FEBA
Friends of Ecosystem-based Adaptation

PlanAdapt
Creating a Climate for Change

Climate justice for people and nature through urban Ecosystem-based Adaptation (EbA)

A focus on the Global South

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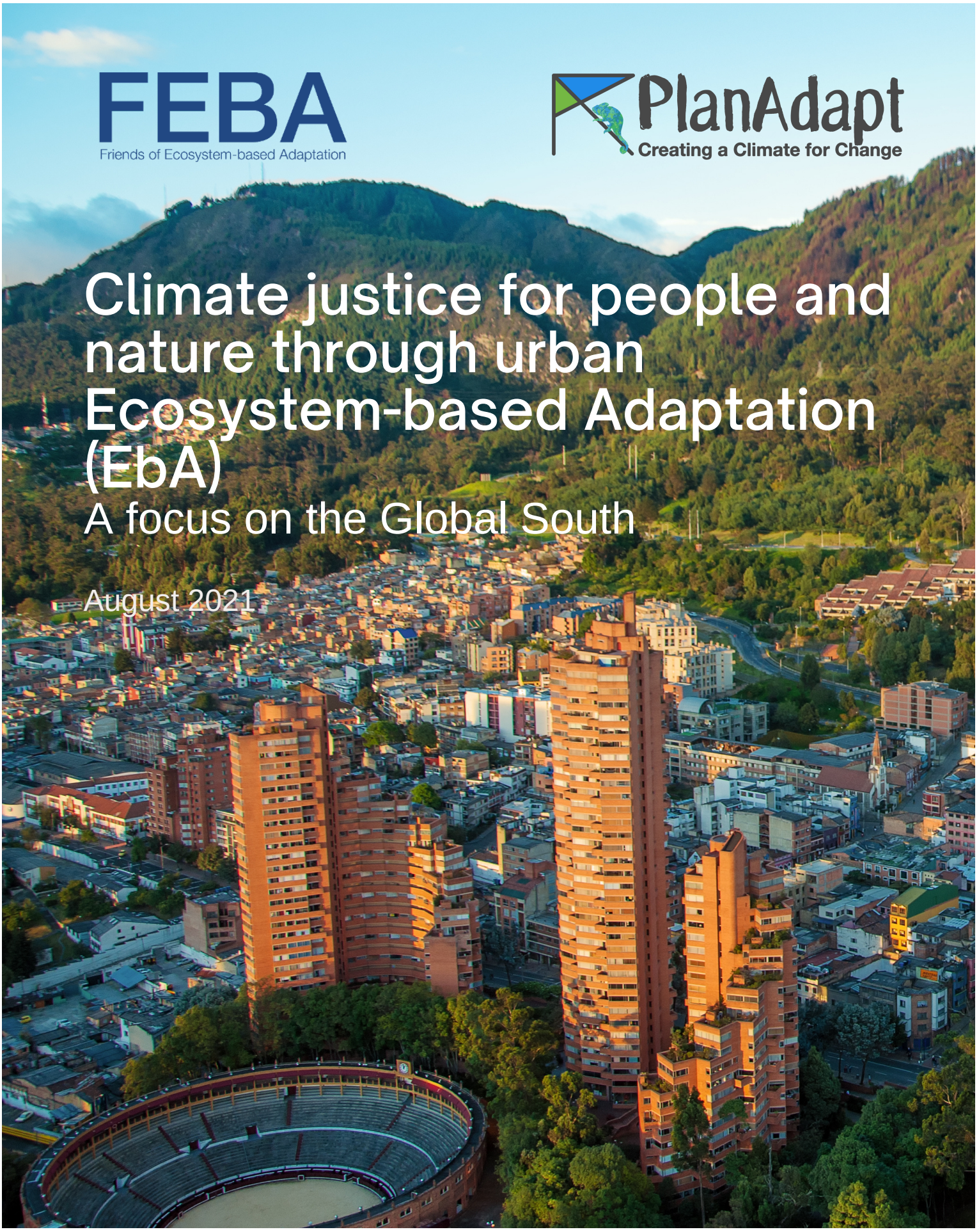

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About PlanAdapt: PlanAdapt is an independent global network-based organisation that provides knowledge services in support of effective, economically just and socially inclusive climate change adaptation and climate risk management around the world, with particular focus on the Global South.

About FEBA: The Friends of Ecosystem-based Adaptation (FEBA) is a global collaborative network of more than 90 agencies and organisations involved in EbA working jointly to share experiences and knowledge, to improve the implementation of EbA related activities on the ground, and to raise awareness and understanding of EbA in adaptation planning processes and multilateral policy frameworks. The International Union for Conservation of Nature (IUCN) serves as the FEBA Secretariat. The coordination of the FEBA network is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag.

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Executive Summary

Ecosystems can greatly improve the liveability of our increasingly urbanised world. The Global South in particular stands to benefit from Ecosystem-based Adaptation (EbA) approaches, or the restoration, conservation and sustainable management of ecosystems and ecosystem services for adaptation to climate change and generation of co-benefits such as food and water security, job creation and even greater community cohesion and empowerment. This joint technical paper therefore discusses examples of urban EbA interventions, predominantly in the Global South, exploring their links with seven proposed EbA Social Principles related to climate justice. These EbA Social Principles are *Participation and inclusiveness*, *Capacity building*, *Fairness and equitability*, *Integration of indigenous and local knowledge*, *Livelihood improvement*, *Gender consideration* and *Appropriateness of scale*. The practical examples were drawn from an online survey on urban EbA interventions which are currently being implemented on the ground. Furthermore, the paper provides six in-depth case studies to explore the particular context of the projects and their links with the EbA Social Principles.

Most of the urban EbA interventions reported a range of adaptation strategies encompassing social, physical and institutional components. Regarding the EbA Social Principles, the majority of the projects reported a high level of *Gender consideration* and *Fairness and equitability*, while *Livelihood improvement* and *Capacity building* were less common.

The survey examples and the in-depth narratives of the case studies explore EbA interventions' tremendous potential to deliver climate-just outcomes for urban areas in the Global South. To help make this a reality, the EbA Social Principles should be deliberately considered during and integrated into the design, implementation and evaluation phases of urban EbA interventions as a standard project component. Identifying the enabling environment for climate justice within urban EbA case studies will help better inform the planning of future urban EbA initiatives with regard to their design process, institutional actors and stakeholders, and biophysical elements.

Port city of Durban (eThekwini), South Africa. Image credit: Michael Jung on Getty Images

Acknowledgements and Disclaimer

This joint technical paper is a shared effort of the Friends of Ecosystem-based Adaptation (FEBA). FEBA is a global collaborative network of 90+ agencies and organisations involved in Ecosystem-based Adaptation (EbA) sharing experiences and knowledge with the aim to advance the implementation of EbA approaches.

This joint technical paper has been produced and edited by the FEBA Urban EbA Working Group. The FEBA Urban EbA Working Group, co-chaired by PlanAdapt and the International Union for Conservation of Nature (IUCN), gathers researchers and practitioners from the fields of urban development, EbA and green-grey infrastructure to help learn from past projects and improve future EbA initiatives in the urban sphere.

PlanAdapt is an independent global network-based organisation that provides knowledge services in support of effective, economically just and socially inclusive climate change adaptation and climate risk management around the world, with particular focus on the Global South.

IUCN is a membership Union composed of both government and civil society organisations. It builds on the experience, resources and reach of thousands of Member organisations and experts, making IUCN the global authority on the status of the natural world and the measures needed to safeguard it.

The Working Group acknowledges and appreciates the time and knowledge shared by the 31 survey respondents, in particular to those who were further interviewed in depth. The authors would also like to thank all members of the FEBA Urban EbA Working Group whose excellent contributions over the past year have helped co-produce this Joint Technical Paper. In this regard, special thank you to Antonio Arce Romero, the FEBA Fellow on Urban EbA.

The views expressed in this joint technical paper do not necessarily reflect those of participating or endorsing organisations.

Urban greening in Hue, Vietnam. Image credit: Michael Pham on Getty Images

Acronyms

BP	Bali Principles
CBD	Convention on Biological Diversity
CCA	Climate Change Adaptation
CI	Conservation International
CSRD	Centre for Social Research and Development
DOEE	Department of Energy and Environment, referring to the authority in Washington, D.C., United States
DRAP	Durban Research Action Partnership
DRM	Disaster Risk Management
EbA	Ecosystem-based Adaptation
Eco-DRR	Ecosystem-based Disaster Risk Reduction
FEBA	Friends of Ecosystem-based Adaptation
GSP	Green Seattle Partnership
IP	Indigenous Peoples
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KZN	KwaZulu-Natal Province, in South Africa
NbS	Nature-based Solutions
NGO	Non-Governmental Organisation
P&C	Principles and Criteria
PRRP	Palmiet River Rehabilitation Project
SDG	Sustainable Development Goal
SRC	Stormwater Retention Credit
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working Group, referring to the FEBA Urban EbA Working Group

1. Introduction

Ecosystem-based Adaptation (EbA) is "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change" (Convention on Biological Diversity (CBD), 2009 & 2010). In the past decades, this approach has gained considerable attention and support from the international community (Milman & Jagannathan, 2017) due to its potential for simultaneously addressing other systemic challenges such as biodiversity loss, food insecurity and climate change.

In cities, EbA is recognised as an approach to enhance resilience through the restoration and rehabilitation of urban ecosystems that support, for example, the reduction of heat island effects, increase the buffer capabilities for flooding or reduce pollution (Keeler et al., 2019). Equally as important, it can become an instrument of economic development through job creation as well as redistributive justice, thereby providing significant co-benefits at the community level. Such benefits support the implementation of the Sustainable Development Goals (SDGs), especially, but not limited to, the ones on sustainable cities and communities (Goal 11) and climate action (Goal 13).

Because of the characteristics mentioned above, urban EbA has also earned the attention of governments, as they are called to "Build Back Better" from the global COVID-19 pandemic that has had severe and wide-ranging impacts on economies and societies worldwide since early 2020. The pandemic demonstrates how closely interlinked we are with each other and our surrounding environment, from the local to global levels. When the social and environmental conditions of our neighbourhoods deteriorate, there are inevitable impacts on our own living conditions. Considering those linkages is a valuable lesson for climate change adaptation.

Socially just and fair adaptation is essential not only for vulnerable communities but also for society and planetary well-being. Protecting and restoring biodiversity and ecosystems in urban contexts is a critical part of sustainable development (IPBES, 2019) and can play a central role in climate change adaptation strategies and plans. With over 54% of the world's population living in urban areas and this proportion expected to increase to 66% by 2050 (UN Habitat, 2018), urban adaptation is increasingly recognised as a high societal priority (Ajibade & Egge, 2019). Additionally, urban green spaces can be a cost effective measure for climate adaptation (Govindarajulu, 2014) and deliver successful risk reduction outcomes (Dhyani et al., 2018).

When planning urban EbA, strategies need to be informed by empirical evidence while continuing to investigate what specific measures may be required and what barriers to implementation might be faced in different contexts (Kabisch et al., 2016). Yet, the evidence-based information on urban EbA planning and implementation is scarce, with the majority of research stemming from the Global North (Brink et al., 2016; Nagendra et al., 2018). Additionally, many Global South countries like India still have a rural focus in their adaptation action (Singh C et al., 2016).

In recognition of these knowledge gaps and the growing importance of urban EbA, PlanAdapt and IUCN convened a new Friends of Ecosystem-based Adaptation (FEBA) Urban EbA Working Group (WG) in March 2020. The WG brings together researchers and practitioners from the fields of urban development, EbA and green-grey infrastructure (encompassing the disciplines of urban planning, architecture and the built environment and human geography) to identify and compile implemented examples of urban EbA planning and implementation around the world, with a particular emphasis on the Global South. Through its work, the WG gathers and shares knowledge on good practices and lessons learned on urban EbA on the ground as a vital part of assisting, planning and implementing adaptation action in urban planning and implementation around the world, with a particular emphasis on the Global South.

This joint technical paper, "Climate Justice for people and nature through urban Ecosystem-based Adaptation (EbA): A focus on the Global South", is the first document produced by the FEBA Urban EbA WG. It contributes to addressing the gap of empirical knowledge on EbA in cities, especially in the Global South. Besides gathering and presenting information from practical case studies, it also explores the goals, such as participation, voice, justice and empowerment, that need to be considered in resilience-building in order to support equitable outcomes (Ensor et al., 2021).

The foundation of this joint technical paper is the 'FEBA Urban EbA online survey on practical examples of urban ecosystem-based adaptation,' conducted in 2020[1]. Of the 31 case studies collected, six specific ones are analysed in further detail to explore how urban EbA contributes to climate justice in the context of urbanisation and demographic trends in the Global South. Cases that met more than three out of six criteria were selected. The criteria were 1) observable results related to climate change adaptation, 2) implementation in the urban context, 3) grassroots-led projects, 4) innovativeness, 5) underexposed projects and 6) implementation in the Global South.

The objective of this paper is twofold:

1) By identifying the characteristics, components and planned purpose of different urban EbA measures within reported EbA case studies, this paper assesses their suitability and effectiveness in different settings; and

2) This paper contributes to ongoing discussion on the different understandings of climate justice in the Global North and Global South and the contribution of EbA to climate justice in cities.

Ultimately, this paper aims to inform the planning of future EbA interventions that contribute to resilient and just cities, particularly in the Global South.

[1] **Background to the survey design:** The process of planning and implementation of an urban EbA intervention will vary based on its context and location. This can be expressed in the form of motivation (whether it was driven by civil society, or through a government initiative, in response to a climate, environmental or disaster risk); level of stakeholder participation and involvement; its integration into existing governance structures, or creation of dedicated management structures; the level of attention being paid to EbA-linked livelihoods (both in terms of novel opportunities created through the EbA, or those which had to be discontinued or relocated due to the EbA); the level to which women, youth and vulnerable groups had voice during design and implementation phases; and whether access for women, the elderly and citizens from different ethnic groups and social strata were considered and incorporated into the EbA intervention.

It is also possible that despite good intentions and design efforts, EbA implementation results in unexpected negative societal/ecological impacts, which are then termed as maladaptation and offer lessons for how to improve future planning and implementation of EbA. Some examples may teach us more specifically about trade-offs that occurred, limitations/constraints that were encountered, and even unexpected positive benefits that may have accrued, due to an Urban EbA intervention.

2. Exploring links between urban EbA, EbA Social Principles and climate justice in the Global South

Ecosystem-based adaptation (EbA) is an approach that uses ecosystems and their services to reduce human and ecosystem vulnerability to the impacts of climate change. Conceptually, EbA is drawn from a results-oriented perspective, with many interventions potentially falling under this category without necessarily being labelled as such (European Environment Agency, 2021; Lo, 2016).

In line with the understanding that climate change adaptation is an interdisciplinary and intersectoral process (Lo, 2016), EbA solutions often incorporate elements stemming from a variety of disciplines and approaches (Brink et al., 2016).

Ecosystem-based Adaptation is the operationalisation of Nature-based Solutions (NbS) for adaptation to climate change. The umbrella term NbS encompasses approaches of working with nature, such as EbA, ecosystem-based disaster risk reduction (Eco-DRR), and ecosystem-based mitigation (EbM) (European Environment Agency, 2021; Cohen-Shacham et al., 2016; IUCN, 2020; Pauleit et al., 2017; PEDRR & FEBA, 2020).

Contributing to the definition of EbA, FEBA published a set of criteria for classifying an approach as EbA. Following these criteria, EbA is a strategy that: "1) reduces social and environmental vulnerabilities, 2) generates societal benefits in the context of climate change adaptation, 3) restores, maintains or improves ecosystem health, 4) is supported by policies at multiple levels and 5) supports equitable governance and enhances capacities" (FEBA, 2017).

This joint technical paper builds on the definition and criteria provided by CBD and FEBA. We place EbA in an urban context and acknowledge the dynamic interaction that it may have with other adaptation strategies. This section explores the practice of urban EbA in the Global South and highlights EbA Social Principles and their connection to climate justice.

What is the relevance of urban EbA in the Global South?

Recent estimates predict than over half the world's population will live in urban[2] environments by 2050 (UN Habitat, 2018). A large share of the urban population is expected to be concentrated in megacities located in the Global South. The trend towards urbanisation places cities as key spaces for addressing climate change adaptation needs. This role is acknowledged by the Intergovernmental Panel on Climate Change (IPCC) in its fifth Assessment Report (AR5). The report states that "urban climate change risks, vulnerabilities, and impacts are increasing across the world in urban centres of all sizes, economic conditions, and site characteristics" (IPCC, 2014).

[2] The authors recognise the methodological manual to define cities "Applying the Degrees of Urbanisation" developed by the European Commission, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Human Settlements Programme (UN-Habitat), the International Labour Organization (ILO), the Organisation for Economic Co-operation and Development (OECD) and The World Bank (2020), which seeks to delineate degrees of urbanisation along the urban-rural continuum. Recognising further that in current practice, every country applies its own criteria to define urban areas, which commonly involve settlement size, population density or economic indicators (UN, 2012), and to allow for comparison between case studies in the absence of these metrics, for the purposes of this paper, urban is defined as an adjective that refers to cities or people who live in cities and towns (UNESCO Thesaurus).

Urban park in Nairobi, Kenya. Image credit: Jordi C

It also presents EbA as a crucial contributor to addressing such risks and increasing urban resilience. In the 2018 IPCC Special Report on 1.5°C, urban areas are highlighted as simultaneously concentrating risk and being sites of innovation for adaptation and mitigation (Bazaz et al., 2018).

While the potential of EbA interventions in the urban realm is clear, implementation challenges at the local level need consideration. EbA solutions in cities demand communication and coordination among various actors – often with different interests and decision-making power – and deliver benefits to multiple stakeholders (Vignola et al., 2009; Wamsler, 2013). Enabling urban EbA learning processes, especially among local authorities, has the potential to effectively mainstream EbA practices (Pasquini & Cowling, 2015). In this regard, developing knowledge that helps to understand, frame and plan EbA interventions appropriate for local urban contexts is of crucial importance.

Even though urban areas in the Global South face diverse sustainability challenges such as pressure for natural resources, much of the knowledge and research on urban sustainability to date has been focused on the Global North (Lo, 2016; McVittie et al., 2018; Nagendra et al., 2018). The majority of available case studies, such as urban EbA for landslide-risk reduction, come from Europe, North America and East Asia (Brink et al., 2016). The knowledge and insights derived from those practical examples cannot and should not be transferred directly to other regions with different climatic and social conditions (Sandholz et al., 2018) or other urban planning processes.

Currently, diverse initiatives have been set in motion to provide new evidence from EbA implementation in the Global South. Notably, the FEBA Urban EbA WG and the Green-Gray Community of Practice, both part of the FEBA network, have dedicated significant efforts to identify EbA case studies from the Global South.

The Green-Gray Community of Practice has documented case studies that demonstrate the applicability of urban EbA, including in the Global South. Case studies show urban potential for river and coastal flood management, freshwater management, community involvement and delivery of economic benefits. From the green-gray perspective, a key lesson for the Global South is that while solutions are emerging, they may not be widely reported yet. Many case studies reported in the Practical Guide to Implementing Green-Gray Infrastructure fall into the category of the Global North.

The FEBA network acknowledges platforms such as the United Nations Framework Convention on Climate Change (UNFCCC) Adaptation Knowledge Portal (AKP), weADAPT and PANORAMA, which include information on EbA in urban settings. The UNFCCC AKP is the biggest repository of EbA interventions, currently compiling more than 450 case studies. Documented case studies range from the analysis of vulnerability in urban settlements, comparison between EbA and engineering options and reforestation efforts to reduce erosion to an atlas mapping the local benefits of nature. The AKP contributes to the evidence that there is a variety of methods to approach urban EbA. However, it includes few reported case studies from the Global South.

The weADAPT platform also gathers some case studies of urban EbA in the Global South, with examples touching upon job creation, urban agriculture and city-wide measures. Similarly, PANORAMA also contains urban EbA case studies, although many of them are categorised under NbS, urban resilience and social development.

2.1. EbA Social Principles

A shared understanding of the qualities and characteristics of EbA among practitioners is required in order to promote its effective implementation (FEBA, 2017). In addition to the conceptual elements of EbA, as in the FEBA Qualification Criteria, the establishment of guiding principles can strengthen implementation. As this joint technical paper aims to shed light on climate justice and its links with urban EbA, a set of EbA Social Principles is proposed. The EbA Social Principles can inform different stages – such as design, planning and evaluation – of EbA projects in general and particularly in the urban realm.

To frame relevant social aspects of EbA, we refer to existing conceptual papers on EbA principles and criteria (P&C). We focus on publications that explicitly mention EbA P&C, including Eco-DRR/EbA principles (Secretariat of the Convention on Biological Diversity, 2019; Sudmeier-Rieux et al., 2019), principles for integrating EbA approaches to adaptation in project and policy design (Andrade et al., 2012), criteria to qualify approaches and interventions as EbA (FEBA, 2017) and criteria for successful EbA interventions (DEA & SANBI, 2017). Additionally, the IUCN Global Standard for Nature-based Solutions™ (IUCN, 2020) was considered.

The method of identifying and selecting social P&C followed a participatory and iterative process. Initially, a document was reviewed, extracting the P&C related to social components, producing a first list of key words under which the mention of the P&C in the document was cited. Following, a second document was reviewed, sub ordering the identified mentions of social P&C under existing key words or, in the case of a new P&C, generating a new key word. This system was repeated until all documents were analysed (see the complete list in Annex 1). Many P&C in the literature contained different degrees of social elements and, for a given characteristic, definitions varied across publications. This plurality of definitions allowed the FEBA Urban EbA WG to explore different perspectives on the social dimensions of EbA and advance the understanding of this approach from a social lens. The final EbA Social Principles are proposed based on expert opinion and presented in Table 1.

2.2. EbA Social Principles and climate justice

This section explores the links between the EbA Social Principles, as defined in the previous section, with climate justice. The analysis places the EbA Social Principles within a typology of justice framings. Furthermore, it shows the broad implications of the EbA Social Principles across society.

For the purpose of this paper, **climate justice** is defined as "the fair treatment of all people and the freedom from discrimination in the creation of policies and projects that address climate change as well as the systems that create climate change and perpetuate discrimination" (Bartholomew 2015). This involves recognising that climate change hazards impact the well-being of people of different genders, ethnicities, ages, sexualities, races and religions and even future generations in a disproportional manner (Byskov et al., 2019). The angle taken in this publication is to understand climate justice as a general guiding principle, while acknowledging the concept has different dimensions (i.e. legal).

Community members meeting in Kayole, Nairobi, Kenya. Image credit: Kayole Mtaa Safi

Table 1. Proposed EbA Social Principles

Participation and inclusiveness 	EbA interventions should be designed, developed and implemented involving local stakeholders, particularly historically marginalised groups, via participatory methods. Actively engaging cross-disciplinary stakeholders aims to ensure transparent, accountable, culturally appropriate and equitable outcomes.
Capacity building 	*Capacity building* in the context of EbA refers to the process of enhancing the strengths, attributes and resources available to societies and communities to respond to climate change impacts. EbA aims to enhance both generic and issue-specific capacities by supporting learning networks, communities of practice and the co-generation of knowledge.
Fairness and equitability 	EbA should promote equitable access to benefits and safeguard the attention to specific needs across groups, particularly with respect to marginalised or vulnerable groups and women, while not exacerbating existing inequalities.
Gender consideration 	*Gender consideration* refers to ensuring that EbA interventions acknowledge and take into account the differentiated roles and responsibilities of individuals based on their sexual orientation and gender identity, while acknowledging gendered power dynamics and the disproportionate impacts of climate change on vulnerable groups.
Livelihood improvement 	EbA should help to ensure income security, resource distribution, and working conditions, as well as maintain human, social, natural, physical, or financial assets. EbA should also maximise synergies with long-term development goals such as poverty reduction, providing tangible benefits for people.
Appropriateness of scale 	*Appropriateness of scale* refers to the principle of including relevant spatial, temporal, stakeholder and policy dimensions that aim to ensure the durability of EbA interventions. This concept can be broken down into scaling up, scaling out and scaling deep. Scaling up impacts policies and law; scaling out implies expanding implementation; scaling deep impacts cultural roots, relationships and communities.
Integration of indigenous and local knowledge 	EbA should aim to equitably consider indigenous and local knowledge alongside the best available science for the design and implementation of interventions. Drawing on indigenous and local knowledge in alignment with the principles of free, prior and informed consent is important to ensuring appropriate and effective adaptation outcomes in the local context.

How can social justice be addressed in the implementation of urban EbA interventions?

When designing urban EbA projects, the EbA Social Principles of *Participation and inclusiveness, Capacity building, Fairness and equitability, Gender consideration, Appropriateness of scale, Integration of indigenous and local knowledge* and *Livelihood improvement* guide just implementation following three principal axes. First, they address distributive justice, focusing on the context of implementation and who benefits from project outcomes to ensure equitable outcomes; second, they consider procedural justice: the processes and procedures involved in planning and implementing these outcomes; and third, they include recognitional justice, by recognising historical contexts and causes of inequalities (Hughes & Hoffmann, 2020).

Distributive justice focuses on the distribution of the project results. EbA Social Principles linked to this justice dimension are *Fairness and equitability*, *Gender consideration*, *Livelihood improvement* and *Appropriateness of scale*. An intercultural approach to adaptation helps to ensure that the outcomes of actions are distributed equitably and that they do not negatively impact specific groups. Of particular relevance to urban EbA is the potential unequal distribution of green and blue space and thus also the ecosystem services that people benefit from, including not only social benefits but also mitigation of urban heat island effects, air pollution and flood risk as well as exposure to positive microbes found in natural areas which can help protect against allergies, etc. To complicate matters, re-greening of city spaces can also have negative impacts on low-income communities, who may be priced out of areas aesthetically enhanced by adaptation measures (Curran & Hamilton, 2020; Dooling, 2009; Haase et al., 2017). Finally, if urban EbA is viewed using a climate justice lens, a further issue of consideration is that the costs (and benefits) of local adaption measures should be equitably distributed. The financial and non-financial costs should not burden low-income households.

To achieve **procedural justice**, the EbA Social Principles of *Participation and inclusiveness, Gender consideration, Integration of indigenous and local knowledge* and *Capacity building* are key to ensuring the fairness of processes related to the planning, implementation, monitoring and assessing of urban EbA. In cities, inhabitants conceptualise their relationship to nature in multiple ways and interact with it via a variety of socio-cultural practices. Accordingly, when implementing and maintaining EbA measures to benefit the wellbeing and livelihoods of urban communities, EbA initiatives should involve consultation with key stakeholders and diverse community members to understand how they value and conceptualise 'nature'. This can require recognising complementary, but also potentially conflicting, uses of the urban areas or values of the ecosystem services provided. Furthermore, this calls for the development of processes that enable meaningful participation of different stakeholders, including marginalised voices. An inclusive, consultative approach to urban EbA fosters pluralistic nature knowledge or eco-literacy, where scientific and indigenous or folk ways of knowing urban ecosystems offer differing perspectives on practical methods of adapting ecosystems within cities for the good of diverse ecological and human communities.

Recognitional justice is concerned with historic contexts and root causes of inequalities and is thus linked to *Participation and inclusiveness, Capacity building, Fairness and equitability, Gender consideration, Integration of indigenous and local knowledge* and *Livelihood improvement*. Historically, indigenous groups, other minority groups, and women have had fewer rights related to participation and representation, as well as land ownership and land use (Diana Deere et al., 2012; Doss et al., 2015). Often these are the same groups whose homes and livelihoods are most

vulnerable and exposed to the hazards of climate change as a result of such systemic marginalisation. Local environmental knowledge has been endangered by language loss; on the other hand, linguistic diversity enhances the effectiveness of biodiversity conservation through the preservation of environmental knowledge and the linguistic transmission of indigenous names, folk taxonomies and oral traditions (Loh, J & Harmon, D., 2014; Maffi, 2005; UNESCO, 2017).

Urban decoration near Bogotá, Colombia. Image credit: Conservation International

How are EbA Social Principles aligned with the Bali Principles of Climate Justice?

The urban EbA Social Principles listed in Section 2 support climate justice. This can be seen from their links to the Bali Principles (BP) of Climate Justice, which were published by a coalition of NGOs in the run-up to the Earth Summit in Bali in 2002, to redefine climate change as a human rights and environmental justice issue. The Bali Principles were defined by a coalition that included indigenous peoples, whereas the EbA Social Principles are derived from policy papers. One added value of making the link between them is to attempt to converge policy and practice. If EbA seeks to adopt a place-specific, holistic approach to adaptation, one way to check that its underlying principles are aligned with this objective is to see in what way they differ from principles that were elaborated through dialogue between indigenous knowledge-holders. Therefore, our comparison constitutes due diligence to ensure that the EbA Social Principles we propose to guide the holistic approach of EbA can guide communities as they work towards multiple social goods. The Bali Principles were chosen for comparison given their robustness and wide usage.

Of the 27 Bali Principles, we have identified 18 that deal with climate adaptation and can be directly linked to at least one of the seven EbA Social Principles (Annex 2). The strongest connections take place with the EbA Social Principles of *Fairness and equitability* and *Participation and inclusiveness*. *Fairness and equitability* can be linked with 14 different Bali Principles and is reflected in their support for community rights "to be free from climate change, [and] its related impacts", "rights of victims of climate change and associated justices to receive full compensation, restoration and reparation for loss of land, livelihood, and other damages", promoting "solutions...that are in line with the principles of a just transition," rights of victims of climate change related to restoration, etc. (BP 1, 4, 9, 13, 15 - 20, 22, 23, 26 and 27). The concept of *Participation and inclusiveness* is integrated into nine Bali Principles (BP 3, 5, 13, 18, 21, 23, 25, 26 and 27) that deal with the rights of and representation of the indigenous peoples, women, affected communities, and youth as well as "democratic accountability".

The other EbA Social Principles also have links to the Bali Principles. For example, *Integration of indigenous and local knowledge* is reflected in five of the Bali Principles through the protection of and valuing of traditional culture, and the upholding of the rights of Indigenous Peoples' to protect their lands against degradation (BP 16, 20, 21, 25, and 27). Support for a just transition and the right for community management for livelihood improvement can also be seen to support *Livelihood improvement* (BP 9, 15, 18, and 27). *Gender consideration* is specifically affirmed by the "need for solutions that address women's rights", but also more generally in the demand for "justice for all peoples, free from any form of discrimination or bias" (BP 19, 22, and 27). *Appropriateness of scale* can be linked to both spatial and temporal scaling and highlights the urgency for climate action and justice (BP 27).

3. Examples of urban EbA in the Global South

This section presents the methodology and the summarised results from the 'FEBA Urban EbA online survey on practical examples of Urban Ecosystem-based Adaptation'[1].

3.1. About the survey

In early 2020, the FEBA Urban EbA WG started the process of identifying practical examples of EbA actions in urban and peri-urban areas worldwide. To this end, an online survey was launched in June 2020 and received responses until December 2020. The survey was designed in English (see Annex 3 for a copy of the survey questions) and then translated to Spanish, French and Portuguese.

The questionnaire had three main sections for each submitted case study. The first section collected general information about the EbA initiative, including the country of implementation, implementing organisation, funding sources, implementation period, and project contact information. The second section contained questions regarding the EbA measure itself, including its main characteristics and components, planned purpose, geographical scale, etc. A third section gathered information about the process of planning and implementing the EbA measure, with a strong focus on the social elements linked to the initiative, including the involvement of different groups during planning and implementation as well as intended and observed benefits.

Selected results from the online survey are presented in this section. These results stem from 31 valid case studies collected in the 'FEBA Urban EbA online survey on practical examples of Urban Ecosystem-based Adaptation'. The channels used to promote the survey were social media and e-mails to selected networks. The call for respondents was published in English, French and Spanish. Case studies were considered as valid when the main survey questions were addressed and did not constitute a duplicate entry.

Responses have not been independently verified and no representation or warranty, express or implied, is made as to the correctness or completeness of any information obtained from the respondents. The collected case studies do not reflect a globally representative sample, but they allow for exploration of urban EbA planning and implementation characteristics and a better understanding of EbA's potential to generate social benefits and address climate justice. As such, even though not conclusive, the results presented provide evidence of emerging elements for future in-depth research.

3.2. General characterisation of case studies

This subsection presents the results from the survey in terms of general and physical characterisation. Results linked to the EbA Social Principles are elaborated in the next sub-section.

Highlights from the survey:

- Most of the urban EbA case studies collected (77%) stem from **Africa, Asia and Latin America**.
- Most urban EbA solutions collected from the survey (61%) included a combination of social, physical and institutional measures.
- **Far-reaching social impact**: more than 40% of all implemented urban EbA cases encompass both urban and peri-urban areas, with 58% reporting far-reaching social effects across more than one district or neighbourhood.
- **Bi- and multilateral donors are by far the biggest funding source** for urban EbA initiatives. Figure 1 provides an overview of the funding sources reported in the survey.

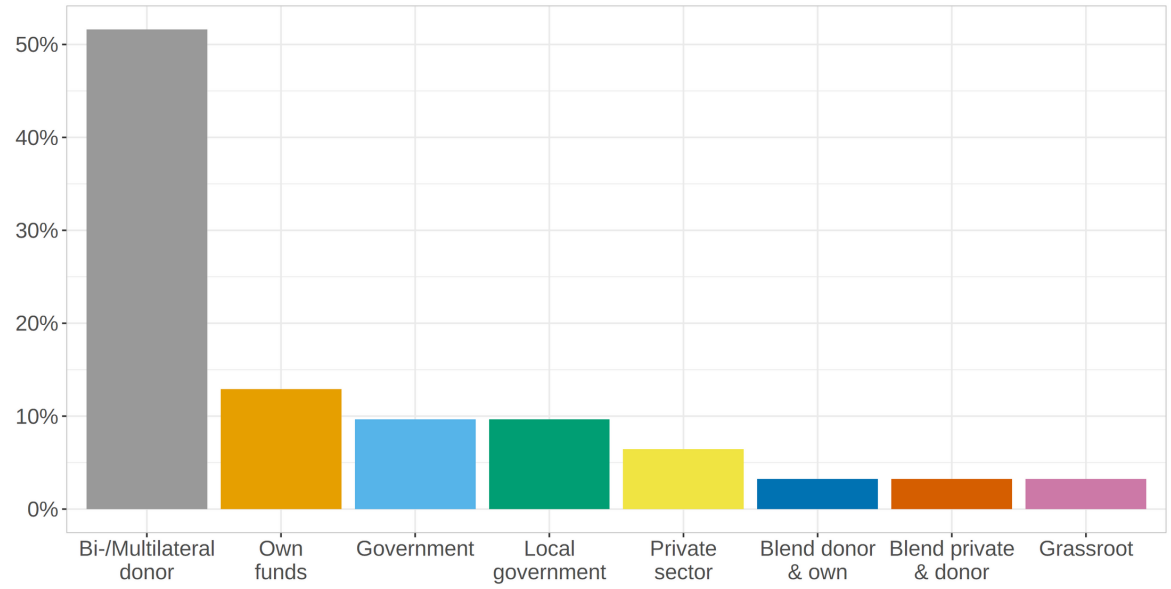

Figure 1. Funding source for the implementation of EbA solutions as reported in the online survey (n = 31)

For the analysis of the survey results, physical measures of EbA solutions were categorised into vegetation-related, water-related and service-related. In this context, an EbA solution constitutes the sum of all EbA measures (physical or otherwise) implemented in the project. Results show that in practice, most EbA solutions are implemented using a combination of these three categories. Figure 2 shows an overview of the type of physical measures reported in the survey. One or more vegetation-related measures, such as the establishment or recovery of urban parks and forests, street trees, ecological corridors, or initiatives for practicing urban agriculture was reported for 87.1% of case studies. Similarly, 74.2% included one or more water-related measures, with the re-naturalisation of river systems and buffer zones, implementation of sustainable drainage solutions and creation of ponds and wetlands among the most common ones. Only two case studies (6.5%) reported payment for environmental services as part of the urban EbA initiative, including 1) CityAdapt (Project) and Green Cities (Programme) in the Netherlands and 2) the Adopt A Site project in Kenya.

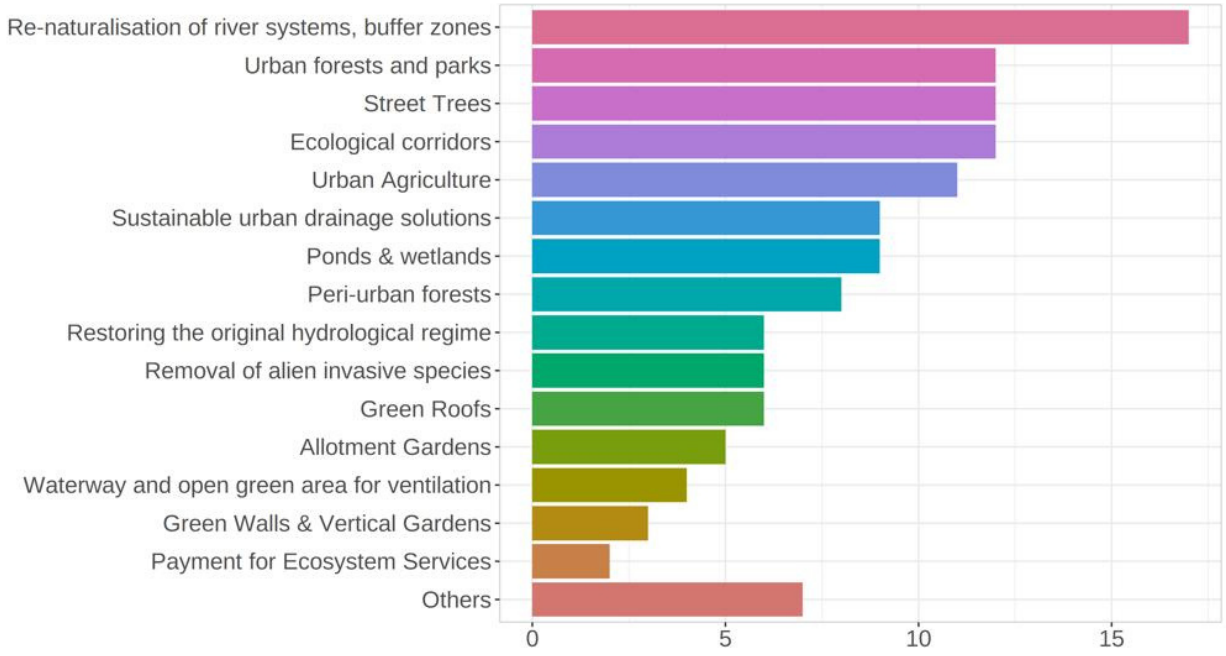

Figure 2. Type of physical measures used to implement urban EbA solutions as reported in the online survey (n = 31)

Within the different types of measures, the most common components reported across different case studies were native trees (71%), vegetation such as shrubs and grasses (42%), wetland conservation and restoration (42%) and river stretches, creeks and estuaries (32%). Figure 3 shows the distribution of physical EbA measure components.

Urban EbA interventions often have multiple components (such as vegetation, wetlands and creeks) with various purposes or intended benefits. Among respondents, education and increase in environmental awareness (71.0%), human well-being (61.3%) and income generation (61.3%) were the most common planned purposes or benefits expected from the implementation of urban EbA solutions. Biodiversity enhancement (61.3%), stormwater regulation (51.6%), and water provision and management (45.2%) were the most common supporting, regulating, and provisioning services, respectively.

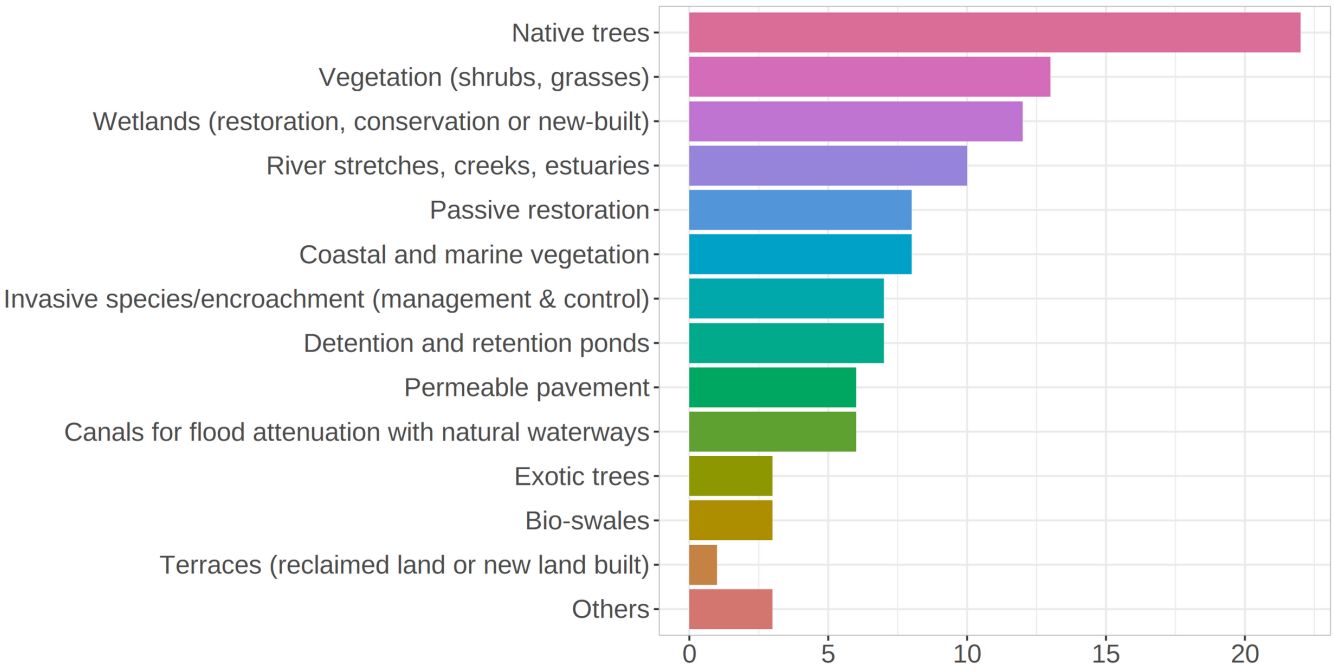

Figure 3. Most common components of physical measures for urban EbA implementation as reported in the online survey (n=31)

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Members of Kayole Mtaa Safi in Kayole, Nairobi, Kenya painting a mural. Image credit: Kayole Mtaa Safi

3.3. Social characterisation of case studies: results and discussion

This sub-section presents the results from the survey, organised according to the EbA Social Principles.

The survey questions were retrospectively categorised according to the EbA Social Principles. A given question often related to more than one principle. For example, the question of whether an EbA solution contributed to equal benefits to men and women was categorised as related to the principles *Gender consideration* and *Fairness and equitability*, which is unsurprising as the definition of the latter may encompass the former. The survey questions reflected five out of the seven EbA Social Principles: *Participation and inclusiveness*, *Capacity building*, *Fairness and equitability*, *Gender consideration*, and *Livelihood improvement*. *Appropriateness of scale* and *Integration of indigenous and local knowledge* were not captured in the online survey but are explored for the in-depth narratives in section 4.

Highlights:

- The majority of urban EbA projects surveyed embodied the ***Participation and inclusiveness*** principle.
- ***Capacity building*** was an essential component in the majority of urban EbA case studies. 74.2% of respondents assessed the potential for stakeholder and citizen empowerment as medium or high.
- ***Fairness and equitability***: 83.8% of respondents assessed access to benefits of EbA implementation for citizens of different ages as medium or high.
- ***Gender consideration***: 61.3% of respondents reported that there was a high level of **equal access to benefits for women and men**, while only 25.8% responded that the level of women representation in their decision-making was high.
- Livelihood improvement: About a quarter of the EbA projects indicated that they had a high level of consideration regarding income generation and livelihood opportunities.

1. *Participation and inclusiveness*

The survey results demonstrate how the EbA Social Principles are applied in urban EbA projects. The majority of EbA projects reported that they were in alignment with the *Participation and inclusiveness* principle (Figure 4). The levels of stakeholder engagement and citizen participation were high in both planning and implementation stages, although the level of participation was slightly higher during the implementation stage than the planning stage. All projects except one reported some form of citizen participation in planning, when that relevant information was available.

In terms of inclusiveness, the majority of projects reported a high or medium level of the representation of women and different citizen groups in their decision-making processes. Notably, nearly a quarter of the projects reported that no information was available regarding inclusiveness, while the rate of 'no information' was under 20% in the case of participation. This difference implies that participation is more emphasised than inclusiveness by EbA projects.

2. *Capacity building*

Questions related to *Capacity building* included not only capacity building components within EbA projects but also the extent of EbA mainstreaming in governance, the potential for stakeholder or citizen empowerment, and the potential for women or vulnerable groups empowerment (Figure 5). Respondents indicated that their EbA projects had a high level of capacity building components in general. Particularly, 74.2% of the respondents reported that there was a high or medium level of potential for local stakeholder or citizen empowerment through EbA measures.

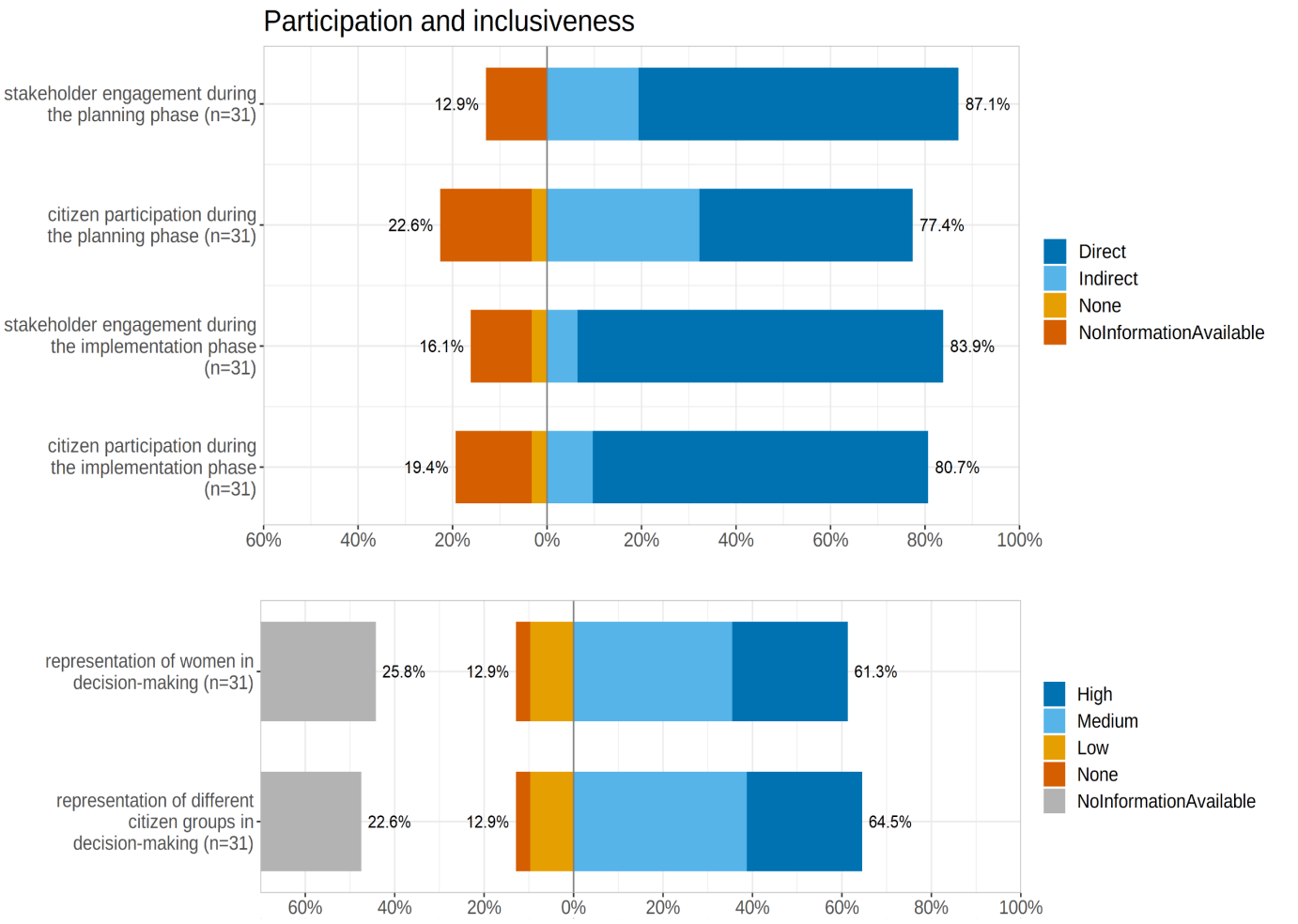

Figure 4. Reported level of participation across different stakeholders from surveyed interventions (n=31)

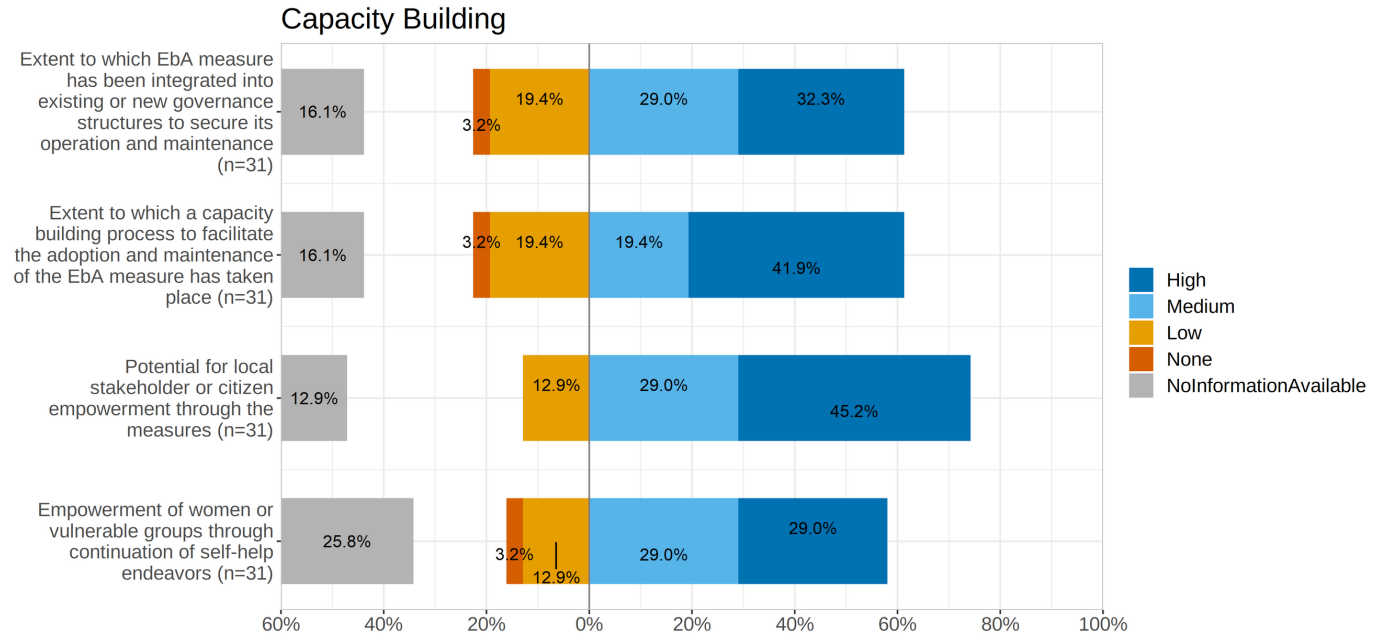

Figure 5. Reported level of Capacity building *from surveyed interventions (n=31)*

3. *Fairness and equitability*

Seven questions of the survey had a link to the principle of *Fairness and equitability* (Figure 6). They included whether the urban EbA projects have promoted: 1) improvement of the distribution of resources to vulnerable groups, 2) improvement of access and rights of resources to vulnerable groups, 3) reduction of the disproportionate impact of climate on women and vulnerable groups, 4) equal access to the benefits for women and men, 5) equal access to the benefits for citizens of different ethnical groups and social strata and 6) equal access to the benefits for citizens of different ages. Among those, the question about promotion of equal access to the benefits for citizens of different ages received the highest rate of positive response (high level 54.8%, medium level 29%). The questions about equal access to the benefits for different gender, ethnic groups and social strata received slightly fewer positive responses but the rate still outweighed the negative responses (low level of equal access). Meanwhile, about a quarter of respondents answered the question about the contribution of the EbA measures to access and rights of resources to vulnerable groups in the negative.

4. *Gender consideration*

When focusing on *Gender consideration* within urban EbA projects, interactions with the other components such as *Participation and inclusiveness*, *Capacity building* and *Fairness and equitability* are clear (Figure 7). 61.3% of the respondents reported that there was a high level of equal access to the benefits for women and men, while only 25.8% responded that the level of women representation in their decision-making was high. This comparison implies that imbalance between access to the benefits and representation in decision-making processes may exist in some EbA projects. More efforts to consider gender equality in the decision-making process of EbA project are necessary.

Community mural painting in Kayole, Nairobi, Kenya. Image credit: Kayole Mtaa Safi

5. *Livelihood improvement*

Three questions from the survey targeted *Livelihood improvement* (Figure 8). These include the generation of income-generating resources and livelihood opportunities, the improvement of the distribution of resources to vulnerable groups and the improvement of working conditions. Compared to other EbA Social Principles, the questions related to *Livelihood improvement* received a relatively low rate of positive answers. About a quarter of the EbA projects indicated that they had a high level of consideration regarding income generation and livelihood opportunities. Also, 32.3% of the projects reported the improvement of working conditions through the EbA measures. At the same time, the relatively high rate of 'low level or no consideration' or 'low level or no relevant achievement' answers to those three questions implies that as the community of EbA practitioners, we need to step up our efforts to integrate livelihood improvement in EbA measures.

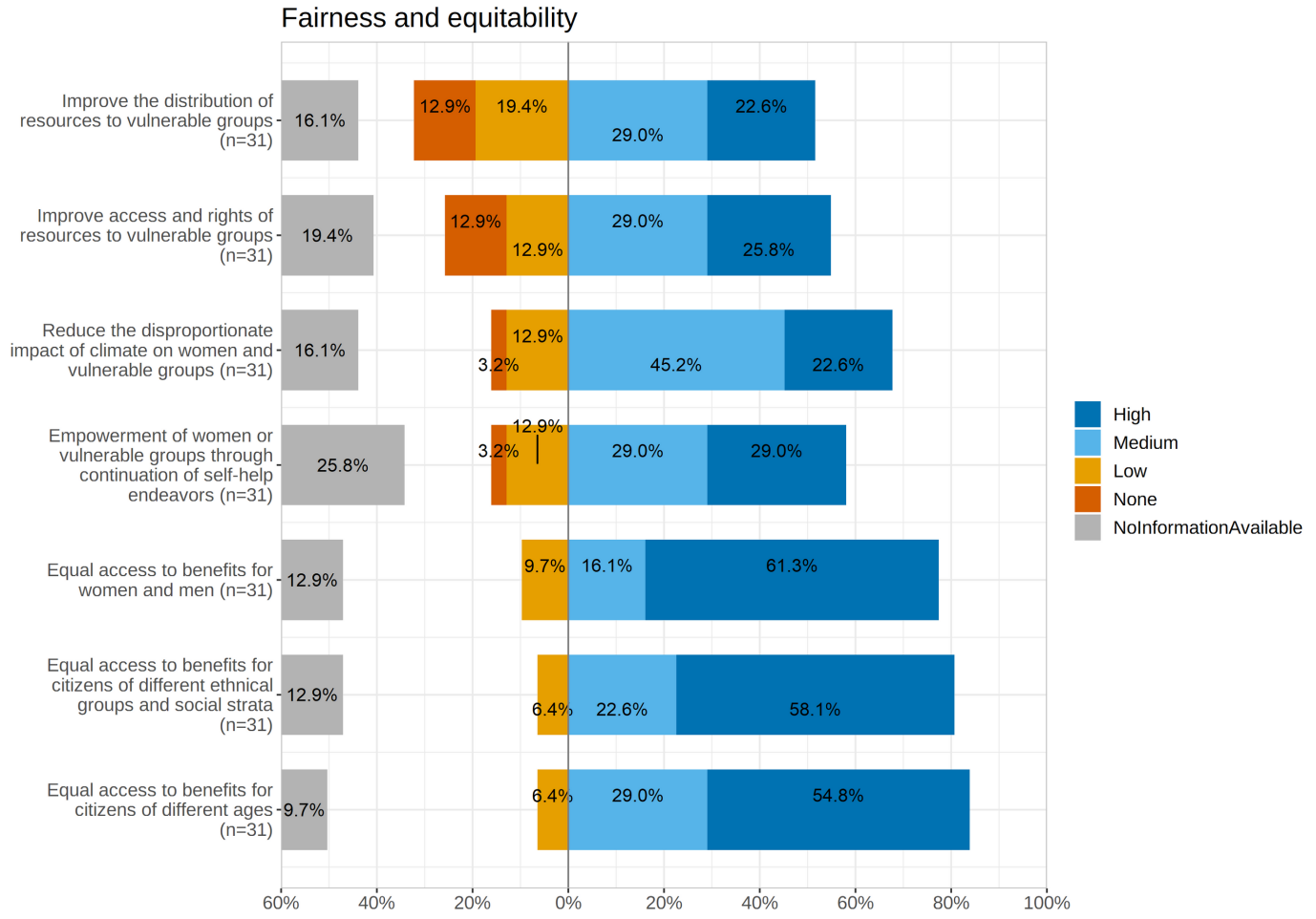

Figure 6. Reported level of Fairness and equitability *across surveyed interventions (n=31)*

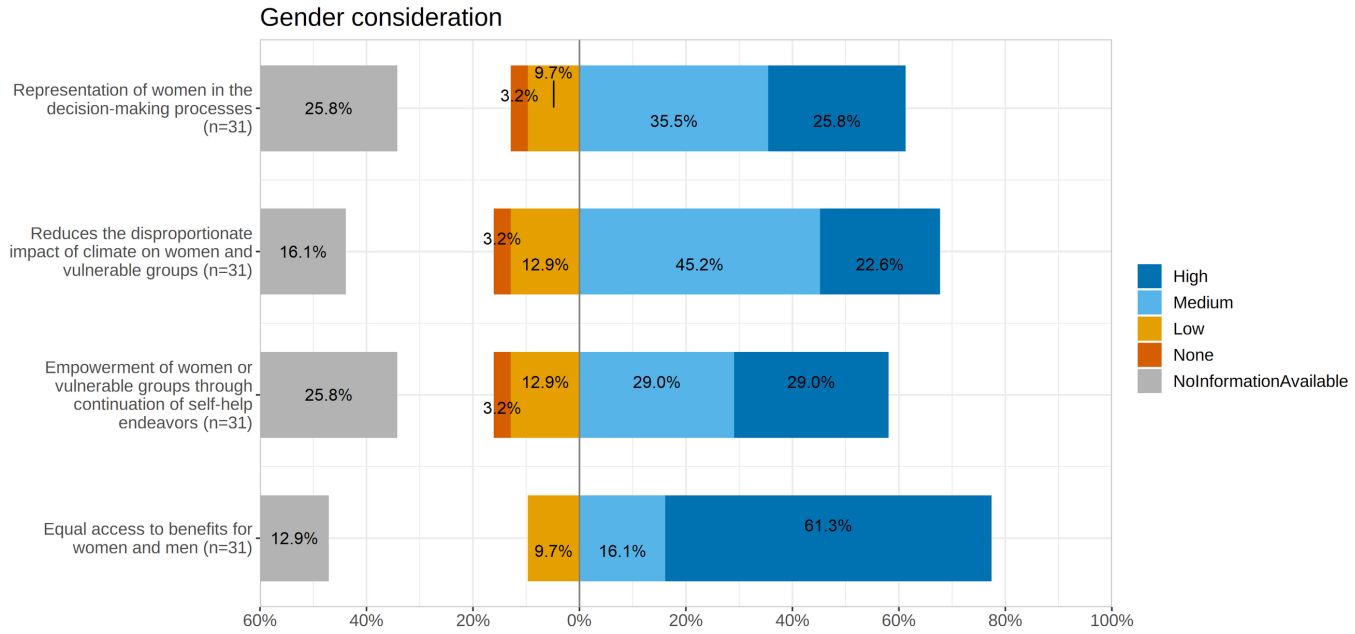

Figure 7. Reported degree of Gender consideration *across surveyed interventions (n=31)*

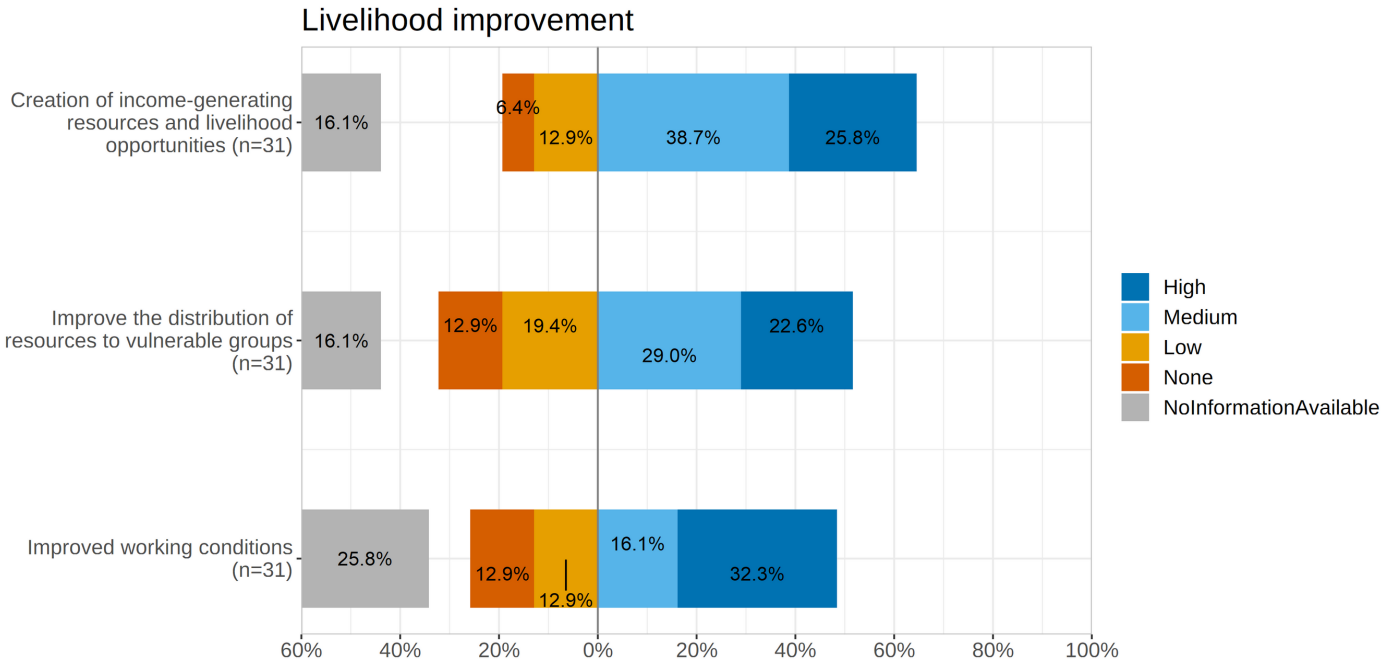

Figure 8. Reported degree of Livelihood improvement *across surveyed interventions (n=31)*

Local organisations implementing urban agriculture to promote food production, livelihood generation and capacity building, in Kayole, Nairobi, Kenya. Image credit: Kayole Mtaa Safi

4. Exploring in-depth narratives of urban EbA and climate justice

This section presents six urban EbA cases chosen from the online survey results.

Cases that met more than three out of six criteria were selected. The criteria were:

1) observable results related to climate change adaptation,
2) implementation in the urban context,
3) grassroots-led projects,
4) innovativeness,
5) underexposed projects and
6) located in the Global South.

These criteria were identified to showcase projects that demonstrate that urban EbA projects are replicable even at a small scale with limited financial and human resources. Two cases from Global North are included because lessons learned from these projects can be transferable to the urban contexts in Global South.

The selected cases were explored more in depth through semi-structured interviews with the programme or project managers and the review of project documents.

Relevant EbA Social Principles are highlighted for each narrative. In addition to the five EbA Social Principles covered by the survey, *Appropriateness of scale* and *Integration of indigenous and local knowledge* were included through further analysis of the selected case studies.

To learn more about each of the case studies beyond the descriptions presented in this publication, view the StoryMaps online (https://arcg.is/1fjzqi0).

Figure 9. Summarised EbA Social Principles

4.1. ResilNam Project, Huế, Vietnam

Title: ResilNam

Location: Huế, Vietnam

Timeline: 2019 - present

Implementing organisation: Centre for Social Research and Development (CSRD), University of Potsdam, Free University of Amsterdam and GRP Water Window funded by Z Zurich Foundation

EbA Social Principles

View the ResilNam StoryMap online: https://arcg.is/9vjDu

Removal of vegetation as part of the maintenance and restoration of the lakes near Huế, Vietnam. Image credit: Centre for Social Research and Development

Flooding is a recurring problem in Central Vietnam's city of Huế where heavy rains and upstream flooding struck the Huế Imperial Citadel in 2020, leaving at least 29 people dead[3]. According to the Vietnam's Ministry of Natural Resources and the Environment, annual rainfall will increase by 2–10% by 2100 and sea levels will rise by up to 94 cm, a potentially dangerous combination which may increase flood risks in the low-lying plains home to the city[4].

ResilNam responds to these and other threats with an ecosystem-based disaster risk reduction (Eco-DRR) approach focused on coastal and urban areas to enhance flood resilience, including via a network of waterways, canals, and ponds whose water retention capacity has been degraded by urban encroachment due to growing population and unregulated urban growth. Local knowledge was integrated by gathering local insights as an ecosystem-based adaptation project for disaster risk management.

The project has restored wetlands, unblocked drainage systems, and dredged canals to improve their functioning for recreation and flood regulation. Wetland restoration for flood water retention has been integrated into a wider framework of blue-green-grey infrastructure, with mangroves also being planted for coastal flood risk reduction, initially on communal lands. These activities, notes co-project leader My Pham, "...raised awareness of city officials and local people about the important role played by the system of waterways and ecosystems." ResilNam plans to hold a film festival to inspire more mangrove planting.

[3] https://e.vnexpress.net/news/travel/places/floodwaters-swamp-hue-imperial-citadel-4175679.html
[4] https://mosaicscience.com/story/mangroves-vietnam-women-environment-climate/

Besides green infrastructure, gender considerations in governance have been key to the project. Based on local consultations and research, women were assessed as being more vulnerable to natural disasters but also playing an important role in valuing and conserving natural resources.

The Centre for Social Research and Development (CSRD) therefore established a women's union to sell mangrove transplants, creating a source of income and thus community buy-in. The regional Disaster Management Committee now also integrates local women's perspectives into Disaster Management Plans.

Despite these successes, the project faced challenges, including convincing local authorities - who preferred quick-win grey solutions such as dykes and reservoirs - of the benefits of green, blue or hybrid solutions, including the need for a mangrove nursery area. The project team also had to work very closely with local authorities to avoid conflicts over land-use access. Finally, because all the land management activities required permissions from multiple government authorities, project implementation activities face major delays.

Remarking on the project's success, My Pham says "we are the first organisation to do EbA in our province. We can see the change in mindsets of provincial disaster management officials. Cities want to be environmentally friendly; they have to consider spaces for public and water retention functions. Women's Unions are also paying more attention to disaster risk management (DRM), sending representatives to the DRM conferences. We can safely say that local people are satisfied with the intervention. We have brought new ideas to our province."

Situation near the ponds in Huế, Vietnam before regeneration initiatives. Image credit: Centre for Social Research and Development

4.2. Palmiet River Rehabilitation Project (PRRP), eThekwini (Durban), South Africa

Title: Palmiet River Rehabilitation Project (PRRP)

Location: eThekwini (Durban), South Africa

Timeline: 2019 - 2022

Implementing organisation: GroundTruth, regional conservancies

EbA Social Principles

View the PRRP StoryMap online: https://arcg.is/0ainfn0

Community being trained to do biomonitoring of the Palmiet River in eThekwini (Durban), South Africa . Image credit: Durban Research Action Partnership (DRAP)

The eThekwini Metropolitan Municipality is the third largest (and quickly growing) city in South Africa, and functions as the major economic hub of KwaZulu-Natal (KZN) Province. Water supply and sanitation are ongoing challenges because the municipality depends on the upper uMngeni catchment, where the quality and volume of water have significantly decreased due to dam construction and degradation of riparian ecosystems due to informal settlements. The latter has increased surface run-off and illegal dumping that pollute water sources and increase flood risk[5].

As a tributary to the uMngeni River, the Palmiet River suffers from these same problems. In addition, other land uses along the river such as high-income residential areas, a university campus and an industrial zone exacerbate flood risks. Acknowledging the benefits of blue-green infrastructure for river management, the eThekwini Municipality initiated the Palmiet River Rehabilitation Project (PRRP), whose key components are to:

- Create artificial wetlands along the river;
- Establish a community-based river management program, engaging all stakeholders;
- Remove alien invasive species (vegetation) from the catchment area;
- Create two rehabilitation plans in the Kingfisher sub-catchment and municipal landfill;
- Support students in calculating the cost of developing green infrastructure.

[5] https://www.sanbi.org/wp-content/uploads/2018/04/ethekwini-project.pdf

Currently, more than four informal settlements are involved in the project. A key social justice feature of this project is their focus on gender with more than 60% of participants required to be women (emphasising gender equity and fair treatment), as many of the settlements' households are headed by women. Youth are also a focus, as it is mainly women and youth who have supported restoration projects. Most men either work in town or migrate to look for work.

The project has dealt with several challenges. First, it was initially planned to end in 2022 after three years. COVID-19 made it difficult to continue PRRP's participatory implementation approach, however, and a formal bidding process (also encountering long delays) is now underway to extend the project. Second, the nature of private land ownership and informal settlements makes the implementation of solutions difficult.

Smiso, the project manager of PRRP, says that although finance for implementation has been challenging, good ongoing relationships with the community have facilitated efforts, especially via local environmental champions. In this regard, the PRRP is becoming a model for other places, with replication and knowledge exchanges via environmental champions in Pietermaritzburg and the Aller River project.

The state of the Palmiet River embankments, near eThekwini (Durban), South Africa, before and after native vegetation was planted by community members to minimise the impact of floods. Image credit: Durban Research Action Partnership (DRAP)

4.3. Green Seattle Partnership, Seattle, United States

Title: Green Seattle

Location: Seattle, United States

Timeline: 2005 - 2025

Implementing organisation: Seattle Parks and Recreation

EbA Social Principles

View the GSP StoryMap online:
https://arcg.is/0yauT4

Volunteers at Green Seattle Day. Image credit: Green Seattle Partnership

The Green Seattle Partnership (GSP) is a 20-year project that was launched in 2005 by Seattle Parks and Recreation. It was designed as a public-private partnership that aims to restore a swathe of aging forest in the city. Stewardship training has been the main focus of the programme, which builds on the narrative of 'Save the trees'. Seattle Parks and Recreation gathers 54 volunteer-based partner organisations, including Mountaineers, Duwamish Alive and the Carkeek Park, among many others.

GSP provides financial, technical and logistical support for removing invasive species such as English ivy and Himalayan blackberry, and planting native species including Douglas firs, Western red cedar, and Western hemlock in city parks[6], helping to reduce stormwater runoff and minimise erosion and sedimentation in Lake Washington and the Puget Sound. Locally, these efforts contribute to greater biodiversity, improved air and soil quality and a reduced urban heat island effect.

Partner organisations' volunteers receive field guides on managing invasive plants, engaging communities in forest stewardship and selecting species for replanting. Their direct stewardship covers 2,700 acres of forested parklands encompassing seven target ecosystems, including conifer and broadleaf forests as well as bogs and fen.

[6] https://www.greenseattle.org/about-us/our-history/

Equitable volunteer participation in these activities is encouraged by five key components described by the Field Guide:

- The aim of having people of colour in proportion to the demographic volunteer hours;
- Individual and programmatic knowledge of institutional racism to be increased via one forest steward training focused on this topic per year;
- Paid opportunities for minorities and underrepresented groups in GSP programming;
- "Equitability lens" applied to all efforts and educational materials; and
- Acknowledgement of tribal history: "We are on the ancestral homelands of the Duwamish and Muckleshoot Tribes, along with other Salish Tribes that have lived here for thousands of years. It's our honour to work with them in healing their ancestral lands." (Forest Steward Field Guide, p. 18)

In this context, improving participation, inclusiveness and equitability within the programme is motivated by awareness of the fact that:

1. Seattle is located on lands that belonged to indigenous peoples, who have been unable to fully express and advocate for themselves on the landscape during the region's recent environmental history; and
2. A 'Save the Trees' rhetoric resonates predominately with a white audience living near forested land in the city's more privileged areas. The aggressive language of 'weeding out invasive species' is problematic in this context, and the GSP is changing the language it employs. While many volunteers participating in GSP are white, the organisation is actively attempting to cast a wider net within the community.

This case study raises the challenges of engaging equitably with a variety of actors in postcolonial, urban contexts, including:

1. a privileged class more receptive to environmental protection discourse,
2. local and indigenous communities, whose land rights and access has been undermined in colonial and postcolonial contexts, and
3. rural migrants that gravitate to urban centres partly due to climate change associated stressors.

It accentuates the importance of choosing appropriate discourse and arguments for urban EbA that will resonate with a multicultural set of actors.

The Duwamish Alive Community Group. Image credit: Green Seattle Partnership

4.4. Stormwater Retention Credit Trading Program, Washington, D.C., United States

Title: Stormwater Retention Credit Trading Program

Location: Washington, D.C., United States

Timeline: 2014 - present

Implementing organisation: District Department of Energy and Environment (DOEE)

EbA Social Principles

Appropriateness of scale

Livelihood improvement

Fairness and equitability

View the SRC StoryMap online: https://arcg.is/0vSjWn0

Retention systems capture and store stormwater runoff and pass it through a filter bed of engineered soil media composed of sand, soil, and organic matter. Rain gardens are a common example of a retention system. Image credit: DOEE

The Stormwater Retention Credit (SRC) Trading Program was launched in 2014 by the Washington, D.C.'s Department of Energy and Environment (DOEE) with the primary aim to reduce stormwater runoff, a priority for Washington, D.C. due to the various rivers in the area, with market incentives toward a switch from grey stormwater detention to a suite of blue-green retention solutions using a rain sponge approach (c.f. passive rainwater harvesting using rain gardens or ponds).

Private investors generate stormwater retention credits (SRCs) when green infrastructure is installed on or impervious surfaces are removed from their properties. These credits can then be sold to the DOEE[7] through the SRC Price Lock Program or on the open market to properties with regulatory requirements for managing stormwater. If new development projects (>5000 feet square) opt for credits rather than meeting stormwater retention requirements, they must purchase credits (two dollars/m^2/yr).

This approach has led to multiple environmental and social benefits, including reduced heat island effects and flood risk in areas where the programme has been implemented. Renewed sightings of the emblematic bald eagle have been recorded, a product of wildlife-rich urban zones with plants, birds and butterflies that improve the quality of life of residents. More non-potable water for irrigation or air-conditioning has also resulted. Decreased stormwater runoff prevents toxic particles

[7] More information available at the Department of Energy & Environment on: https://doee.dc.gov/src

from being discharged into water courses, improving river water quality and the health of fish, which can serve as a free source of protein and may benefit those living in local food deserts.

Individuals and institutions (such as churches, universities and cemeteries[8]) that allow retention structures on their land have seen their property values increased due to the resulting "natural aesthetic." In addition, landowners pay fewer stormwater fees and receive royalties of 5% from the SRC. The SRC projects sign 12-year contracts with local landowners to ensure continued maintenance of green infrastructure. Green jobs were also created by allowing re-training and certifying prison offenders to tender for contracts worth USD 15,000 per year.

A representative of The Nature Conservancy (TNC) cites two key enabling conditions for the SRC scheme:

1. environmentally progressive city governments, and
2. a sufficient resource base.

Additionally, trust building is vital for EbA benefit sharing. In a multicultural city like Washington, D.C., aggregator staff that can 'code switch' or speak like the locals encourages the participation of landowners in marginalised communities, such as the Anacostia River area where distrust has resulted from a legacy of unfair planning initiatives. Because institutional and private landowners involved in the SRC play a major role as stewards to ensure the health of Washington, D.C.'s diverse ecological and social communities, the SRC provides them with financial incentives and environmental and wellbeing benefits to encourage their buy-in. There are now plans to establish an SRC in Chicago, a sign of the upscaling of this successful EbA approach.

In the Global South, an SRC could be a powerful mechanism to reduce stormwater flooding and in urban centres, particularly where modernisation trends (shopping malls, offices, carparks) are driven by investment.

Blue-green retention solutions are being implemented across Washington, D.C., by individuals and institutions, like at Mount Olivet Cemetery. Image credit: Tim Evanson on Flickr

[8] More information available at: https://www.treehugger.com/historic-dc-cemetery-doubles-pollution-absorbing-sponge-4867426

4.5. Kayole Estate Transformation, Nairobi, Kenya

Title: Kayole Estate Transformation Project

Location: Kayole, Nairobi, Kenya

Timeline: 2018 - present

Implementing organisation: Kayole Mtaa Safi

EbA Social Principles

Livelihood improvement

Participation and inclusiveness

Fairness and equitability

View the Kayole StoryMap online: https://arcg.is/00rP5q

Members of Kayole Mtaa Safi bettering their community. Image credit: Kayole Mtaa Safi

Kayole is a neighbourhood in Nairobi, Kenya where Samuel Odamo, director of Kayole Mtaa Safi, is a resident. In 2018, after the World Bank Nairobi Sanitation Project's success with increasing access to running water and wastewater management[9], Odamo and his colleagues at Kayole Mtaa Safi, a local NGO, decided to build on the project's results, bringing the community and government officials together to decide how to use its open spaces, leading to the Kayole Estate Transformation Project.

Run by community volunteers and funded with small grants from the local government, Kayole Mtaa Safi has since carried the project forward, removing garbage, planting trees, and setting up playground structures with the goal of creating a fun and open space for people of all ages, especially children. Sometimes, neighbours donate their time and tools for maintenance work.

Many young people have been active as well, in line with Kayole Mtaa Safi's mission to help youth reach their full potential by taking an active role in improving their environment. According to Odamo, 60-70 local youth have been participating in the Kayole Estate Transformation project, and he is planning to invite more schools with the hope that this spurs a greater sense of community ownership.

[9] https://www.worldbank.org/en/news/feature/2020/02/19/providing-sustainable-sanitation-and-water-services-to-low-income-communities-in-nairobi

Despite challenges like neighbours building illegally and unreliable funding, Odamo and his colleagues are not giving up; they want a safe recreational space for everyone. Odamo thinks that the area's parking lots and river bank can be transformed into a park, which will not only be suitable for recreation but also income-generating food stands or work in photography for special events. "We see the community is really appreciating what we are doing. They are realising the benefits. When you engage the community and the community takes ownership, that means the sustainability of the project is guaranteed," says Odamo.

Although not originally designed with climate adaptation in mind, such grassroots initiatives enhance community resilience, especially when the community agrees on the importance of urban green spaces and feels a sense of ownership. EbA measures can help sustain such efforts over the long term[10].

> "If we want to change the world, the fastest way is to change where I live. It has to start where I live. We change Kayole, we change Nairobi, we change Kenya."
>
> - Samuel Odamo

Community meeting to gather opinions in Kayole, Nairobi, Kenya. Image credit: Kayole Mtaa Safi

[10] More information is available in the Kayole Mtaa Safi website: https://kayolemtaasafi.weebly.com

4.6. Páramos Conservation Corridor Project, Bogotá, Colombia

Title: Páramos Conservation Corridor

Location: Bogotá, Colombia

Timeline: 2008 - present

Implementing organisation: Conservation International

EbA Social Principles

Livelihood improvement

Participation and inclusiveness

Appropriateness of scale

View the Páramos StoryMap online: https://arcg.is/1yH4Of0

Replanting native vegetation near Bogotá, Colombia. Image credit: Conservation International

The Páramos Conservation Corridor Project has been recognised in Bogotá and abroad for its achievements. The work on the Urban Creek of Bogotá received the Award for Global Best Practices in Ecological Restoration from the Global Forum on Human Settlement. Led by Conservation International (CI), the project has focused on Nature-based Solutions in the form of EbA in Bogotá and surrounding peri-urban and natural areas since 2008. The project addresses the complex issues of rural-urban connectivity via watershed restoration for reliable downstream water supplies for approximately 8 million Bogotáns.

Located in the upper reaches of the watershed 3,000 meters above sea level, three páramos, a high-altitude wetland ecosystem unique to the Andes, surround Bogotá. Almost like a sponge, these páramos naturally filter and retain water, slowly releasing it into 192 creeks and streams that eventually reach Bogotá. The 192 creeks that drain to Bogotá come from the “Cerros Orientales”, a mountain chain located at the east of Bogotá. Three main páramos serve as reservoirs to supply water to the city via pipelines. Despite their importance, the páramos are under threat from direct human degradation, invasive species (gorse shrubs), and climate impacts such as erratic rainfall patterns and high temperatures.

CI, with the support of local communities and the government, started in 2014 to restore creeks and streams for better flood controland eco-tourism at two pilot sites located at the junction between city limits and natural areas. Once considered dangerous, these sites now have

adequate lighting at night and have become favourite locations for ecotourism. For example, the removal of invasive species alongside restoration efforts have made the Las Delicias Creek the second most popular nature trail in Bogotá, used by 3,000 people a week while providing job opportunities to locals.

Although this project's success has motivated the city of Bogotá and the municipal government to replicate the project and scale up its EbA strategies elsewhere, Natalia Acero, Water and Cities Program Director of CI-Colombia, points to the dual challenge of valuing EbA benefits and addressing social issues during the restoration process.

"Nature restoration is important. But what matters more is social restoration and trust building. Everything depends on them, and they are the key for sustainability. If you don't involve the communities and stakeholders, even if you restore the entire watershed, it wouldn't work," Acero says.

To help with trust building, CI established a community theatre in 2017 where unhoused individuals can carry out small jobs and earn money. However, restoring social trust remains a question of time and dedication.

Engaging and raising awareness with young children in Bogotá, Colombia. Image credit: Conservation International

A waterfall a short walk from downtown Bogotá, Colombia. Image credit: Conservation International

Removing invasive vegetation in Bogotá, Colombia. Image credit: Conservation International

5. Towards the holistic inclusion of justice elements in EbA interventions in the Global South

5.1. Summary of key learnings from the survey

Most urban EbA interventions were reported to include a mix of adaptation elements, including social, physical and institutional measures. The majority of interventions reported having far-reaching spatial impacts, as opposed to household or stand-alone interventions. Accordingly, the majority of surveyed interventions occur in the core urban areas or in a mix of urban and peri-urban areas. Few occur in peri-urban areas only.

The exploratory nature of the survey did not allow for the distinction of preference for one type or a cluster of components or purposes when urban EbA is planned and implemented in the Global North, as compared to interventions in the Global South. Furthermore, actual, observed impacts from an urban EbA intervention may vary from planned interventions, and will need time for observation and further processes of refinement of the initiative. The existing evidence base on urban EbA is scattered and it is therefore difficult at present to assign a robust classification of EbA in the Global North as distinctly different from EbA in the Global South.

The survey provided evidence on the social elements linked to the reported interventions of urban EbA. The EbA Social Principles incorporated into the survey are: *Participation & inclusiveness*, *Capacity building*, *Fairness and equitability*, *Gender consideration* and *Livelihood improvement.* Figure 9 shows the level of consideration of elements of the EbA Social Principles across the surveyed case studies. Results will be discussed in the following paragraphs per EbA Social Principle.

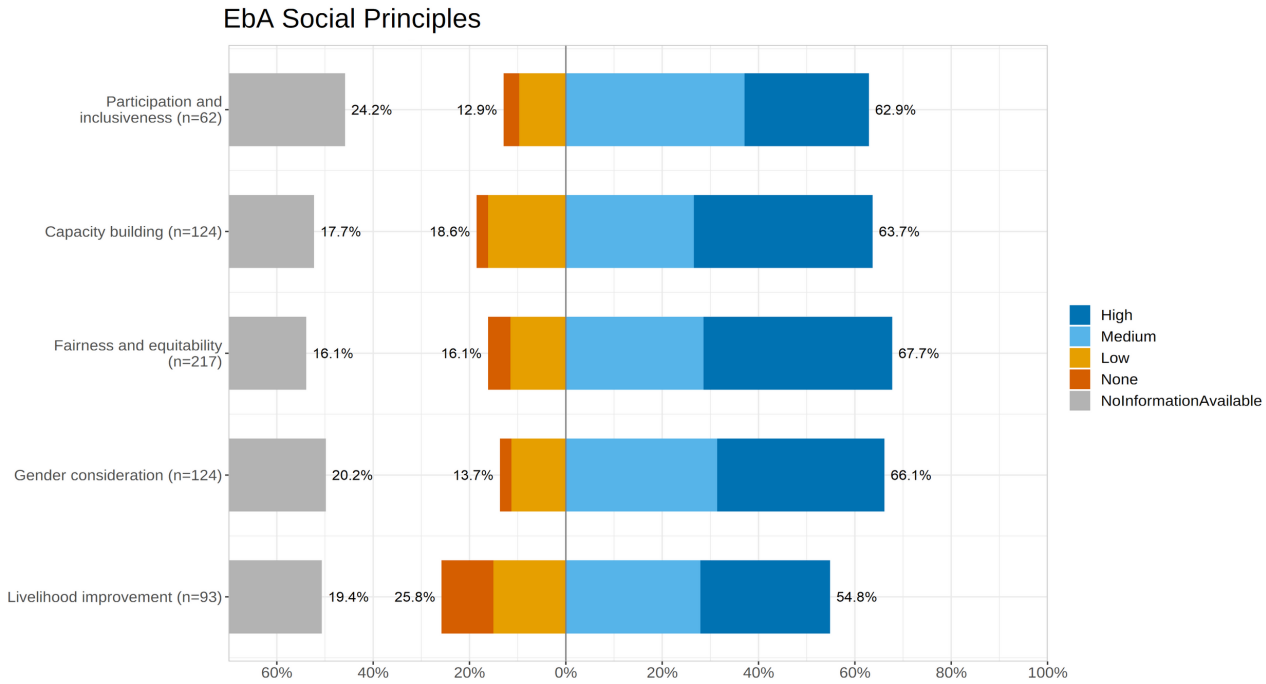

Figure 10. Aggregated scores for the level of consideration of EbA Social Principles in surveyed interventions (n=31)

The majority of urban EbA interventions reported a high level of ***Participation and inclusiveness*** across all phases of implementation. Most of the projects declared a high or medium level of participation of women and different citizen groups during the decision-making processes. The level of citizen and stakeholder engagement was higher during the implementation phase, as compared to the planning phase. Concrete examples of the application of this principle can be found in the inclusion of unhoused and young people for eco-tourism activities in the Páramos Conservation Corridor Project, Bogotá, Colombia; or via relying on volunteer work in the Palmiet River Rehabilitation Project (PRRP), Durban, South Africa.

With regards to ***Capacity building***, potential for empowering local stakeholders and citizens was identified as high. Half of the case studies pointed to capacity-building processes that have taken place and measures that have been integrated into governance structures. However, the other half of case studies reported lower potential or no information. Examples of the inclusion of this principle can be found via the institutional changes promoted by the ResilNam Project, Huế, Vietnam or via the collaboration between citizens and the government in the Páramos Conservation Corridor Project, Bogotá, Colombia.

In the category of ***Fairness and equitability***, most case studies stated a high potential for granting equal access to the benefits for citizens of different ages, ethnical groups, and social strata and for men and women. Improving rights, distribution and access of resources to vulnerable groups was identified with a lower potential, even though half of the case studies declared having some degree of potential.

More than three quarters of case studies reported granting equal access to the benefits for women and men. The percentage of interventions that grant representation of women in the decision-making process dropped to only half. The ***Gender consideration*** principle was particularly prominent in the ResilNam Project, Huế, Vietnam. A key factor was to recognise the different vulnerability of women to disasters, as well as women's role in conserving natural resources. Another example of a key policy is the implementation of a quota for minimum participation of women, such as in PRRP, Durban, South Africa.

With regards to ***Livelihood improvement***, a high potential for the creation of income-generating resources was reported for more than half of case studies. Improving working conditions was identified as having a lower potential in the category. Evidence from the ResilNam Project, Huế, Vietnam shows the application of this principle by setting up a women's union for selling mangroves. Another example is the increased potential of eco-tourism as an alternative income source for poor neighbourhoods in the Páramos Conservation Corridor Project, Bogotá, Colombia.

From the set of EbA Social Principles analysed in-depth for selected case studies, the more frequently cited principles are *Participation and inclusiveness*, *Capacity building* and *Livelihood improvement*. In contrast, *Appropriateness of scale*, *Fairness and equitability*, *Gender consideration* and *Integration of indigenous and local knowledge* are less represented in the selected in-depth cases.

The surveyed case studies together with the in-depth narratives show a clear potential for urban EbA interventions to deliver climate-just measures in the Global South. However, the effective inclusion of climate justice elements should be intentional and integrated in the planning phase to be fully reflected in the EbA related procedures as well as outcomes. It should be noted that to also reflect recognitional justice framings of climate justice, historic contexts and root causes of inequalities should also be accounted for in both procedures and outcomes. The examples of urban EbA interventions gathered and presented here contribute to the knowledge base, but the FEBA Urban EbA Working Group recognises the need to continue developing and sharing knowledge related to urban EbA in the Global South.

5.2. Recommendations for practitioners and policy makers

On ensuring urban EbA interventions contribute to climate justice

Based on the evidence provided by the survey results and the in-depth analysis, the following recommendations can be highlighted by the FEBA Urban EbA WG:

- Recognising and incorporating the guiding principles for just urban EbA interventions is crucial. This joint technical paper provides a framework for linking the proposed EbA Social Principles with climate justice principles. Including climate justice principles in urban EbA interventions not only produces short-term benefits for people and nature, but also ensures long-term sustainability.
- Translating climate justice elements into concrete project guidelines can be challenging due to lack of information, particularly in the Global South. This joint technical paper provides a starting theoretical basis and evidence of EbA Social Principles linked to climate justice. We advise practitioners to use this paper as a starting point to advance common understanding of just urban EbA interventions in the Global South.
- When designing and implementing urban EbA interventions, special attention should be dedicated to making sure that livelihoods are improved, capacity building processes are delivered, and gender equitability is considered (these three aspects were less frequently considered among 31 case studies from the survey).
- We advise practitioners and policy makers to foster stakeholder participation, in particular the participation of more vulnerable groups, during planning and implementation processes. Where applicable, EbA interventions should focus on addressing the root causes of vulnerability.

Community members working together to improve their surroundings near Bogotá, Colombia. Image credit: Conservation International

Youth spending time together by an urban water body in Huế, Vietnam. Image credit: Rene Arnold / Centre for Social Research and Development

- Consideration of different scales of action and promoting equitable access to benefits from urban EbA interventions were principles reported of frequent consideration among case studies. We encourage the continued intentional inclusion of these principles for future interventions.
- Financing urban EbA interventions is a common challenge. Financing mechanisms exist, such as low-interest loans, conservation-oriented microfinance, special funds, tax incentives, and payments for ecosystem services, but funding opportunities must be expanded.

The FEBA Urban EbA WG advises practitioners, policymakers and other stakeholders to refer to this technical paper for documented case studies and evidence of success factors, and to build on the concepts presented here to improve just implementation of EbA around the world.

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7. Annexes

Annex 1. Matching Characteristics of Social EbA Principles and Criteria

This table presents theoretical elements from selected sources that relate to the EbA Social Principles.

Participation and inclusiveness

- "Ensure that EbA and Eco-DRR are sectorally cross-cutting and involve collaboration, coordination, and co-operation of stakeholders and rights holders" (Secretariat of the Convention on Biological Diversity, 2019, p.44).
- "Interventions must be designed to be inclusive and to consider the needs of and impacts of climate change on marginalised groups" (DEA & SANBI, 2017, p 6).
- "Interventions are designed, developed and implemented through participatory processes" (DEA & SANBI, 2017, p 6).
- "Integrating environmental approaches into disaster risk management and CCA requires multi-sectoral and multi-disciplinary collaboration, all while involving local stakeholders in decision-making" (Sudmeier-Rieux et al., 2019, p 79).
- EbA should involve "participatory planning, recognising the needs of the poorest and most vulnerable is essential" (Andrade et al., 2012, p.3)
- "The different and multiple benefits of EbA are channelled to the stakeholders and local communities concerned" (Andrade et al., 2012, p.3).
- "EbA is participatory, transparent, accountable, culturally appropriate and actively embracing equitability and gender issues. For this to happen: ... Planning should focus on equality and the special needs of marginalised social groups and promote active, free, meaningful and full participation of stakeholders" (Andrade et al., 2012, p.3).
- EbA "supports equitable governance and enhances capacities.- EbA enhances governance of natural resources with respect to the use of biodiversity and ecosystem services, by following a community-centered, participatory and gender-sensitive approach; it embraces transparency, empowerment, accountability, non-discrimination and active, meaningful and free participation at the local level" (Friends of Ecosystem-based Adaptation (FEBA, 2017).
- "NbS are based on inclusive, transparent and empowering governance processes" - Criterion 5 in (IUCN, 2020).
  - "All NbS should have an inclusive approach when identifying and establishing governance mechanisms, and recognise and respect pre-existing cultural practices and land uses where possible, throughout the lifecycle of the intervention and beyond. ... All stakeholder groups should be represented and their stakes in the intervention considered when making decisions concerning the NbS" (IUCN, 2020, p.29).
  - "Full participation is important to the success of the intervention. Passive participation where certain stakeholder groups may simply be informed of what will or has happened will detract from the robustness of the process. Similarly, participation cannot be an information extraction exercise by one or more stakeholder groups, nor can it be based on coercion or incentivised by material gains" (IUCN, 2020, p.30).
  - "NbS should allow for the active participation of all people who may be directly or indirectly affected from the start to end of the intervention" (IUCN, 2020, p.30).

Capacity building

- "Raising awareness and building capacity" (Secretariat of the Convention on Biological Diversity, 2019).
- "Interventions are supported by capacity building processes" (DEA & SANBI, 2017, p 6).
- "Interventions support learning networks, communities of practice and the co-generation of knowledge" (DEA & SANBI, 2017, p 6).
- EbA "supports equitable governance and enhances capacities.- EbA enhances governance of natural resources with respect to the use of biodiversity and ecosystem services, by following a community-centered, participatory and gender-sensitive approach; it embraces transparency, empowerment, accountability, non-discrimination and active, meaningful and free participation at the local level" (FEBA, 2017).
- "NbS are based on inclusive, transparent and empowering governance processes" - Criterion 5 in (IUCN, 2020).
  - "To achieve participatory, equitable, transparent and accountable governance of NbS interventions, the approach needs to empower stakeholders, especially those who may be poor, less influential or marginalised, at the start of the process, through proactive capacity enhancement and knowledge sharing" (IUCN, 2020, p.29).

Fairness and equitability

- "EbA and Eco-DRR should promote fair and equitable access to benefits and should not exacerbate existing inequities, particularly with respect to marginalised or vulnerable groups. EbA and Eco-DRR interventions should meet national labour standards, protecting participants against exploitative practices, discrimination and work that is hazardous to their well-being" (Safeguard) (Secretariat of the Convention on Biological Diversity, 2019).
- "Interventions are cognisant of the disproportionate impacts of climate change on women and are designed with this in mind" (DEA & SANBI, 2017, p 6).
- "EbA is participatory, transparent, accountable, culturally appropriate and actively embracing equitability and gender issues. For this to happen … - Planning should focus on equality and the special needs of marginalised social groups and promote active, free, meaningful and full participation of stakeholders; … - EbA should aim to empower people as rightful directors of their own future in the face of climate change and development" (Andrade et al., 2012, p.3).
- EbA "generates societal benefits in the context of climate change adaptation. EbA reduces vulnerabilities of people through the use of biodiversity and ecosystem services and by producing societal benefits in a fair and equitable manner" (FEBA, 2017, p. 5).
- "NbS are based on inclusive, transparent and empowering governance processes" - Criterion 5 in (IUCN, 2020).
  - "NbS also need to contribute to addressing structural, emotional and governance inequities that may exist, especially those that keep the most marginalised from decision-making power" (IUCN, 2020, p.29).
  - "Where stakeholders are subject to inequality, inequity and marginalisation, in terms of their power, social position, culture or financial status, the underlying causes should be understood and all efforts made to reduce or avoid such inequities as much as possible" (IUCN, 2020, p.31).
- "NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits. Fair and transparent negotiation of trade-offs and compensation among potentially affected parties for any loss as a result of the NbS, including livelihoods, provides the basis for successful long-term NbS outcomes" - Criterion 6 in (IUCN, 2020, p.32).

Gender consideration

- "Maximise synergies in achieving multiple benefits, including for biodiversity, conservation, sustainable development, gender equality, health, adaptation, and risk reduction" (Secretariat of the Convention on Biological Diversity, 2019, p.44).
- "Interventions are cognisant of the disproportionate impacts of climate change on women and are designed with this in mind" (DEA & SANBI, 2017, p 6).
- "EbA is participatory, transparent, accountable, culturally appropriate and actively embracing equitability and gender issues. For this to happen: … Vulnerability assessment processes and adaptation measures must be gender sensitive" (Andrade et al., 2012, p.3).
- "EbA enhances governance of natural resources with respect to the use of biodiversity and ecosystem services, by following a community-centered, participatory and gender-sensitive approach … The ability to adapt to climate change hinges on the ability of local people (comprising different groups, genders, customary bodies, etc.) to take on their rights and responsibilities and to be represented by officials who are accountable to them" (FEBA, 2017).
- "NbS are based on inclusive, transparent and empowering governance processes" - Criterion 5 in (IUCN, 2020).
  - "Participation is based on mutual respect and equality, regardless of gender, age or social status, and upholds the right of Indigenous Peoples to Free Prior and Informed Consent" (IUCN, 2020, p.30).

Livelihood improvement

- "Maximise synergies in achieving multiple benefits, including for biodiversity, conservation, sustainable development, gender equality, health, adaptation, and risk reduction" (Secretariat of the Convention on Biological Diversity, 2019, p.44).
- "Interventions must result in tangible benefits to people within the context of climate change adaptation" (DEA & SANBI, 2017, p 6).
- "Interventions support socio-economic benefits that go beyond improving adaptive capacity" (DEA & SANBI, 2017, p 6).
- "Eco-DRR and EbA is anchored in sustainable livelihoods and development. … Eco-DRR strategies need to align with long-term development challenges, such as poverty reduction and addressing unsustainable use of natural resources through sustainable livelihoods development" (Sudmeier-Rieux et al., 2019, p 78).
- EbA "is about promoting the resilience of both ecosystems and societies. This means: … Ensuring that local stewardship enhances both livelihoods and ecosystem management" (Andrade et al., 2012, p.2).
- EbA "Generates societal benefits in the context of climate change adaptation" (FEBA, 2017, p. 5).
- "Design of NbS is informed by scale." - Criterion 2 in (IUCN, 2020).
  - "While planning the NbS, it is important to actively seek potential synergies with diverse sectors (e.g. agriculture, forestry, water, health, etc.) that could contribute to the NbS, address livelihood needs and improve environmental quality" (IUCN, 2020, p.20).
- "NbS are economically viable." - Criterion 4 in (IUCN, 2020).
  - "For example, the creation of green jobs and sustainable livelihoods can be integrated within the scope of an NbS intervention to provide incentives for further impact" (IUCN, 2020, p.26).

Appropriateness of scale

- "Design EbA and Eco-DRR interventions at the appropriate scales, recognising that some EbA and Eco-DRR benefits are only apparent at larger temporal and spatial scales" (Secretariat of the Convention on Biological Diversity, 2019, p.44).
- "Interventions must use credible, scale relevant climate scenarios" (DEA & SANBI, 2017, p 6).
- "EbA operates at multiple geographical scales. To do this:
  - Landscape-scale approaches and impact assessments are important to identify cumulative and indirect drivers of vulnerability;
  - ... Institutions involved should develop strong and linkages, as ecosystems do not necessarily relate to political or administrative nits, or to the scale in which the private sector operates" (Andrade et al., 2012, p.2).
- "EbA measures need to reduce climate vulnerability for people at an appropriate scale (e.g. at least local scale but ideally ecosystem or landscape/seascape scale)" (FEBA, 2017, p. 5).
- EbA "is supported by policies at multiple levels. As part of a larger adaptation strategy, EbA operates at one or more levels (i.e. local, national, regional, landscape, and sectoral levels), and can involve supporting sectoral adaptation and multi-sectoral approaches at multiple geographic scales. It is, or becomes, an integral part of key policies and implementation frameworks targeted towards sustainable development, agriculture, land use, poverty reduction, natural resource management, climate change adaptation, and disaster risk reduction. EbA should be integrated into existing policy frameworks so that interventions can be sustainable and scalable, rather than short-term and stand-alone" (FEBA, 2017, p. 6).
- "Design of NbS is informed by scale." - Criterion 2 in (IUCN, 2020).
  - "Good NbS design is aware of and takes into account the interactions that occur across different social and ecological scales within a land or seascape" (IUCN, 2020, p.19).

Integration of indigenous and local knowledge

- "Ensure that EbA and Eco-DRR interventions are evidence-based, integrate indigenous and traditional knowledge, where available, and are supported by the best available science, research, data, practical experience, and diverse knowledge systems" (Secretariat of the Convention on Biological Diversity, 2019, p.44).
- "EbA interventions are knowledge and evidence-based as informed by the best available science and robust indigenous and local knowledge" (DEA & SANBI, 2017, p 6).
- "Integrating environmental approaches into disaster risk management requires multi-sectoral and multi-disciplinary collaboration, while also involving local stakeholders in decision-making. Successful implementation of Eco-DRR/EbA needs multi-sectoral cooperation and multi-disciplinary approaches and teams. It requires involving people with different technical expertise and knowledge, for instance city engineers and land developers working together with ecologists and disaster management experts, as well as including those with local or traditional/ indigenous knowledge.
  - ... Understanding different local livelihoods needs and priorities, utilising local or traditional knowledge, and involving local stakeholders in decision making are critical for promoting risk reduction through sustainable ecosystems management. Local communities are direct users of the natural resources in their area and their knowledge of local ecosystems should be used for planning of Eco-DRR/EbA initiatives. Raising the awareness of local men and women by demonstrating the combined livelihoods and risk reduction benefits of ecosystem management is equally important in winning and sustaining local support" (Sudmeier-Rieux et al., 2019, p 79).
- "EbA is based on the best available science and local knowledge, and should foster knowledge generation and diffusion. For this to happen:
  - ... The best available scientific knowledge and climate modelling should be used in conjunction with local knowledge. Sharing and incorporating indigenous and local knowledge in ways that comply with the principles of free, prior, and informed consent, is critical to ensure effective and locally appropriate adaptation" (Andrade et al., 2012, p.3).
- "A combination of climate information (based on the best available scientific data and models and local knowledge) and vulnerability assessments should form the basis for implementation" (FEBA, 2017, p. 6).
- "NbS are based on inclusive, transparent and empowering governance processes." - Criterion 5 in (IUCN, 2020).
  - "Participation should be aimed at ensuring that a diversity of knowledge, skills and ideas inform the implementation and evolution of the intervention, whereby stakeholders have ownership of NbS and can even self-mobilise collective and continued actions post intervention" (IUCN, 2020, p.30).
- "NbS are managed adaptively, based on evidence." - Criterion 7 in (IUCN, 2020).
  - "Learning based on evidence should drive NbS management ... Further evidence, produced from both traditional and scientific knowledge sources, can also be brought into the iterative learning process" (IUCN, 2020, p.34).

Annex 2. EbA Social Principles and Their Link to the Bali Principles of Climate Justice

This table shows the links between the Bali Principles of Climate Justice (left) and the EbA Social Principles (top). The blue highlights represent a link and the text therein provides an explanation.

	Participation and inclusiveness	*Capacity building*	*Fairness and equitability*	*Gender consideration*	*Livelihood improvement*	*Considera-tion for scaling*	*Integration of indigenous and local knowledge*
1. Affirming the sacredness of Mother Earth, ecological unity and the interdependence of all species, Climate Justice insists that communities have the right to be free from climate change, its related impacts and other forms of ecological destruction.			Fairness can be linked with "the right to be free from" negative impacts and changes from EbA solutions.				
3. Climate Justice affirms the rights of indigenous peoples and affected communities to represent and speak for themselves.	Participation of IP and affected communities in all phases of EbA.						
4. Climate Justice affirms that governments are responsible for addressing climate change in a manner that is both democratically accountable to their people and in accordance with the principle of common but differentiated responsibilities.			EbA can promote fairness in societies if it supports democratic accountability and common but differentiated responsibilities.				
5. Climate Justice demands that communities, particularly affected communities play a leading role in national and international processes to address climate change.	Participation of communities, especially affected communities, in higher level processes in situations where EbA is scaled up and out.						
9. Affirming the principle of Ecological debt, Climate Justice protects the rights of victims of climate change and associated injustices to receive full compensation, restoration, and reparation for loss of land, livelihood and other damages.		EbA can protect the rights of victims of climate change by helping them adapt with distributive justice.					

	Participation and inclusiveness 	*Capacity building* 	*Fairness and equitability* 	*Gender consideration* 	*Livelihood improvement* 	*Considera-tion for scaling* 	*Integration of indigenous and local knowledge* 
13. Climate Justice affirms that any market-based or technological solution to climate change, such as carbon-trading and carbon sequestration, should be subject to principles of democratic accountability, ecological sustainability and social justice.	EbA can be organised and funded via market-based solutions, such as payment for ecosystem services, which should involve local communities and engage in procedural justice.		EbA can be organised and funded via market-based solutions, such as payment for ecosystem services, from which the benefits should be distributed fairly and equitably.				
15. Climate Justice affirms the need for solutions to climate change that do not externalise costs to the environment and communities, and are in line with the principles of a just transition.			EbA as part of a just transition should not externalise or unfairly distribute costs to communities or the environment.		EbA as part of a just transition should not externalise or unfairly distribute costs of implementation, including impacts to local livelihoods.		
16. Climate Justice is committed to preventing the extinction of cultures and biodiversity due to climate change and its associated impacts.			EbA can help level the playing field by supporting local cultures and biodiversity affected by climate change.				To prevent extinction of cultures, EbA solutions need to integrate, utilise and value cultural knowledge.
17. Climate Justice affirms the need for socio-economic models that safeguard the fundamental rights to clean air, land, water, food and healthy ecosystems.			EbA safeguards fundamental rights to healthy ecosystems including fair and equitable access and use.				
18. Climate Justice affirms the rights of communities dependent on natural resources for their livelihood and cultures to own and manage the same in a sustainable manner, and is opposed to the commodification of nature and its resources.	EbA can promote and empower sustainable community management and ownership of natural resources.		EbA can promote fairness for communities to own and manage their natural resources.		EbA can promote community management for their own livelihood improvement in a way that is in opposition to commodifica-tion of nature and its resources.		
19. Climate Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.			Fairness and equitability are the expression of mutual respect and justice for all peoples and freedom from bias/discrimi-nation.	Gender consider-ation can be a component of mutual respect and justice for all peoples and freedom from bias/discrim-ination.			

	Participation and inclusiveness 	*Capacity building* 	*Fairness and equitability* 	*Gender consideration* 	*Livelihood improvement* 	*Considera-tion for scaling* 	*Integration of indigenous and local knowledge* 
20. Climate Justice recognises the right to self-determination of Indigenous Peoples, and their right to control their lands, including sub-surface land, territories and resources and the right to the protection against any action or conduct that may result in the destruction or degradation of their territories and cultural way of life.			The right of IPs to self-determination and control / protection of their lands is fair and equitable.				To protect against the destruction of cultural way of life, EbA solutions need to value and utilise traditional and local knowledge.
21. Climate Justice affirms the right of indigenous peoples and local communities to participate effectively at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation, the strict enforcement of principles of prior informed consent, and the right to say "No."	Effective participation of IPs at every level is crucial for their inclusion, including through FPIC.						Empower-ing local and indigenous voices in EbA decision-making can help them protect and integrate traditional knowledge.
22. Climate Justice affirms the need for solutions that address women's rights.			EbA solutions should be fair and equitable to women and other gender minorities.	Gender consider-ation in EbA relates directly to solutions that address women's rights.			
23. Climate Justice affirms the right of youth as equal partners in the movement to address climate change and its associated impacts.	Participation and inclusion of youth in EbA recognises their specific vulnerabilities and contributions.		Having youth as partners in EbA planning and implementation enables them to more fairly and equitably benefit from EbA.				
25. Climate Justice calls for the education of present and future generations, emphasises climate, energy, social and environmental issues, while basing itself on real-life experiences and an appreciation of diverse cultural perspectives.	Participation and inclusion of stakeholders with diverse cultural perspect-ives and experiences is crucial for raising awareness and understanding of EbA.	Education about EbA using real life experi-ences and diverse perspect-ives is needed in capacity-building.					Real life experiences and appreci-ation of diverse cultural perspectives are reflected in indigenous and local knowledge.

	Participation and inclusiveness	*Capacity building*	*Fairness and equitability*	*Gender consideration*	*Livelihood improvement*	*Considera-tion for scaling*	*Integration of indigenous and local knowledge*
26. Climate Justice requires that we, as individuals and communities, make personal and consumer choices to consume as little of Mother Earth's resources, conserve our need for energy; and make the conscious decision to challenge and reprioritise our lifestyles, re-thinking our ethics with relation to the environment and the Mother Earth; while utilising clean, renewable, low-impact energy; and ensuring the health of the natural world for present and future generations.	Everyone is called upon to participate by making active choices as consumers.		Ensuring the health of the natural world for present and future genera-tions will promote fairness and equitability of benefits and impacts for different segments of society.				
27. Climate Justice affirms the rights of unborn generations to natural resources, a stable climate and a healthy planet.	Inclusion of future generations expands the notion of participa-tion in a radical way. Actions need to consider future generations .	Capacity building is required for future generations to adapt to climate impacts.	EbA solutions need to be fair and equitable towards future generations.		EbA can help prevent the degradation of resources that are needed to support future livelihoods.	Considera-tion of future generations relates to temporal and geospatial scaling and planning, including scaling of the urgency for climate action and justice.	

Annex 3. FEBA survey on practical examples of urban EbA

This annex provides links to view the 'FEBA survey on practical examples of urban EbA.'

View the English version of the survey as a PDF document here: https://www.iucn.org/sites/dev/files/feba_survey_on_practical_examples_of_urban_eba.pdf

View the English version of the survey as a Word document here: https://www.iucn.org/sites/dev/files/feba_survey_on_practical_examples_of_urban_eba.docx

The survey was designed in English and then translated to Spanish, French and Portuguese.

Endorsements

INTERNATIONAL CLIMATE INITIATIVE (IKI)

IUCN | Urban Alliance

International Rainwater Harvesting Alliance
IRHA

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

GLOBAL ADAPTATION NETWORK

(TMG) ThinkTankforSustainability
Töpfer Müller Gaßner

IISD
International Institute for Sustainable Development

Climate Change
Africa Opportunities

The views presented herein do not necessarily represent the official position of any organisations listed here.