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Title: UN Decade on Ecosystem Restoration: key considerations for Africa

Running head: Decade on Restoration in Africa

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Abstract

To support and scale-up global restoration efforts, the United Nations (UN) has proclaimed 2021–2030 the “UN Decade on Ecosystem Restoration”. The Decade offers significant opportunities for and challenges to restoration, in particular for Africa, a continent that has a large need and potential for restoration. We thus argue that the Decade must be a success in

and for Africa, and for this to happen, opportunities and challenges to achieving its goals must be promptly identified, and considered in the planning and implementation of restoration. Here, we outline six key areas that should be considered at a strategic level by African countries during the Decade. These are: (1) ensuring effective oversight and governance relevant to Africa; (2) translating the goals to meet the African context; (3) making the case for restoration amid multiple development demands; (4) growing an African restoration community of practice based on regional need; (5) collaborating to improve restoration outcomes; and (6) establishing an Africa-relevant evidence base for restoration. We believe that these six key areas – even though they are not all novel – are currently not addressed at a level that matches the scale of the problem on the continent. Although the specific actions to be taken under each key area are dependent on the restoration context, integrating these key areas in the planning and implementation of restoration efforts will likely lead to improved restoration outcomes during the Decade.

Keywords: Africa; Restoration challenges; Decade on Restoration; Restoration opportunities; United Nations

Implications for Practice

- Countries should individually set specific, measurable, achievable, realistic, and time-bound objectives, and ensure that these filter down to restoration projects.
- Restoration efforts should incorporate poverty alleviation strategies to improve livelihoods and mobilize community support.
- Significant capacity building is required to meet the goals of the Decade, and this should follow a systemic approach.
- Restoration efforts should be collaborative and include local communities, researchers, practitioners, policy makers, and as many relevant stakeholders as possible.

Introduction

Human activities have led to global biodiversity change, increased species extinction, altered ecosystem services, and modified ecological functions (Johnson et al. 2017; Le Roux et al. 2020). The need to reverse these impacts to ensure the continued functioning of earth's ecosystems is imperative, and ecological restoration is the foremost tool to achieve this (Aronson & Alexander 2013). While the science and practice of restoration has rapidly grown in the past three decades (Wortley et al. 2013), the continuing high levels of degradation highlight the need for restoration efforts to grow exponentially (Perring et al. 2018). Accordingly, the United Nations (UN) has proclaimed 2021–2030 the “UN Decade on Ecosystem Restoration” to support and scale-up global restoration efforts (UNEA 2019).

With the Decade comes significant challenges for restoration and opportunities to increase public awareness on restoration, adoption of best practice and policies, and scaling up of restoration activities (Cooke et al. 2019; Young & Schwartz 2019). This also applies to Africa, one of the most degraded continents in the world, with over 700 million hectares of land already degraded, and another three million hectares added annually (Akinnifesi 2018). Africa's high vulnerability to land degradation stems from it being two-thirds dryland or desert (Penny 2009). Drylands and deserts are susceptible to degradation largely due to poor soil fertility as well as scarce and variable rainfall (Penny 2009). This is further exacerbated by complex histories, development demands and anthropogenic drivers such as a high dependency on natural resources at the household level, poor agricultural practices, deforestation, weak governance, colonial histories, insecure land tenure, pervasive poverty, and population growth (Muchena et al. 2005; Irekefe et al. 2011; Pieterse et al. 2018; Smit 2018; Lwasa 2019; Maja & Ayano 2021). Most African countries are classified as “least developed countries” by the UN (UNCTAD 2020), and about 35% of the people in Africa currently live in extreme poverty, the highest of any continent (World Poverty Clock 2021).

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Considering its rich and diverse ecosystems, combined with the high dependence of a significant portion of its population on natural resources – in the frequent absence of technology, economic opportunity, and infrastructure – to meet daily livelihood needs (Anderson et al. 2013; Lwasa 2019), Africa has both the potential and the need for restoration (Gnacadja & Wiese 2016; Akinnifesi 2018). Furthermore, Africa’s need for restoration is compounded by the continent’s exceptional vulnerability to the impacts of climate change (Lwasa 2010; Gameda & Sima 2015). Several large-scale restoration initiatives – emerging from both government and the private sector – have been implemented to address degradation in Africa. For example, the African Forest Landscape Restoration Initiative was launched in 2015, to restore 100 million hectares of land by 2030 (Akinnifesi 2018). Such large-scale efforts are complemented by numerous local-scale projects taking place in different countries across the continent (e.g. Bongers et al. 2006; Holmes et al. 2020).

We thus argue that for Africa, the Decade must be a success, and for this to happen, opportunities and challenges to achieving its goals must be identified, and considered in the planning and implementation of restoration. We consider the Decade to be successful in a country if its goals (Table 1) are achieved. Here, we propose six key areas that should be considered by African countries at a strategic level to facilitate improved restoration outcomes during the Decade. Our aim is not to differentiate Africa from the rest of the world per se, but to highlight issues pertinent to the continent, acknowledging that some of these apply elsewhere. Here, we follow the definition of restoration success by the Society for Ecological Restoration (SER) International Primer on Ecological Restoration (2004) – i.e. an ecosystem is considered restored “when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy”.

Ensuring effective oversight and governance relevant to Africa

Many African countries have made several continental and international commitments that are related to biodiversity conservation, and restoration of degraded ecosystems. Key examples include the: (1) African Union's Agenda 2063, which aims to reduce biodiversity loss by 90% while stopping and reversing land degradation and desertification by 2063 (AU 2015); (2) United Nations Convention to Combat Desertification (UNCCD), which seeks to restore productivity of degraded land, improve livelihoods, and reduce the impacts of drought (UNCCD 1994); and (3) United Nations Sustainable Development Goals, whose Goal 15 seeks to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" (UNGA 2015). The strong synergies between these initiatives and the Decade present a unique opportunity to concentrate efforts on restoration, accelerate community-led action to meet these commitments and maximize positive outcomes for the environment, with concomitant gains for the people of Africa. However, we note the significant challenge of ensuring that these commitments are carried out. Particularly, at a continental scale where a diversity in governance and priorities exists among countries. Therefore, we call on African countries to ensure that they honor all the commitments they have made on biodiversity conservation, and restoration of degraded ecosystems.

We believe that nominating a government department as a focal point to coordinate national restoration efforts by providing resources and support will increase the ability of each country to meet the goals of the Decade. The department should particularly assist with communication between dissimilar groups – where the inclusion of a diversity of actors and sectors across various scales is typical of successful restoration – creating benchmarks, identifying strategies to enhance restoration outcomes, and coordinating efforts to revise policies. This has been shown to work. For example, Nigeria created the Department of Drought and Desertification Amelioration to strengthen institutional coordination of activities towards rehabilitation and

restoration of desertified areas (Federal Government of Nigeria 2012). As a function of complex colonial histories, associated local and global power dynamics and resource use, persistent poverty, and significant fiscal constraints combined with frequent weak governance (Smit 2018); restoration efforts have been demonstrated as sufficiently relevant to be managed at the national scale. Restoration occurring under a national banner can ensure that the local, national and international efforts (across the multiplicity of actors and ‘dialogues’) needed (Richardson & Lefroy 2016) are relevant across different scales and allow for continental data sharing, comparison, and collective effort. Being cognizant of resource constraints and noting the particularly strong alignment between the Decade and the UNCCD’s core mandate of addressing desertification, land degradation and drought; we suggest that the proposed department work closely with the UNCCD focal point for the country to overcome the challenge of collaborating across many countries that might have dissimilar governance structures, views of landscape values, resources for restoration, and interest in participation (Chazdon et al. 2021).

Translating the goals to meet the African context

Setting goals to guide restoration efforts is key for the restoration process as it outlines expectations, drives plans for action, and dictates the type and extent of monitoring that is required (Ehrenfeld 2000). While there is no universally accepted model or context for setting restoration goals (Ehrenfeld 2000), goals must be clearly defined to facilitate the setting of objectives (Hobbs & Norton 1996; Tear et al. 2005). Here, we distinguish between goals and objectives and consider goals to be “conceptual statements reflecting societal value and political or institutional intent” (Tear et al. 2005), while objectives are specific, measurable, achievable, realistic, and time-bound targets that facilitate the monitoring and evaluation of progress towards achieving set goals.

We commend the UN for setting clear ecological and social goals for the Decade (Table 1). We presume that the omission of objectives was purposeful as they would need to be informed by the specific context of each country and/or restoration project (e.g. scale, site conditions, habitat types, climate change predictions, and feasibility). The lack of objectives attached to the goals therefore presents African countries with the opportunity to individually set objectives that are stakeholder-driven and informed by evidence relevant to their specific context (i.e. science, indigenous and local knowledge), and ensure that these filter down to restoration projects (Tear et al. 2005; Perring et al. 2015; Tengö et al. 2017; Gornish et al. 2021). Monitoring plans should also be developed with these objectives in mind (Hobbs & Norton 1996; Lindenmayer 2020). The SER's *International Standards for the Practice of Ecological Restoration: Including Principles and Key Concepts* (McDonald et al. 2016) provide good guidance to countries on monitoring restoration success. Particularly, countries should monitor six key ecosystem indicators during the Decade: (1) absence of threats; (2) physical conditions; (3) species composition; (4) structural diversity; (5) ecosystem functionality; and (6) external exchanges (McDonald et al. 2016).

Countries should develop platforms that spatially show areas that require restoration to aid decision-makers in the selection of areas targeted for restoration during the Decade (see for example ReStory 2022). A reporting system, ideally based on standardized monitoring, should be created to ensure that each country can regularly share its progress towards achieving the objectives with its policy makers, researchers, practitioners, citizens, other countries, and the UN. This system will facilitate tracking of progress, sharing of lessons learned, and maintain a sense of transparency and accountability to meet commitments. We acknowledge that progress may be slow for some countries and/or goals not met; however, such a reporting system will make it easy to identify such cases and facilitate the implementation of corrective measures.

The UN should take the responsibility of applying necessary pressure to ensure that countries meet their goals during the Decade.

Making the case for restoration amid multiple development demands

Given the large extent of land degradation in Africa and the direct reliance on natural resources by a significant portion of its population (Lwasa 2019), restoration should be a priority for all African countries as part of their development agendas (Aronson et al. 2006). However, this may not currently be the case, and is unlikely to change on a large scale in the near future, despite the Decade. Therefore, other development imperatives (e.g. building infrastructure and provision of basic services) are likely to be prioritized over restoration practice and research when allocating fiscal resources. Furthermore, many parts of Africa are facing armed conflicts (Fisk 2014). These conflicts play a role in shaping national priorities, undermine efforts to restore degraded areas, affect cooperation among citizens, and in most cases, directly lead to the degradation of ecosystems (Gorsevski et al. 2012).

We urge all African countries to consider how restoration and poverty alleviation can occur in tandem (Table S1; Aronson et al. 2006). There is mounting evidence that addressing the source of degradation can significantly reduce degradation pressure (e.g. DeFries et al. 2021). For example, landowners can deploy small-scale restoration to improve ecosystem services resulting in improved crop production, and work towards diversifying income sources (e.g. Kabore & Reij 2004; Pye-Smith 2013; Li et al. 2020), while successfully revegetating landscapes (Djenontin et al. 2018). Although relationships between people, land, culture, and money on the continent are complex, considerations of how livelihoods can be enhanced as a direct result of restoration should be prioritized (Goffner et al. 2019). It is worth noting that there are existing initiatives that work on the integration of poverty alleviation strategies and restoration on the continent – e.g. the Sustainable Trade Initiative that is active in 18 African

countries (IDH 2020). However, the scale at which this work is being done should significantly increase to match the need for restoration on the continent if the goals of Decade are to be achieved (Table S1). We also urge wealthier African countries as well as non-African institutions to consider partnering with restoration efforts in different parts of Africa as financial investments are critical for widespread adoption of both small- and large-scale restoration projects (Schlecht et al. 2006; Schweizer et al. 2021). Overall, African countries should ensure that despite multiple competing development demands, substantial financial investment is made in restoration by including it in their annual national budgets during the Decade if its goal are to be met. Furthermore, beyond poverty alleviation African countries should recognize the key role that restoration can play in economic output and job creation. There is mounting evidence from different countries and ecosystems showing that restoration can be a viable option as economic activity, because it generates income, creates employment, and reduces poverty while promoting the conservation of natural areas (Aronson et al. 2010; BenDor et al. 2015).

Growing an African restoration community of practice based on regional need

Significant capacity building following a systemic approach is required if the goals of the Decade are to be met. Capacity building is commonly used to refer to just the training of individuals (Potter & Brough 2004; Eade 2007). In contrast, a systemic approach to capacity building includes nine separate, but interdependent aspects as outlined in Table 2 (Potter & Brough 2004). We therefore encourage African countries to not rush to train more people in restoration, but first identify their needs based on the nine components of systemic capacity using a strategic cradle-to-grave approach, and devise a plan to implement appropriate measures to holistically build capacity to meet the goals of the Decade (Table S1). Such an approach has been used with the health sector in India, where systemic capacity needs were assessed using a variety of techniques, including algorithms, ‘fish-bone’ analysis, matrices, and

semi-structured interviews. Findings of this research were then used to build consensus on what systemic changes were needed to effectively build capacity (Potter & Brough 2004). A significant part of this process is ensuring the participation of the relevant private and public sectors, and the importance of cross-sectoral dialogue (Richardson & Lefroy 2016).

Collaborating to improve restoration outcomes

Ecosystems do not respect human borders, and no one person or organization has all components for successful restoration. Therefore, collaboration across communities, organizations, research institutions, and countries, will be key to successful restoration (Urgenson et al. 2017; Clark et al. 2019). At a continental or regional level, African countries should take the opportunity presented by the Decade to collaborate with one other, and share resources, expertise and success stories. Cross-border collaboration between multiple countries should become a prominent feature on the continent (Adams et al. 2014). One such example is the Yaoundé Agreement of 2013. West and Central African countries agreed to collectively address threats to maritime sustainability, aquatic security and safety by promoting information sharing and joint operations between maritime agencies at the national and regional level (Okafor-Yarwood et al. 2020a). Though challenges remain, this cooperation recognizes the importance of multinational collaboration to addressing cross-boundary issues involving the terrestrial and marine environment.

In the traditional sense of partnerships, researchers and practitioners should cultivate collaborations to produce and share knowledge. For example, researchers can provide knowledge of current experimental work described in peer reviewed literature (Wortley et al. 2013), while practitioners can describe feasibility of management applications in the field. Furthermore, practitioners can specifically play a role in the production and sharing of knowledge by: (1) identifying restoration problems that could benefit from academic expertise

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and reaching out to known researchers; (2) developing research questions and/or hypotheses of studies together with researchers; (3) assisting with experimental design and setting-up; particularly, providing access to field sites and knowledge on study species and/or area; (4) co-authoring research outputs; and (5) assisting with the dissemination of research outputs through relevant networks (Funk et al. 2020). By co-producing knowledge, resources and results are easily shared, findings are more data-informed, complexity is acknowledged, and relevance is broadened (Cooke et al. 2021). “Boundary spanners” can enhance trust, idea exchange, and transdisciplinary relationships, ensuring the implementation of science driven policies (Honeck et al. 2021). Ecological restoration must engage the academic and the practical, the scientific and the social, and as Galbraith et al. (2021) note, this is essential as community engagement is an explicit aspiration of the United Nations Decade on Ecosystem Restoration 2021–2030.

The planning and deployment of restoration projects should be inclusive, transparent, and involve collaborations with as many stakeholders as possible (Lwasa 2019; Galbraith et al. 2021, Gornish et al. 2021). An example of a restoration project that is successful due to strong collaboration between local communities, researchers, practitioners and stakeholders is the Kenyan incentivized and community-led mangrove restoration initiative, Mikoko Pamoja. The project aims to restore and conserve mangroves through the sale of carbon credits. Approximately 117 hectares of mangrove forests are under a co-management scheme where communities safeguard the forests and its resources. The project has a measurable impact on community well-being (Okaför-Yarwood et al. 2020b), as well as restoration success (Kairo et al. 2018). The sale of carbon credits from this project provides income to fund social benefits (Okaför-Yarwood et al. 2020b).

We were excited by the recent launch of the Society for Ecological Restoration’s Africa Chapter, which we believe will play a crucial role in facilitating and strengthening collaboration among researchers, policy makers, and practitioners in Africa. National and local

restoration networks should be initiated (or strengthened if already in existence), and these should not only be reserved for researchers and practitioners, but also include different stakeholders and policy makers.

Establishing an Africa-relevant evidence base for restoration

Decisions made by practitioners are often influenced by personal knowledge rather than the available body of evidence (Young et al. 2016; Cooke et al. 2018). However, to ensure that scarce resources dedicated to restoration are used effectively to address the time-sensitive nature of ecosystem threats, restoration efforts cannot be ill-advised and/or not based on the best available evidence. Therefore, to improve restoration outcomes during the Decade, we urge practitioners to utilize evidence-based restoration (Ntshotsho et al. 2011). Evidence-based restoration dictates that policy and management decisions should be informed by rigorous, transparent, and repeatable methods that identify and amass knowledge sources, critically evaluate, and synthesize the available evidence (Ntshotsho et al. 2015; Cooke et al. 2018). Critically, this evidence base should be made up of multiple sources (i.e. scientific, indigenous, and local knowledge) (Tengö et al. 2017). Indigenous and local knowledge may provide more comprehensive answers to restoration questions since ecological restoration exists at the nexus of society and science, and leads to improved community engagement in restoration projects (Wehi & Lord 2017). Restoration efforts must also include a robust monitoring program to further develop the evidence base (Choi 2004; Hagger et al. 2017).

We note that in many instances such evidence may not be available to support restoration, and practitioners may have to rely on personal knowledge to guide restoration efforts. Therefore, we urge researchers to support restoration efforts by: (1) committing to community-based research, which centers on partnering with local practitioners and community representatives; (2) generating products that can be used for evidence synthesis (e.g.

publication of both positive or negative results; Nsikani et al. 2018); and (3) engaging more in evidence synthesis (e.g. systematic reviews; Haddaway & Verhoeven 2015; Cooke et al. 2018). We strongly believe that restoration initiatives in degraded areas across similar ecosystems should be systematically implemented (i.e. test same methods, techniques and treatments) across different countries and contexts, thus allowing for real shared knowledge and experiences. In their review of the state of science on the continent, Irekefe et al. (2011) are optimistic and note cases where the fiscal contribution to science is improving and paint a scenario of a continent that is embracing opportunities to contribute to science. However, while peer-reviewed publications are on the rise (Irekefe et al. 2011), historical research mostly remains in the grey literature. Here, we propose the establishment of a continental evidence base, emerging out of national partnerships and collaboration, that tabulates the work that has gone before and serves as a base on which to grow, monitor, and effectively inform restoration on the continent into the future.

Conclusion

The African continent is experiencing high levels of degradation and the need for restoration continues to grow. The Decade offers an unprecedented opportunity for Africa to support and scale up its restoration efforts, improve livelihoods, augment infrastructure shortfalls, and mitigate climate risk. However, numerous challenges threaten the success of the Decade on the continent – e.g. weak governance and high development demands on fiscally constrained systems. In this article, we outlined six key areas that should be considered by African countries at a strategic level during the Decade: ensuring effective oversight and governance relevant to Africa; translating the goals to meet the African context; making the case for restoration amid multiple development demands; growing an African restoration community of practice based on regional need; collaborating to improve restoration outcomes; and establishing an Africa-

relevant evidence base for restoration. Addressing these key areas is pivotal to improving restoration outcomes during the Decade.

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Table 1. Goals of the UN Decade on Ecosystem Restoration as outlined by UNEA (2019).

Goal for the Decade
1. Foster political will, the mobilization of resources, capacity-building, scientific research and cooperation and momentum for ecosystem restoration at the global, regional, national and local levels.
2. Mainstream ecosystem restoration into policies and plans to address current national development priorities and challenges due to the degradation of marine and terrestrial ecosystems, biodiversity loss and climate change vulnerability, thereby creating opportunities for ecosystems to increase their adaptive capacity and opportunities to maintain and improve livelihoods for all.
3. Develop and implement policies and plans to prevent ecosystem degradation, in line with national laws and priorities.
4. Build on and reinforce existing restoration initiatives in order to scale up good practices.
5. Facilitate synergies and a holistic view of how to achieve international commitments and national priorities through the restoration of ecosystems.
6. Promote the sharing of experiences and good practices in ecosystem conservation and restoration.

Table 2. Components of systemic capacity building that need to be considered during the Decade and specific examples of the requirements of each component. Adapted from Potter & Brough (2004).

Component of systemic capacity building	Example
Performance capacity	Availability of tools and equipment to implement restoration.
Personal capacity	Individuals are sufficiently knowledgeable, skilled and confident to implement restoration.
Workload capacity	Presence of enough staff with the appropriate skills to handle the workload.
Supervisory capacity	Mechanisms for accountability, reporting and monitoring are in place.
Facility capacity	Enough offices, workshops and/or warehouses to support restoration efforts.
Support service capacity	Presence of adequate laboratories, training institutions, research facilities, and supply organizations to support restoration efforts.
Systems capacity	Flows of information, money and managerial decisions occur in a timely and effective manner.
Structural capacity	Presence of decision-making forums where inter-sectoral discussion may occur and decisions made.
Role capacity	Appropriate individuals, teams, and/or committees have been given the authority and responsibility to make decisions that are key to successful restoration.