

NATURE-BASED SOLUTIONS TO SUPPORT EQUITABLE CLIMATE RESILIENCE

Final Synthesis Report



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INTRODUCTION

The [Adaptation Research Alliance](#) (ARA) supported a co-creation process that aimed to bring local experiences and knowledge to bear on the design of a potential research programme on Nature-based Solutions (NbS) for equitable climate resilience in Sub-Saharan Africa (SSA). The project team consisted of United Kingdom Research and Innovation (UKRI), [Natural Environment Research Council](#) (NERC), [Foreign, Commonwealth and Development Office](#) (FCDO), [Adaptation Research Alliance](#) (ARA), the [Water Engineering and Development Centre](#) (WEDC) at Loughborough University and the [Climate System Analysis Group](#) (CSAG), hereafter referred to as 'the team'.

The co-creation process included a desktop literature review, led by WEDC and two phases of consultations led by CSAG: i) Multi-actor workshops (MAW) with people involved in NbS across the region; and ii) community consultations to check the local-level relevance of the themes that emerged and to allow for new ideas/issues to emerge. Knowledge synthesis phases occurred between each set of consultations, which were led by WEDC with input from CSAG and other team members, hereafter referred to as 'the team'

Following the desk-based review (see process outlined in Figure 1), and the multi-actor workshop synthesis, this synthesis outlines the process of research focus, incorporating the outputs from community workshops (see separate synthesis report) with the earlier knowledge generation outputs to identify final research themes and example research questions for the potential programme.

This final synthesis report is the result of outcomes from a desk-based review and engagements with a range of stakeholders through multi-actor workshops and community consultations.

METHOD AND PROCESS

To narrow down and define the final themes we started with the nine preliminary themes, identified in the previous desk-based review process (see Figure 1), and examined their relative importance from stages 1 and 2 (desk-based review and multi-actor workshops) as an initial basis for selecting 3-4 final emergent themes.

Our reflections based on the data were:

- There were very few of the nine themes that could be easily eliminated as 'less relevant' based on the quantitative data due to variability between desk-based review and MAW findings. In addition, some scored low quantitatively across both stages (e.g. cost-benefit analysis) but seemed to be inherent to many comments from the MAW even if not coded as such.
- Quantitative analysis of theme co-occurrence highlighted several co-themes:
 - i) Knowledge transfer + policy, governance and funding (*Bottom-up community-driven governance*)
 - ii) Knowledge transfer + cost-benefit analysis (*Open, holistic valuation*)
 - iii) Cost-benefit analysis + policy, governance and funding (*Evidence of benefits needed for policy/governance/funding*)
 - iv) Knowledge transfer + monitoring (*Open, accessible evidence*)
 - v) Scale/setting + monitoring (*Monitoring NbS at scale/in context*)
- Equity is fundamental to all themes and the potential programme but did not feature in the original list as it did not seem appropriate to define it as a distinct theme. Instead, equity was highlighted as a thread that should cross-cut all themes and be integral in the research process from start to finish (see below).
- It did not seem appropriate for the scope of the final themes to be entirely defined by an initial delineation of themes decided early in the process of the desk-based review (before any of the MAW or community engagements).

Therefore, in addition to the co-occurrent themes (above) we analysed the content of Table 1 from the MAW, the descriptive analysis, community workshop synthesis, and the team workshop reflections, as a set of comments separate from the nine preliminary themes and identified themes that emerged across categories.

Within the descriptive analyses and team reflections the following challenges emerged:

- Equity
- IPLC/knowledge transfer including communicating benefits/trade-offs and in decision-making/governance
- Multi-benefit/multi-value CBA (inc. trade-offs and competing priorities)
- Monitoring (beyond biophysical to social, ecological, economic)
- Issues of spatial scale, scaling-up
- Specific contexts (urban, informal, complex risks)

Combining these with the co-occurrent themes, we identified four final emergent themes:

1. Producing an open evidence base of NbS impacts

2. Scalability (or spatial scale) and contextualisation of NbS
3. Whole-system valuation and optimisation of NbS
4. Empowering community-driven governance.

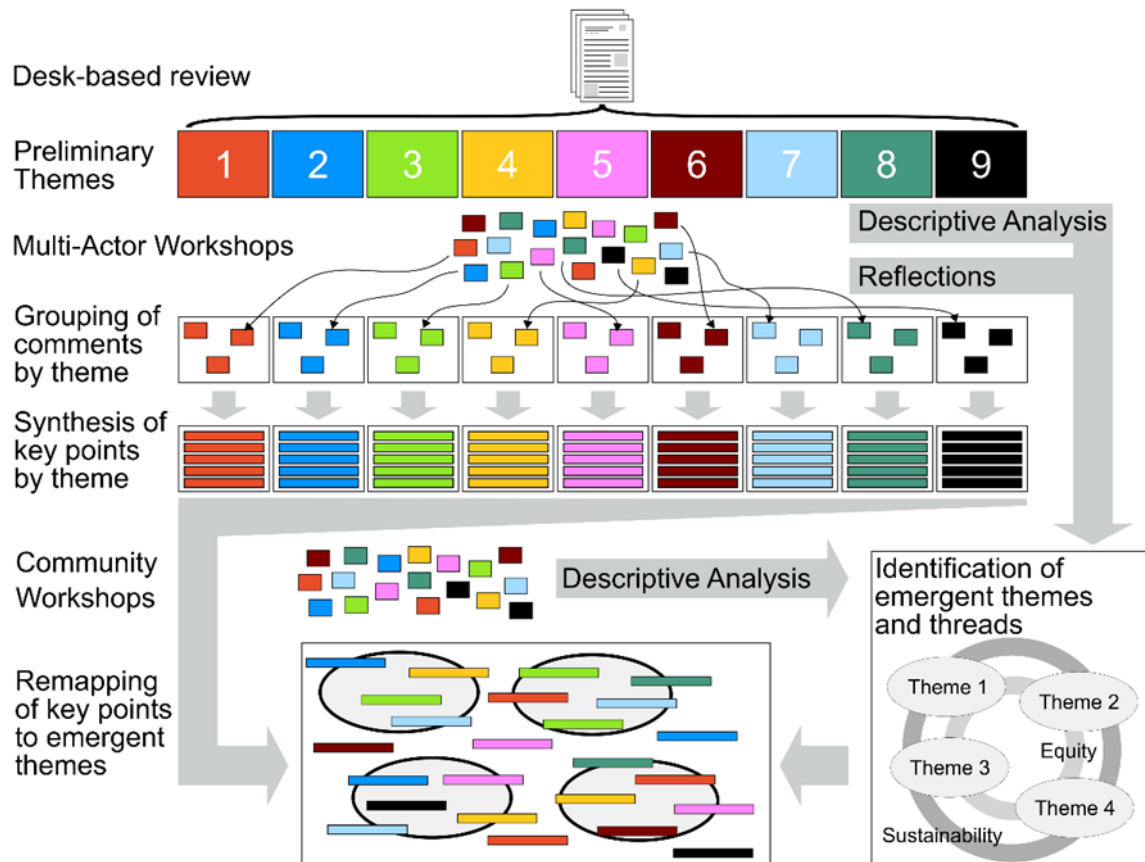


Figure 1: Overview of theme identification and development process across all stages of the scoping.

We also identified two threads that are relevant to all four themes (Figure 2):

Equity: This is central to the potential call and therefore should be relevant to any themes. Considering the MAW outputs, we found examples of issues relating to equity across each of the themes. Major considerations are IPLC, GESI and Knowledge Transfer (KT) which was considered here. Two aspects of equity were covered within the scoping outputs:

- i) Equity in how the research and implementation is carried out. For example, making sure that research is co-led by local researchers (whereas NbS research in SSA has often been done by non-African researchers), removing barriers due to terminology, and including local knowledge.
- ii) Equity in terms of the outcomes of NbS interventions. For example, ensuring that NbS benefits prioritise vulnerable & marginalised groups and that a range of values (and trade-offs) are considered.

We have included equity as a single term, as both aspects came out strongly through the scoping process and should be considered.

Temporal sustainability: The focus of the scoping project on climate means that temporal impacts due to climate change are an important factor. However, other temporal factors such as securing long-term finance, evolution of policy drivers, maintenance and long-term partnerships also emerged from the scoping process. Finally, the desire for an action-oriented research programme relies upon long-term sustainability and impact of the research beyond the short-term grant programme duration. Therefore, this was chosen as a thread to apply to each of the themes.

The themes, threads and example questions and challenges that emerged for each from the scoping process are shown in Table 1.

Table 1: The four final themes with related comments, research challenges and reflections from the literature review, MAW outputs, community workshops, and WEDC/CSAG reflections. Specific challenges relating to the cross-cutting threads of Equity and Temporal Sustainability are listed. Some of the key points made may apply to multiple themes and so there may be some duplication.

Theme	1. Producing an open evidence base of NbS impacts	2. Scalability (or spatial scale) and contextualisation of NbS	3. Whole-system valuation and optimisation of NbS	4. Empowering community-driven governance
Example research questions and challenges	<ul style="list-style-type: none"> • Incorporation of existing formal and informal knowledge • Comparative analysis of effectiveness between locations and contexts • New methods for data collection (e.g. Earth Obs., low-cost monitoring) • Measuring impacts of NbS at the landscape scale • Holistic multi-benefits/threat monitoring (quantitative & qualitative) • Development of new methods for modelling complex processes • Baseline monitoring is a major challenge • Highlighting failures of NbS (open dialogue) • Cross-research field learning and evidence transfer (e.g., biologists to engineers) 	<ul style="list-style-type: none"> • What are the compound benefits of NbS mosaics? • How do NbS interact with grey/natural elements at landscape scale? • Integration of NbS into local policy context at appropriate scale • How do NbS interact with systems/environments they are in? • Variability in impacts between context (Socio-ecological/economic) • Can NbS benefits be scaled up? • How does NbS efficacy vary between contexts? How and where do they work? • Context-driven implementation • Measuring impacts of NbS at scale (Some are not scalable) • Context specific gaps (Urban, Industrial parks, etc) 	<ul style="list-style-type: none"> • Biophysical, social, ecological and economic (transdisciplinary) valuation (e.g. NC approaches) • Multi-hazard consideration • Transdisciplinary knowledge production and integration • Context-driven implementation • How can they be optimised to bring maximum co-benefits? • How is optimisation constrained by socio-economic conditions? • Optimising sustainable maintenance schedules to maintain value • Producing realistic implementation costs (and recognising cost of no action) • Need for sensitisation to climate adaptation concepts (i.e. increasing community value of NbS) 	<ul style="list-style-type: none"> • How to enshrine bottom-up, community-driven NbS in policy and law? • How to mobilise resources for scaling up NbS? • How to ensure measurable community capacity post project delivery? • Mapping political/economic risks throughout the decision-making process. • How to develop strategies for improving the rationale for adaption to NbS for stakeholders • How do we de-silo decision making and have KT between organisational levels? • Integrating existing policies into NbS work
Equity	<ul style="list-style-type: none"> • Openly available for all to access • Appropriate format, style, language for all users, including diverse formats such as creative arts • Including local knowledge and experience from other projects • Evidence of social/economic impacts • Getting IPLC terminology and knowledge into peer-reviewed literature. • Community science and wider benefit monitoring. 	<ul style="list-style-type: none"> • Awareness of local trade-offs and applying appropriate compensation. • Context-specific needs of people must be considered 	<ul style="list-style-type: none"> • Consider value (benefits, costs, trade-offs) to all stakeholders • Prioritisation of beneficiaries in optimisation approach • Recognition and valuation of community knowledge in the process. • Optimising benefits using IPLC and linking them throughout the valuation system. • Prioritisation of the needs of vulnerable & marginalised 	<ul style="list-style-type: none"> • From research to practice (action-research) • Need for examples of good equitable case studies • Equitable decision-making and research design • Transparent governance and decision-making • Communication in appropriate format, style and language for all users
Temporal sustainability: (CC, funding, sustainability, maintenance, evolution of impacts)	<ul style="list-style-type: none"> • Prediction of climate change impacts • Prediction of evolution of natural systems and derived impacts • Long-term NbS impacts under a range of climate change scenarios. 	<ul style="list-style-type: none"> • Potential of larger-scale mosaics to cope with CC extremes • NbS in rapidly developing (e.g. urban) contexts. 	<ul style="list-style-type: none"> • Change in impacts through time (timescales of benefits/trade-offs) • Changes to priorities and policies through time • Achieving long-term funding • Optimal funding strategies for designs 	<ul style="list-style-type: none"> • Knowledge transfer to decision-makers and IPLC is essential for long-term sustainability • Long term partnerships • Sustainable maintenance schedules (Emergency maintenance, routine, and full overhaul, have a maintenance schedule)

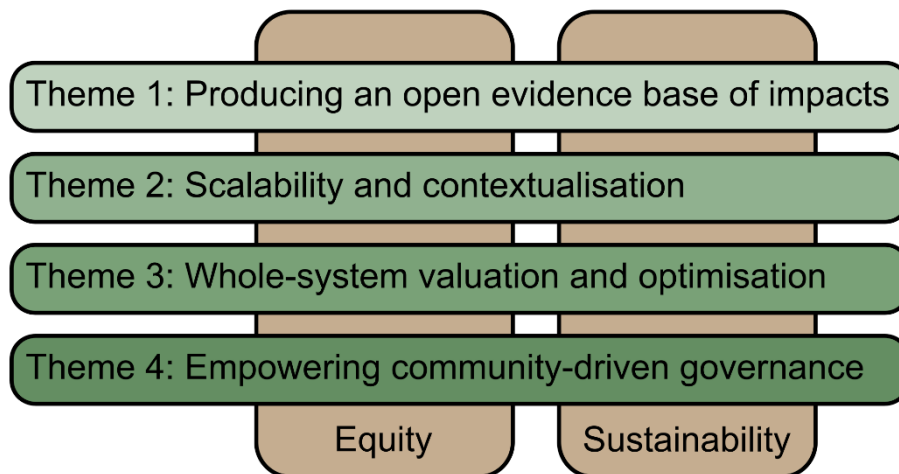


Figure 2: Schematic of the final four themes and two cross-cutting threads

Remapping of themes to scoping outputs

In order to validate that the final emergent themes do cover the important challenges raised through the scoping process, the outputs from the MAW and community workshops were mapped to the final themes (see colour coded tables in Appendices).

Key points or topics not recognised explicitly within the themes:

Through remapping, we noted that some areas overlapped and there were some key points from the scoping data that were not explicitly included:

- **Native vs Invasive species, control and opportunity:** This area is not explicitly mentioned in Table 1 as it does not necessarily fit into one of the four themes. However, the impacts/function of local fauna and flora and invasive species was identified as an important and under-researched area. This came from discussions particularly within South African contexts where invasive trees are removed as part of land restoration projects. This area could be researched as a very regional focus on flora and fauna under Theme 2 (Contextualisation of NbS).
- **Urban complexities:** This is also a specific research area that comes under the context theme (Theme 2) but is mentioned as a key point as many researchers spoke of NbS in an urban/peri-urban context. While this could provide an opportunity to investigate very specific urban NbS issues, including it as a distinct theme would substantially narrow the scope and exclude broader themes that emerged. This area could be used as a more specific research question, for example, how does the efficacy of NbS change in a rapid-urbanisation context?
- **Informality and NbS:** This was another emergent challenge, alongside other complex risks such as conflict. This is not explicitly included as a theme but could fall within the contextualisation of NbS (Theme 2).
- **Knowledge Transfer and IPLC:** Despite emerging as key aspects in the multi-actor and community workshops, IPLC and Knowledge transfer do not explicitly feature in the four themes as they apply to multiple aspects. However, IPLC are strongly considered in Theme 4 and they do feature within the research questions/areas in Table 1 across all four themes. Therefore, they could be considered as a third thread alongside equity and sustainability. However, it was decided not to as: (i) there is substantial overlap with equity and (ii) it is less directly applicable to Theme 2.

The final scope for the call was decided by the funding partners based on these scoping outputs. Those interested in applying to the call should visit the [call web page](#) to read the final scope in detail.

APPENDIX 1: COLOUR CODED MAPPING OF THEMES TO MAW OUTCOMES

To check the coverage and analyse any substantial gaps in the final themes, the 9 original themes identified in the systematic review and used as a framework by the MAWs were mapped to the emergent themes. The colour coding is to the 4 themes; 1) **Bold**, 2) Underlined, 3) **Yellow**, 4) **Blue**. If something fits into multiple themes it is coded as such (e.g., Theme 3 and 4 would be **green** coded, theme 1 and 3 would be **Bold and Yellow**).

Gap/Theme	Theme 1, Theme 2, Theme 3 , Theme 4
Scale and setting of NbS and its impacts/efficacy	<p>Three key issues/questions/challenges emerged:</p> <ol style="list-style-type: none"> 1. <u>How do NbS interact with the systems/environments they are placed within? This includes a biophysical approach to basin planning using a geomorphic framework and consideration of ecosystems but also socio-ecological and socio-economic systems.</u> 2. The variation in NbS impacts/efficacy between contexts. <u>NbS implementation should be context-driven as different contexts will lead to completely different NbS processes and impacts. How can we use comparative analysis to understand different contexts and see where/how NbS solutions do work?</u> 3. <u>How to scale up NbS and at what scales can they deliver? Benefits do not always translate between scales. What capacities/resources need to be mobilised to scale up? Within this, compound benefits of NbS mosaics need to be included.</u>
Temporal change of NbS: evolution of efficacy and climate change adaptation	<p>The long-term impacts/efficacy of NbS need to be understood, particularly under different climate change scenarios, to provide a case for NbS as viable adaptation measures. Benefits and trade-offs need to be considered temporally to ensure ongoing benefit and performance measures/evidence developed to measure this across the project life cycle. Practically, long-term sustainability (e.g. maintenance, community capacity post-project, long term financing, long term partnerships, political/economic risks/drivers) need to be considered and managed.</p>
Monitoring NbS: low-cost, wide-spread indicators and solutions	<p>There is an evidence gap around monitoring and evaluation due to lack of accurate data, and an evidence base is needed, targeted at researchers, funders and communities. This monitoring should be holistic across multiple benefits and disciplines, including biophysical components and social systems and should therefore include quantitative and qualitative indicators. At present, with limited data, it is difficult to know whether interventions are having the desired outcomes and many benefits/outcomes are not captured. Baseline data are also important for designing locally-effective NbS that have maximum impact. Technology has an important role in improving NbS monitoring.</p>
Knowledge transfer challenges: Western and IPLC	<p>Generally, the emphasis was on mutual, democratic, collaborative learning, across and between groups and regions. Four main challenges were identified:</p> <ol style="list-style-type: none"> 1. Transfer of findings from research to decision-makers and IPLC. Need to develop effective methods for local governments and communities to understand the rationale for adaptation and the value of NbS for a range of stakeholders (towards equity in particular). This is essential both for implementation but also long-term sustainability. Specific challenges include access to evidence base (e.g. OA), clarity on benefits/beneficiaries and packaging/translating outputs for specific groups. 2. Learning from previous/existing projects, including learning from failure. We need good case studies of NbS that are socially and environmentally demonstrable and have been successful (long-term). 3. Bottom-up, community driven approaches and knowledge co-production. Often local knowledge/experience/learning is not recognised as NbS (or alternative terminology is used) and is therefore either not captured or does not make it into peer-reviewed or grey literature. It is also essential to understand the

	<p>needs/perceptions of IPLC alongside other objectives and how IPLC can support NbS implementation.</p> <p>4. Knowledge transfer and integration between research communities in NbS-related fields. Bringing together knowledge on ecosystem services/functions, socio-economic valuation, finance and social science as part of a transdisciplinary approach.</p>
<p>Design, maintenance, and implementation challenges</p>	<p>The major challenge identified within design and implementation was locally optimising NbS, using local knowledge and interlinking with other aspects of the system, to understand and provide maximum benefit and additional opportunities for nature and people beyond their primary purpose. However, it was also recognised that socioeconomic conditions may constrain the optimal utility of NbS.</p> <p>Although NbS are context specific, an evidence base of where/how NbS work and the benefits of different interventions, aimed at practitioners, would be beneficial.</p> <p>In terms of maintenance, a significant challenge is funding, managing and maintaining long term partnerships and programmes required to ensure long-term maintenance of NbS assets.</p>
<p>Cost-benefit analysis of NbS</p>	<p>Holistic cost-benefit analysis is required, such that it:</p> <ol style="list-style-type: none"> 1. Considers the needs of, and benefits to, a wide group of stakeholders, prioritising the needs of the vulnerable & marginalised. The benefit to all groups/communities within the scope of a policy should be considered. 2. Captures monetary and non-monetary (e.g. ecological, social) values. There is a need to develop mechanisms/methods for valuing NbS in different contexts/terms (e.g. natural capital accounting) according to different groups of people and their needs. This valuation needs to account for socio-economic conditions that may constrain the optimisation of NbS value as well as identifying benefits/opportunities for NbS beyond maintaining the status quo. It should also include realistic costs of implementation and costs of no action. 3. Adequately considers timescales of benefits, including trade-offs and changes to priorities and benefits over time. 4. Considers the compounded benefits of a mosaic of NbS interventions <p>This analysis will increase buy-in from communities, governments and the private sector.</p>
<p>Challenges of policy, governance, and funding for projects</p>	<p>Challenges were identified within each area of policy, governance and funding.</p> <p>Policy: How can NbS be integrated within new/existing policies and how do existing policy processes (at different scales) influence work on the ground? Frameworks and policies for enabling/harnessing NbS are lacking and new policies are required that operate at the scale at which benefits are realised and which provide approval mechanisms for new/alternative NbS techniques. Similarly, targeting the optimal entry level within policy and governance structures is important, balancing inclusion and power.</p> <p>Governance: First, there is a need for sensitisation and capacity building, so that governments and other key actors both see the value in NbS and recognise the actions/behaviours that are necessitating climate change adaptation. Second, appropriate institutional arrangements need to be in place balancing the required national resourcing/coordination with appropriate polycentric governance such that there is within-context ownership and management of NbS.</p> <p>Funding: The main issue raised is how to attract long-term funding to support NbS. Government partnerships are required for long-term funding, but these are also vulnerable to changes in the political economy. Currently there is reluctance in the private sector to support long-term projects, but the role of small/medium enterprises in funding NbS could be further explored. How can existing budgets also be leveraged funding for NbS?</p>
<p>Threats/Impacts on humans from NbS</p>	<p>This topic was only directly mentioned in terms of trade-offs by farmers and land users, particularly in cases with non-local benefits or where local benefits and trade-offs are not well understood.</p>

Feature specific lack of research (Mangroves, grassland, hybrid, etc...)	<p><u>Specific research gaps were identified in the following contexts:</u></p> <ul style="list-style-type: none"> - <u>Urban: heat, water and sanitation</u> - <u>Industrial Parks</u> - <u>Indigenous plants and their suitability</u>
Other:	<p>Several themes emerged that did not fit directly on to one of the themes from the desk-based review. These included:</p> <ul style="list-style-type: none"> - Equity: This was discussed across many themes as a common underlying challenge. Within the Miro board comments, specific issues raised were: How to promote equity through research process and design, how NbS shape and are shaped by different dimensions of equity, ensuring benefits are equitable, prioritising the vulnerable/marginalised. - Understanding NbS in relation to complex risks and unconventional practices/contexts like migration, conflict and informal areas

APPENDIX 2: COLOUR CODED MAPPING TO COMMUNITY WORKSHOPS

To check the coverage and analyse any substantial gaps in the final themes, the outputs from the community workshops were mapped to the emergent themes. The colour coding is to the 4 themes; 1) **Bold**, 2) Underlined, 3) **Yellow**, 4) **Blue**. If something fits into multiple themes it is coded as such (e.g., Theme 3 and 4 would be **green** coded, theme 1 and 3 would be **Bold and Yellow**).

Knowledge transfer: **there is a disjunct between international "best practices" and local level needs - there is a need to adapt NbS knowledge to the local African context (2). The need to involve local communities from the very beginning of NbS interventions is increasingly being acknowledged to be sure local knowledge is integrated (i.e. co-creation), however there is limited understanding on how to do this (2, 5). There is a need to increase awareness across different groups in Africa on the benefits of NbS, particularly the longer-term benefits/outcomes of this approach (1, 2, 5, 6). Local and traditional knowledge have not been well documented or employed when designing climate adaptation interventions in African contexts (1, 2, 5). Scientific NbS information and concepts need to be translated across various languages, disciplines and/or working practices so that benefits of technical knowledge and/or information on benefits can be shared (e.g. incorporating NbS thinking into engineering degrees, translating NbS concepts into terms that are practical at the local community level, using local platforms). Generally, access to scientific climate information needs to be improved (1, 2, 5, 6). There is also a need to facilitate better communication and coordination across groups of actors who have a role to play in NbS (e.g. government and local communities) (1).**

Equity: equity was discussed as a core aspect of NbS in all consultations. **Historically, there has been a strong link between livelihoods and NbS work in Africa, a theme that was mentioned in many consultations (2, 3, 4). Evidence suggests that in many cases, livelihoods benefits have ended when projects have ended (3). However, the engineers emphasised a shift in NbS discourse, from one that is centred on livelihoods to one that acknowledges the wider benefits from NbS beyond livelihoods (2). Participants acknowledged the need for co-design with local communities and that this is not generally being done effectively (2, 5). Black communities are forgotten when it comes to service provision and disaster risk response in Durban (1). Participants also mentioned the need to better understand the differential vulnerabilities across communities in relation to NbS interventions and their benefits (e.g. women, elderly etc.) (5). The question of who generally benefits from NbS programmes was raised in one of the consultations - a participant suggested that the academic community currently realises most substantial benefits (3). Longer term benefits from NbS interventions are not well understood (3). Trust building between different groups of people (including academics, engineers and local communities) is essential for such design processes but they are very context dependent and participants need to consider stakeholder fatigue (2).**

Urban complexities: in Africa, many people are first-time urban dwellers (having moved from rural/natural areas) and are therefore not familiar with urban systems e.g. some people living in informal settlements in Durban are not familiar with urban drainage systems and throw their waste water into rivers (1, 2). Urban ecosystems have been transformed e.g. local communities used to drink water from the rivers that run through Durban, which are now heavily polluted (1). **The issue of competition and trade-offs related to land use arose (1, 6) e.g. land that could be used for urban agriculture is being developed (6). Many people settle in places that increase their vulnerability (e.g. in flood areas) with plans to redirect water when faced with the potential for risk, but these strategies are not being implemented in time (1). People build formal and informal houses in wetlands in Durban - many people who own land near rivers sell this land to people who need housing because many people don't own land (1). Formal and informal houses also connect their sewage pipes to rivers because it is the easiest solution and they lack knowledge (1).**

Cost-benefit: **challenging to compare NbS solutions with engineering solutions (2). What are the limits of NbS? e.g. a wetland can only deal with so much sewage/pollution and in some cases, grey/built infrastructure is needed (2)**

Scale and setting: **In many instances, local communities need to deal with very localised issues e.g. crime - affecting infrastructure for NbS, load shedding, water shedding etc. in Cape Town (6). NbS policies that are applied to whole landscapes can lead to context-irrelevant solutions (5). NbS knowledge that has been developed in other contexts needs to be adapted for the African context, in which different interventions and/or designs are required across contexts (2, 5). There are some issues that are common across landscapes such as environmental degradation and challenges around waste management (5). Addressing**

issues at the smaller scale is more likely to result in direct benefits, while investigating complex landscape scale issues requires more funding (trade-offs) (2). There is a need to better understand how the localised interventions that are currently being implemented in Africa successfully scale (1). Relational tools required (e.g. to build trust) and optimal engagement processes will differ across landscapes and cultural contexts (2).

Policy, governance and funding: In some cases, there are policies that enable NbS-related interventions (e.g. Climate Change Act, 2016 in Kenya) but there is a need to develop community-centric policies (5). The availability of financial, human and technological capacity plays a role in implementation of NbS (5). Strategic actors should be better engaged and/or involved in designing NbS interventions to facilitate scaling and to impact more communities (5). Traditional political structures (e.g. traditional governance structures in South Africa) can be leveraged to engage people and share information but this does not happen often (1). Politicians in South Africa hide behind the “story of the poor” for which they must provide (e.g. free services), which benefits their campaigns and does not allow for local agency to be developed (1). Many NbS challenges in Durban relate to politics, fraud and corruption (1).

Design, implementation and maintenance: Much innovation is needed to be sure that interventions can be sustained beyond project timeframes (5). Most ongoing NbS interventions are designed and implemented by NGOs who engage policy makers and other actors (5). **Deliberate community participation is an important part of the design of NbS (5). Designing NbS is challenging because we don’t understand much about the failures of such interventions (2).**

Monitoring NbS: Knowledge on M&E of NbS exists but has not been well implemented, resulting in limited understanding of the benefits of this approach (2). Solutions need to be adaptive (based on what we learn) and robust - M&E is critical for learning and we need better understanding of climate-related indicators (2). **Monitoring NbS is much more challenging than monitoring traditional engineering solutions because there are many more indicators to consider (2). There is a long way to go with regards to designing, implementing and monitoring NbS at the local level (2). Availability of and access to data is a challenge for effective monitoring of NbS (2). We need more and better ways of understanding diverse benefits (and challenges) of NbS while bearing in mind the unique community interventions from diverse communities (5).**

Temporal change and NbS: **People often opt for “quick fixes” (outcomes that are demonstrable in the short term) instead of prioritising NbS to mitigate effects of climate change over the longer term (5).** Peoples movements/urban dynamics over time are important (e.g. people haven’t grown up in urban areas and are therefore not familiar with urban landscapes) (1). **Some people who haven’t historically cared about the state of the river in Durban do care these days because the river has become wider with all the floods and is now nearer to their houses (1).** Some of the flood adaptation measures that have been practiced by local communities are no longer effective because the river is too wide.

Invasive vs. native species: the importance of managing invasive alien species, as a form of NbS in South Africa, was again emphasised during one of the engagements (4)

NbS and complex risk: there are strong links between management of river and/or natural systems, floods, waste management and health in informal areas (1, 5).

Threats from NbS: in Africa, **NbS threats are often linked with water-related NbS e.g. open water presents a drowning risk and contaminated water as part of attenuation structures can result in ill health (2). It is important to understand the failings and threats from NbS in an African context to design optimal solutions (2).**

Other themes: ideas/insights emerged as a result of the engagement and are not related to a particular theme. These are detailed below.

- NbS and Disaster Risk Reduction (DRR): the need to better understand a suite of ‘back-pocket’ NbS interventions that can help with DRR (2, 4) (this could link with NbS and temporal change?)
- People forget about climate-related traumas fairly quickly (5) (this could also link with NbS and temporal change?)

Project/programme design: **stakeholder fatigue (local communities) was mentioned as a common issue when considering involving local communities in NbS projects, particularly in cases where communities are not realising benefits from interventions and are tired of telling their stories (3, 4). Programmes need to demonstrate sustainability and potential for transformation (4).**

Nature-based Solutions to Support Equitable Climate Resilience

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