: 1. Considers the scope and nature of the problems that need to be solved 2. Considers nature boundaries 3. Ensures the participation of multiple stakeholders 4. Integration with multidisciplinary and interdisciplinary fields 5. Strategic design and stability of the NBS policy (p.19)
Renato Monteiro, José C. Ferreira	Green Infrastructure Planning Principles: An Integrated Literature Review	2020	Green Infrastructure Planning Urban	1. Connectivity 2. Multifunctionality 3. Multiscale (planning should consider all different scales) 4. Integration (with other urban structures, i.e., grey infrastructures) 5. Diversity (of solutions to address a specific issue) 6. Applicability 7. Governance (collaboration with citizens in the planning process)

10 Liu, Hai-Ying, Marion Jay, and Xianwen Chen. 2021. "The Role of Nature-Based Solutions for Improving Environmental Quality, Health and Well-Being" Sustainability 13, no. 19: 10950.

and Paula Antunes [11]				8. Continuity (post-implementation monitoring and empirical measurement of outcomes) (p.8-9)
Joint Nature Conservation Committee (JNNC), UK	Nature-based Solutions Triple Win Toolkit	2021	NBS addressing climate change, biodiversity, and poverty Focus on ODA recipient countries	Underlying principles of NbS ODA projects that successfully (i.e., effectively and efficiently) and simultaneously contribute to biodiversity, climate, and poverty-alleviation policies: 1. Engage local communities in a participatory approach 2. Account for site-specific and complex dynamic contexts 3. Put in place social and environmental safeguards 4. Design with longevity and futureproofing in mind 5. Build robust, long-term monitoring systems 6. Provide sustainable, equitable financial incentives 7. Consider trade-offs and synergies across multiple scales (p.11)

[11] Monteiro R, Ferreira JC, Antunes P. (2020) Green Infrastructure Planning Principles: An Integrated Literature Review. *Land*. 2020; 9(12):525.

GYBN, YOUNGO, and Y4N	**Global Youth Position Statement on Nature-based Solutions**	n.d.	Youth position on NBS	1. NbS must not delay the urgently needed decarbonization of the economy. 2. NbS must provide benefits for both biodiversity and climate. 3. Biodiversity conservation and ecosystem integrity must be centralized within NbS policy, research, and practice. 4. NbS must prioritize local biodiversity conservation, ecosystem integrity, and ecosystem functions and be grounded in justice, equity, and inclusion. 5. NbS policy development requires a legally agreed framework recognized and upheld by both the CBD and the UNFCCC. 6. NbS implementation must follow strict binding social and environmental safeguards. 7. Avoid co-option and false solutions (p.2)
BCSD Malaysia	Investing in high-quality nature-based solutions	2021	Use of NBS by businesses	Minimum criteria for NBS: 1. Deliver both climate and biodiversity solutions 2. Net-positive for nature and biodiversity 3. Support people and local communities.
Marlène Elias et al.[12]	Enhancing synergies between gender equality and biodiversity, climate, and land	2021	Gender-responsive NBS	To ensure synergies between forest management/REDD+/EbA initiatives and gender issues: 1. Initiatives must address social barriers, recognize rights, equitably distribute benefits, and enhance capacities.

[12] Elias M; Ihalainen M; Monterroso I; Gallant B; Paez Valencia AM. 2021. Enhancing synergies between gender equality and biodiversity, climate, and land degradation neutrality goals: Lessons from gender-responsive nature-based approaches. Bioversity International. Rome, Italy.

	degradation neutrality goals			2. Integrate women's knowledge and priorities in initiatives to strengthen resilience and create more effective and sustainable land-use systems.
Paolo Rosasco, Katia Perini [13]	Selection of (Green) Roof Systems: A Sustainability-Based Multi-Criteria Analysis	2019	Design criteria for green roofs	Sustainability-based multicriteria analysis of green roofs 1. Thermal insulation properties 2. Roof protection 3. Weight of system 4. Health effects 5. Air quality 6. Maintenance costs 7. Recycle materials 8. Runoff 9. Acoustic noise reduction 10. Installation costs 11. Embody energy and carbon emission 12. Sustainability location 13. Tax incentives 14. Urban aesthetic 15. Real estate benefit 16. Building aesthetic 17. Energy savings (p.10)

[13] Rosasco, Paolo & Perini, Katia. (2019). Selection of (Green) Roof Systems: A Sustainability-Based Multi-Criteria Analysis. Buildings. 9. 134. 10.3390/buildings9050134.

Christian Albert et al.[14]	Planning nature-based solutions: Principles, steps, and insights	2020	Adaptive planning of NBS	Guiding principles of successful NBS implementation planning: 1. Place-specificity 2. Evidence base 3. Integration 4. Equity 5. Trans-disciplinarity (p3.)
UK Green Building Council	Principles for delivering urban Nature-based Solutions	2021	Principles of NBS planning	Principles for organizations and individuals planning NBS: 1. Define ambitions and goals 2. Assess risks, baselines, and impacts 3. Maximise multifunctionality 4. Identify value, costs, benefits, and funding 5. Create long-term management plans 6. Collaborate, educate and innovate (p.9)
The Nature Conservancy	Strategies for Operationalizing Nature-Based Solutions in the Private Sector	n.d.	Use of NBS by businesses	Primary Business Drivers for Adopting Nature-Based Solutions: 1. Lowering project costs 2. Managing regulatory requirements and risk 3. Mitigating natural disaster risk 4. Engaging community stakeholders 5. Increasing marketing/branding 6. Achieving sustainability goals 7. Promoting employee well-being (p.11)

[14] Albert, Christian & Brillinger, Mario & Guerrero, Paulina & Gottwald, Sarah & Henze, Jennifer & Schmidt, Stefan & Ott, Edward & Schröter, Barbara. (2020). Planning nature-based solutions: Principles, steps, and insights. AMBIO A Journal of the Human Environment. 50 (8)

Victoria Schneider,	Are nature-based solutions the silver bullet for social & environmental crises?	2021	NBS addressing climate change	Risks of NBS use: 1. Greenwashing 2. Overlooking indigenous groups (land rights and displacement) 3. Replacing decarbonization commitments.
Society for Ecological Restoration	International Principles and Standards for the Practice of Ecological Restoration, Second Edition	n.d.	Ecological restoration	Principles of ecological restoration: 1. Engages stakeholders 2. Draws on many types of knowledge 3. Informed by native ecosystems while considering environmental change 4. Supports ecosystem recovery processes 5. Assessed against clear goals and objectives, using measurable indicators 6. Seeks the highest level of ecosystem recovery possible 7. Gains cumulative value when applied at large scales 8. Part of a continuum of restorative activities. (p.6-9)
IUCN	Science-based ecosystem restoration for the 2020s and beyond	2021	Ecological restoration principles	Principles of ecological restoration: • Managing trade-offs equitably (e.g., with robust spatial planning) • Adaptive management and monitoring to secure effective and long-term restoration actions

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