

This is a repository copy of *Dryland nature based solutions for informal settlement upgrading schemes in Africa*.

White Rose Research Online URL for this paper:
<https://eprints.whiterose.ac.uk/170735/>

Version: Published Version

Other:

Thorn, Jessica Paula Rose, Hejnowicz, Adam Peter, Marchant, Robert orcid.org/0000-0001-5013-4056 et al. (5 more authors) (2021) *Dryland nature based solutions for informal settlement upgrading schemes in Africa*. ICLEI Africa.

Reuse

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

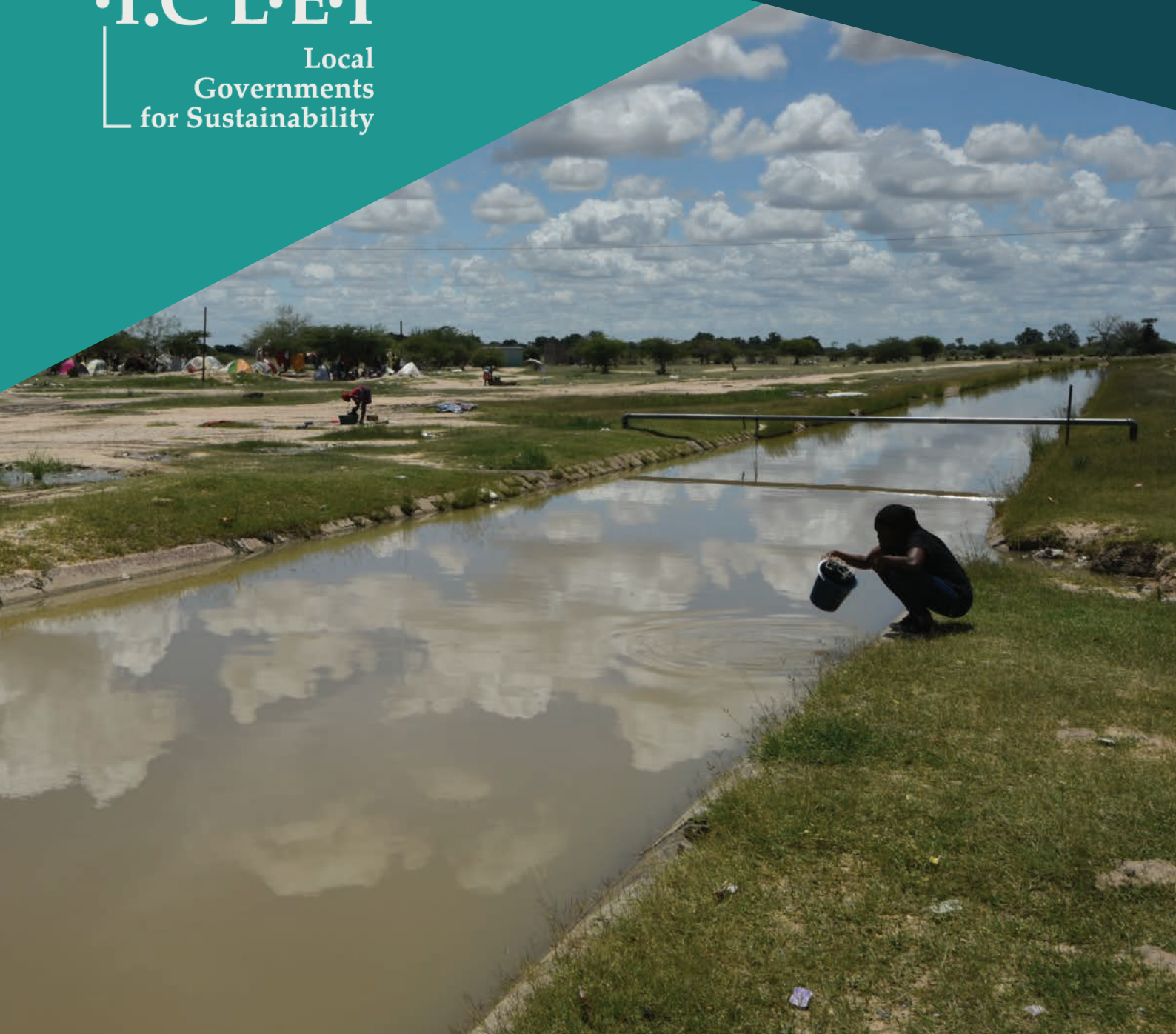
Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

POLICY BRIEF

Dryland nature based solutions for informal settlement upgrading schemes in Africa

·I.C·L·E·I
Local
Governments
for Sustainability



Upgrading schemes are increasingly used by city and national governments to address rapid unplanned peri-urban growth, improve infrastructure services and living conditions, and enhance resilience to climate change for the most marginalised vulnerable urban populations. Part of this upgrading process involves introducing alternative tenure systems to address innovation and sustainable development challenges. Nature-based solutions (NBS) are actions which work with and enhance nature to produce a diverse range of services on which human well-being depends. Building protecting and restoring NBS is particularly useful in resource-constrained informal settlements, due to cost-effectiveness, health and economic co-benefits. In some instances, in-situ upgrading programmes combined with flexible tenure systems and NBS have the scale and scope to impact a significant proportion of urban populations. Namibia is pioneering this approach, having chosen three pilot cities, namely Windhoek, Gobabis and Oshikati, as part of the roll-out of its national [Flexible Land Tenure Act](#)¹. Among many, this act aims to fill the gap in tenure regularisation for the most vulnerable groups.

Based on an ongoing study in these cities looking at rural-urban climate resilient futures in Namibia, Kenya and Tanzania through the “[Peri-Urban Resilient Ecosystems](#)” partnership, the following **ten practical recommendations provide guidance for urban policy makers, planners, designers and local authorities in dryland areas. The ten practical recommendations can strengthen informal settlement upgrading schemes by optimising NBS and the ecosystem services they provide (figure 1)**. Key themes relate to urban development for inclusive prosperity, informed decision-making, innovation and experimentation, integration and complementarity.



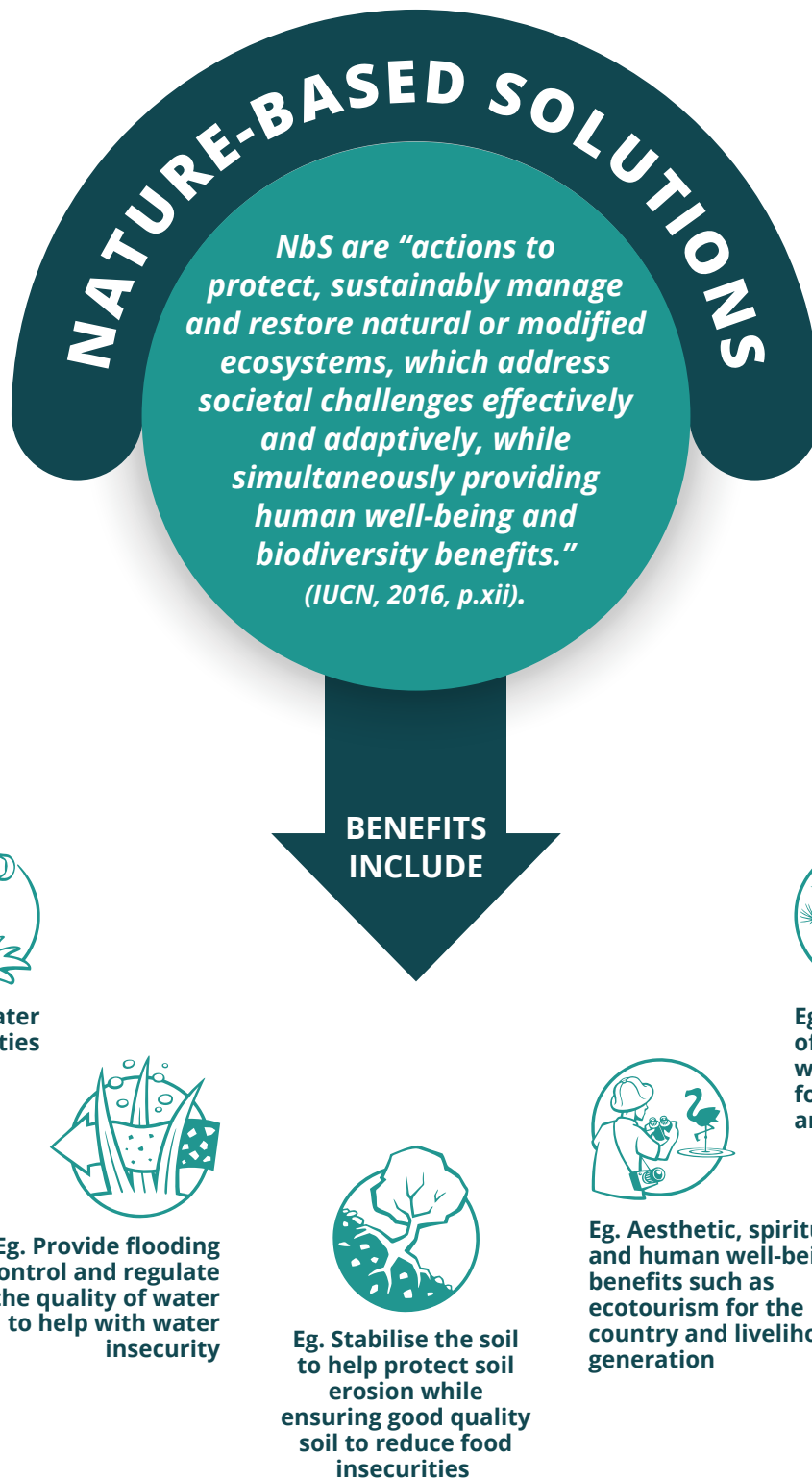


Figure 1: Nature-based solutions and their ecosystem services

POLICY RECOMMENDATIONS



Recommendation 1: Integrate dryland nature-based solutions into in-situ upgrading schemes.

NBS provides a means for cities to successfully navigate the linkages between systems such as food, water, energy and climate, thus enhancing urban resilience. NBS measures are often more cost-effective than manufactured and engineered alternatives. The links to NBS for improved health and well-being through improved physical and mental health is also well documentedⁱⁱ. Urban agriculture, as a form of NBS, can increase food security and livelihood diversification. For example, Greenwell Community C and Farm Okukuna in Windhoek are applying permaculture techniques to curb malnutrition. These immense benefits as well as the innovative governance, institutional, business, and finance models and frameworks inherent to NBS implementation provide a wealth of opportunity for social transformation and increased social inclusiveness in citiesⁱⁱⁱ. Given the range of interventions classified as NBS and the cross-sectoral co-benefits, as new processes and designs for informal area upgrading are interrogated and implemented, opportunities for NBS implementation should be explored and, where relevant, upgrading activities should make use of NBS.



Recommendation 2: Effectively partner with civil society organisations and the private sector.

The last 20 years has seen many upgrading initiatives driven by communities, supported by their local governments and relevant Slum/Shack Dwellers Federations (SDI/SDF). The foundation of these federations is community-managed savings groups; most of which are run by, or contributed into, by women, so their needs and priorities are fully included. The SDFs, and their supporting non-governmental organisations (NGOs), actively seek good relations with politicians and city officials to support co-production of upgrading initiatives. As a result, federations have developed methodologies for effective community engagement. A number of these civil society organisations have also been actively exploring the use of NBS in upgrading programs and therefore can provide best practice examples. For example, the Mathare Safety Committee in Mathare Valley in Nairobi, Kenya work to improve water security challenges through green infrastructure. The private sector is also critical for financing NBS measures whilst key in improving the capacity for innovation. This illustrates the power of co-creation and that these organisations have a critical role to play in upgrading, as both innovators and supporters of NBS. Engaging early on in the process and involving stakeholder consultation from the outset, can help ensure alternatives are technically, politically, socially, and economically feasible.



Recommendation 3: Integrate hybridised approaches of green, blue and grey infrastructure.

Use the urban living system (e.g. green areas, riverbeds) and the built environment (e.g. roads, buildings) together to better meet all the integrated needs of cities. For example, planting trees in cemented walkways with grids around the trees allows water to flow into the ground, moderating the impact of heatwaves, abating pollution, preventing flooding whilst leading to a green and shady walkway for communities. This approach to upgrading should follow an inclusive design process, bringing together a diverse set of stakeholders to co-produce strategies and plans. This hybrid approach is made easier when budgets for green infrastructure are included as part of grey infrastructure projects. Policy makers can also help by encouraging experimentation, learning, and innovation in the private sector through subsidies and tax incentives for NBS. See the case study below which shows that making use of NBS in grey infrastructure projects saves money for local governments.



Recommendation 4: Explore integrated approaches to upgrading with complementary co-benefits.

At the local scale the division of actions that mitigate and adapt to climate change are often unhelpful in securing a resilient urban future. On the other hand, integrated approaches to upgrading that accounts for interconnections among sectors, between governance levels, across space and different phases of infrastructure's lifecycle can build stronger environmental, social, and economic sustainability^{iv}. Upgrading activities should encompass an analysis of links between adaptation and mitigation from the settlement and city scale to the wider catchment – and NBS is an effective approach to do so. For example, implementing integrated water management across catchments or reducing energy consumption related to the built environment through better building design and alternative building materials.



Recommendation 5: Keep drylands alive through soil biodiversity.

Soil biodiversity and soil organic carbon management are vital elements to ensure the land's ability to produce food, store water, control soil erosion and dust, maintain soil stability during extreme rainfall events, reduce carbon losses, among other benefits to people and ecosystems living in harsh and increasing warm dryland environments^v. Upgrading schemes can consider the promotion of agroecological practises to maintain soil organic matter in and around homes in informal settlements, creating more self-sufficient, attractive settlements which communities will be proud of and therefore more likely to maintain^{vi}.

Woody and herbaceous species can help restore degraded ecosystems based on biophysical and ecological properties (e.g., carbon sequestration, oxygen and shade production, water infiltration and filtering out harmful particulates, and species that are resilient to climate change and variability)^{vii} and socio-economic value (e.g., food, pastoral, commercial, energetic, medicinal, cultural). To do so, barriers need to be overcome to ensure access to irrigation water, that is affordable, clean and harvests runoff and rainwater. The use of drought tolerant seeds, implementation of training that overcomes perceptions associated with urban agricultural labour can support this action point.



Recommendation 6: Plant indigenous trees along roads and in households.

Planting native and indigenous trees at a household scale should be a key priority. Initiatives and plans that support this activity could include environmental by-laws which sees developers having to submit plans that pro-actively depict plans for tree planting on their land. These plans then need to be enforced through regular consultation. Prior to upgrading settlements, developments often clear away all original vegetation, removing important habitat for biodiversity, without considering the organic form around which the settlement can be designed and adding valued neighbourhood resources. A visible and popular signal of proactive planning for urban growth is planting or maintaining indigenous or native trees to line the future road grids, and in public recreation areas, as has been done in Freedom Square in Gobabis^{viii}.



Recommendation 7: Link informal transport networks with green spaces.

Many African cities inherited poor urban designs meaning communities often face prohibitively costly and long commutes to employment opportunities. For example, in Nairobi, residents may use up 20-50% of their daily expenditure on transport fare^{ix}. Parks and green spaces offer opportunities to make more connected cities, through pedestrian, or cycling routes, while addressing issue of urban sprawl. Green spaces can improve health and mental well-being, reduce green house gas emissions and emissions, and alleviate land conflict pressures through the efficient use of space, which frequently occurs in informal settlements. Doing so requires close examination of ensuring pedestrian security, and maintaining clean routes void of solid waste.



Recommendation 8: Shift perspective from “unplanned” to “unserviced”.

Informality is an integral part of most African cities^x. Due to the high rates of urbanisation, there tends to be rapid expansion of both the informal economy and informal settlements in many urban centres on the continent. As a result, unplanned areas often make up a large portion of cities’ urban landscapes^{xi}. Through ICLEI Africa’s work under the Urban Natural Asset (UNA^{xii}) programme, it has become clear that some city councillors are somewhat hesitant to operate in areas of informality, particularly when unplanned development directly competes with and disrupts formalised plans and regulations. However, informal areas are often the source of innovative solutions that can be harnessed for the betterment of the city as a whole. Changes in perception around how decision-makers see areas of informality is not only necessary to foster better engagement between informal sector representatives and municipalities, but also use NBS as the ideal entry point to service these settlements with the potential to take implementation from the unplanned to the planned.



Recommendation 9: Experiment with “untried beginnings”.

The UNA programme showcased that to transform a landscape, practice or community, it is not necessary to assume you need “new things” to get rid of the old in order to transform a place, practice or community. This is most clearly demonstrated through its experimentation with the principle of Urban Tinkeringⁱⁱⁱ. This approach re-imagines the use of existing urban elements, such as open green spaces or dilapidated buildings, and identifies valuable shifts in how they work. Shifting infrastructure functions during upgrading processes then creates the opportunity for design adaptability and innovation, allowing infrastructure elements to serve multiple, often unrelated, functions that address context-specific challenges such as safety concerns or illegal waste dumping. Again, NBS are extremely well positioned to support this experimentation, transforming infrastructure elements through integration with NBS. For example, dryland areas prone to erosion provide the opportunity for NBS for soil management therefore increased food security.



Recommendation 10: Generate and use relevant data for evidence-based decision making.

The imperative of climate change provides opportunities to transform cities, improve low-income communities' well-being and environmental conditions more broadly, using NBS. However, this implies large investment opportunities. Currently, insufficient data and knowledge prevent promising business cases from becoming apparent and compelling. Insufficient data and information are also associated with insecure property rights and lack of access to credit and advisory services – hampering progress - while the skills and knowledge of women and marginalised groups are not yet sufficiently recognised in knowledge co-production and policy development^{xiii}. Meanwhile, too often decisions are made ignoring the evidence base. Due to the governance and finance frameworks inherent to NBS implementation, an NBS approach can help collect the necessary data, allowing for a foundation for an investment-friendly environment to be laid. In addition, joining perspectives from a diverse range of stakeholders is absolutely critical for improved evidence-based decision making.

Case study: Nakivubo Swamps: Wastewater management, Uganda

The Nakivubo Swamp filters waste from the city of Kampala. A proposal was submitted to drain the wetland to make way for agricultural land. An ecosystem services study showed that if the wetland was drained the local government authority would have to budget an estimated USD 2 million per annum to provide the infrastructure that the Nakivubo swamp was providing for free through the benefits of nature. In view of this evidence, which showed that maintaining the wetland was the most cost-effective method to ensure future purification benefits, the NBS solution was implemented^{xiii}.



ADDITIONAL INFORMATION

- ⁱ<https://www.lac.org.na/laws/2012/4963.pdf>
- ⁱⁱhttps://www.researchgate.net/publication/318204825_Urban_natural_environments_as_nature-based_solutions_for_improved_public_health_-_A_systematic_review_of_reviews
- ⁱⁱⁱSatterthwaite, D., Archer, D., Colenbrander, S., Dodman, D., Hardoy, J., Mitlin, D and Patel, S. (2020). Building Resilience to Climate Change in Informal Settlements. *One Earth*, 2, 2, 143-156.
- ^{iv}IDB 2018. What is Sustainable Infrastructure? A Framework to Guide Sustainability Across the Project Cycle. <https://publications.iadb.org/en/what-sustainable-infrastructure-framework-guide-sustainability-across-project-cycle> Accessed 25 June 2020
- ^vhttps://www.iucn.org/sites/dev/files/content/documents/tech_brief_land_degradation_neutrality_revised_2017_2.pdf
- ^{vi}https://modern.gov.lambeth.gov.uk/%28S%280cmzi2vta2o4ow55m5w2s455%29%29/documents/s56922/02%20value_of_green_space_report1.pdf
- ^{vii}https://cdkn.org/wp-content/uploads/2019/11/IPCC-Land_Africa_WEB_20Nov2019.pdf
- ^{viii}<https://landportal.org/library/resources/nust10628577/participatory-land-delivery-processes-gobabis-case-freedom-square>
- ^{ix}Deborah Salon & Sumila Gulyani (2010) Mobility, Poverty, and Gender: Travel 'Choices' of Slum Residents in Nairobi, Kenya, *Transport Reviews*, 30:5, 641-657
- ^xICLEI CBC. 2019. Handbook 3: Innovative approaches to planning in an African context: Urban tinkering in Malawi, in *The value of urban natural assets when planning for resilient Africa cities: consideration and decision-making processes*. Cape Town, South Africa: ICLEI CBC.
- ^{xi}ICLEI CBC. 2019. Handbook 5: The value of working with informality: Improving collaboration at informal markets in Malawi, in *The value of urban natural assets when planning for resilient Africa cities: consideration and decision-making processes*. Cape Town, South Africa: ICLEI CBC.
- ^{xii}<https://cbc.iclei.org/project/una-africa/>
- ^{xiii}https://cdkn.org/wp-content/uploads/2019/11/IPCC-Land_Africa_WEB_20Nov2019.pdf
- ^{xiiii}<http://www.teebweb.org/wp-content/uploads/2013/01/Protected-wetland-for-securing-wastewater-treatment-Uganda.pdf>

This document is an output from research carried out by the University of York and University of Cape Town African Climate and Development Initiative, Stockholm Environment Institute York as part of *GCRF ODA Pump Priming Peri-Urban Resilient Ecosystems* (PURE): Catalysing participation through innovation to strengthen rural-urban climate resilient futures in Namibia in collaboration with selected partners; ICLEI Africa, Namibian Housing Action Group, Shack Dwellers Federation of Namibia, Namibia University of Science and Technology and University of Namibia. PURE is funded by the Global Challenges Research Fund and the Climate Research for Development (CR4D) Postdoctoral Fellowship [CR4D-19-21] implemented by the African Academy of Sciences (AAS) in partnership with the United Kingdom's Department for International Development (DfID) Weather and Climate Information Services for Africa (WISER) programme and the African Climate Policy Center (ACPC) of the United Nations Economic Commission for Africa (UNECA). It is also supported by an African Women in Climate Change Science fellowship of the African Institute of Mathematical Sciences and the International Research Development Centre of Canada. The project is supported by several organisations and local governments. In addition, this output includes findings that are based on outcomes, activities and learnings from the *Urban Natural Assets for Africa* programme as well as the *Future Resilience for African Cities and Lands* project. These recommendations represent the views which emerged during participatory consultations with numerous, diverse stakeholders including informal settlement residents, local authorities, shack dweller federations, NGOs, CBOs, urban planners, amongst others. These recommendations represent the views received during consultations with diverse stakeholders and cannot be considered a definitive account but rather insights into an ongoing process. The views expressed and information presented in this brief are not necessarily endorsed by all partner institutions.

ACKNOWLEDGEMENTS

