

# GLOBAL LAND OUTLOOK

## Southern Africa Thematic Report

Leveraging the Land, Water  
and Energy Nexus in SADC



**United Nations**  
Convention to Combat  
Desertification



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**Global Land Outlook, Regional Thematic Report for Southern Africa:** Leveraging the Land, Water and Energy Nexus in SADC

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**Acknowledgements:** The UNCCD and SADC Secretariats provided support throughout the drafting process. Multiple regional stakeholders provided insights into regional challenges and opportunities related to LDN implementation in the GLO Briefing Workshop. These included members from SADC-GMI, AfDB, GWP-SA, Cuvecom, UNCCD-SPI, Environmental Monitoring Group (EMG) and various national government departments. Additional insights were provided by Noel Oettle (EMG) and Nunes Mazivile (TFCA's Technical Advisor (FANR)) in consultation.

**Suggested citation:** UNCCD 2022. Global Land Outlook, Regional Thematic Report for Southern Africa: Leveraging the Land, Water and Energy Nexus in SADC. UNCCD. Bonn.

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Cover photo:  
© Unsplash/Hans Jurgen Mager

Design and layout: QUO Bangkok, Co., Ltd.

ISBN on-line: 978-92-95118-62-1  
ISBN print: 978-92-95118-63-8

This publication is available for download at  
<https://www.unccd.int/resources/global-land-outlook/overview>

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# Executive summary

Land degradation in Southern Africa has been driven by multiple natural and human-induced processes including soil erosion, unsustainable agricultural practices, tree harvesting for charcoal production, contamination, pollution and biodiversity loss. The effects have negatively impacted the livelihoods of a significant proportion of the region's population that relies on subsistence agriculture. Insecure land tenure systems – combined with pervasive poverty and low literacy levels among rural populations – complicate land management processes and place the most vulnerable at increased risk.

Member states of the Southern African Development Community (SADC) are actively responding to the growing challenge of land degradation. They have embraced commitments to better manage and restore land resources, and to meet the targets in the Sustainable Development Goals (SDGs). At a sub-regional level, the action programme to combat desertification has been aligned to the United Nations Convention to Combat Desertification (UNCCD) ten-year strategy. This will promote adaptive management during planning, implementation and monitoring of activities to achieve Land Degradation Neutrality (LDN) targets. SADC's response to land challenges mirrors continental-level commitments made by the African Union's Agenda 2063.

This Global Land Outlook regional thematic report focuses on the cross-sectoral linkages of land-water-energy (LWE) systems or nexus points that can be used to leverage progress towards achieving LDN. Given the current status of land resource management and related cross-cutting issues in Southern Africa, the report highlights gaps that need to be addressed and good practices that could be scaled up and out. The nexus gains approach offers a helpful lens through which to negotiate trade-offs and identify synergies for increasing overall resource use efficiency at local, national and regional levels.

For sustainable land management (SLM) to be a multiple benefits solution, it needs to be context-specific and aligned across different sectors and stakeholder groups. Case studies drawn from countries across Southern Africa offer insights into the practical on-the-ground solutions for addressing land degradation. They highlight drivers, risks and key priorities for advancing LDN targets. Lessons are also drawn from the Great Green Wall for Sahara and the Sahel Initiative (GGW) to inform the design and implementation of a similar large-scale endeavour in Southern Africa.

Finally, five pathways and associated strategic mechanisms are presented. These pathways offer an integrative approach to leverage LWE nexus gains and incorporate LDN into policy and decision-making at all scales. Key considerations are emphasised for implementing the GGW concept that was formally endorsed in October 2019 by the SADC Ministers responsible for Environment, Natural Resources and Tourism. The GGW strategy offers a coordination mechanism to boost funding for combating land degradation in Southern Africa.



# Key messages

**Regardless of which type of future scenario is projected, the SADC region is going to experience strong pressures on land and land-based resources, exacerbated by various physical and social stressors.** Challenges in the next few decades will include larger and more affluent populations alongside diminishing land availability and expanding agricultural needs. Ensuring stable land governance frameworks and tenure security for all will be key enabling factors in leveraging the LWE nexus to reverse land degradation.

**Nexus thinking highlights the strong links between the food, water, energy and environment sectors. While the LWE nexus is essentially local, it can have significant large-scale repercussions in vulnerable regions such as Southern Africa.** Holistic, systemic thinking and integrated solutions can help guide the development and implementation of initiatives aimed at achieving LDN. This will increase overall resource use efficiency across the region, ensuring a top-down approach to the LWE nexus is developed alongside bottom-up initiatives. This will help build a knowledge base on best practice, targeted policies and proven solutions. Clear and comprehensive strategies and policy frameworks will create opportunities for achieving LWE nexus gains; many of which are already included in the Sub-regional Action Programme (SRAP) to combat desertification and the 10-year roadmap of the SADC Regional Indicative Strategic Development Plan 2020-2030 (RISDP).

**A more standardised approach to setting, implementing, and reporting on Land Degradation Neutrality (LDN), Nationally Determined Contributions (NDCs) and National Biodiversity Strategies and Action Plans (NBSAPs) in the SADC region is required.** There is currently a lack of cohesive regional target-setting across all three Rio Conventions (UNCCD, CBD and UNFCCC) within SADC member states. These targets are often expressed differently between countries, while the level of detail varies in terms of commitments and implementation plans. This highlights the importance of coordinating targets at the national level and aligning them with regional implementation plans. For example, the SADC Regional Biodiversity Strategy and Action Plan could provide a coordinating framework. In terms of LDN, well-established science-based guidelines are available; however, capacity and resources for structured reporting in SADC should be prioritised.

**Realising LWE nexus gains in SADC will only be achieved through concerted efforts to integrate LDN targets with land-use planning and more sustainable management of land, water and energy resources.** This should be underpinned by a sound understanding of the human-environment system and effective governance mechanisms. A combination of pathways is required to enable large-scale regional change as envisioned in the RISDP. Key focus areas related to the LWE nexus in Southern Africa include: achieving multiple benefits; responsible and inclusive governance; scaling out and up SLM; and leveraging innovative finance.

**Achieving LDN requires responsible and inclusive governance to support the transition to sustainable and resilient food systems.** Transparent, accountable and inclusive governance mechanisms – forming part of a coherent normative framework – are necessary to create an enabling environment for both local and regional initiatives to advance LWE nexus gains. Where diversity, equity and inclusion are actively encouraged in planning and implementation, LWE nexus gains can be amplified as an integral part of a people-centred approach to planning and development.

**Land and natural resource governance are central to addressing human vulnerability, poverty and gender inequality.** Southern African countries share common land tenure challenges. Reforming land ownership is fundamental to the transition processes taking place in the region and ensuring equitable access to land and natural resources. A lack of secure land tenure for rural populations across the region constrains sustainable livelihood opportunities, as people are forced to use increasingly marginal lands for their subsistence. Governance systems that are responsible and inclusive will encourage the long-term investments necessary to protect soil, biodiversity and ecosystem services.

**The development and implementation of climate change adaptation strategies will be critical in the SADC region.** It is encouraging that member states have been proactively developing their respective strategies with the support of development partners and the international community. However, integration of climate change as a cross-cutting and universal thread throughout land, water and energy policies and strategies remains significantly under emphasised. This requires coordinated efforts to integrate climate change adaptation measures within land-use planning and improved management of land, water and energy resources. SADC has revised its Climate Change Strategy and Action Plan to fully align with international agreements and support harmonisation among member states. Achieving a more resilient region needs the implementation of enabling policies, along with investment innovative technologies from both private and public enterprises.

**In addition to the land impacts associated with the expansion of renewable energy projects in SADC, there will also be impacts from growing mining operations and the decommissioning of coal mines and power stations over the coming decade.** Warranting special attention is renewable energy planning and how it relates to land use. Care needs to be taken to ensure that integrated land use planning informs the selection of suitable land for renewable energy and mining projects. The aim of planning would be to avoid, mitigate and manage impacts on livelihoods, biodiversity and ecosystem services.

**Innovative financing for SLM can be considered as an umbrella approach. It comprises a range of sources, mechanisms and instruments – as well as related processes and thematic areas – through which funding can be mobilised.** Key funding sources could include the private sector, market-based mechanisms, trade organisations, foundations, civil society organisations and other financing mechanisms for climate change adaptation and mitigation, biodiversity conservation and sustainable land resource use. In order to strengthen UNCCD implementation and scale up SLM in the region, SADC structures and member state institutions would need to coordinate their efforts to source funding. Public-private partnership arrangements should also be considered and encouraged.



# 1. OVERVIEW

Land is an essential resource globally. The United Nations Convention to Combat Desertification (UNCCD) defines land as “the terrestrial bio-productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system” (UNCCD, 2017). How land is perceived, valued and governed influences attitudes towards land use and the way that land is managed. Keeping land in a healthy state is an essential contribution to human security – ensuring access to food and water, the stability of employment and livelihoods, resilience to climate change and extreme weather events, and ultimately social and political stability.

## 1.1 Purpose of this report

The focus of this report is to provide evidence-based, policy-relevant information and explore recent trends regarding land management, water management and energy as it relates to land uses in the SADC. The report aims to provide a variety of stakeholders, including national governments, funding agencies and sustainable development organisations with a firm basis from which to formulate an integrated response to mutual and entwined challenges faced by land, water and energy management. These challenges include issues such as desertification, drought and land degradation (DDL), tenure security, land governance, transboundary aquifer management and competing priorities for water use and the impact of land use in renewable energy developments.

The report also highlights specific opportunities that can be leveraged to harness potential gains from overlapping objectives in the land, water and energy sectors. The information and trends in this report were carefully selected to foster collaboration between governments, agencies and interested parties when formulating a coordinated response to the challenges faced and opportunities presented by the land-water-energy nexus in SADC. This includes

identifying potential synergies between continental, national and subnational commitments within the nexus to better manage and restore land and water resources. This level of collaboration can lead to accelerated nexus gains, where the implementation benefits of individual interventions become more than the sum of their parts.

## 1.2 SADC in focus

A good understanding of the context allows for improved inferences and better questions. To plot a route, one needs a thorough understanding of the map. This Global Land Outlook (GLO) thematic report focuses on Southern Africa, a region covering a total land area of 10 million km<sup>2</sup> comprising 16 countries – 12 mainland and four island states (SADC, 2021) (**Figure 1**). SADC recognises land management and sustainable development as key elements of food security, climate resilience and environmental protection (SADC, 1997). Due to its multiple functions, land in the region has historically been at the centre of most political, social and economic struggles. Laws and policies developed during the colonial and apartheid periods resulted in the dispossession of the local population, often pushing them onto fragile and marginal areas, further compounding land degradation (Hadisi & Ndodo, 2018).

The drylands of Southern Africa cover a total area of 224 million hectares (84% of the region) and represent 3.6 percent of the world’s drylands. The majority (60%) of drylands are semi-arid and correspond to the central plateau of Botswana, northern Namibia and South Africa (FAO, 2019). Drylands are vulnerable to climate change, which will affect their provision of ecosystem services and increase land degradation. The region is also experiencing high levels of urbanisation, driven by rural-urban migration that leads to urban sprawl, informal settlements, conflicts for land, and environmental impacts.

## Agriculture and arable land

Despite its geographic size, only 25% of Southern Africa is arable (SADC, 2012a). The region's arable and domesticated land is used for various purposes, including agriculture, mining, forestry, wetlands, wildlife conservation and human settlements (SADC, 2008). At least 70% of SADC's 345 million people depend on agriculture for their food, income and employment (SADC, 2018). As the economies of most countries in Southern Africa are based on rain-fed agriculture, there is considerable demand for arable land, mainly in the rural areas. More than 65% of the region's population lives in rural areas, depending on agriculture for their livelihood (FAO, 2018). Due to constraining factors, such as low soil fertility and rainfall variability, only 5% of Southern Africa is under permanent cropland (SADC, 2012; World Bank, 2018). The expansion of cropland, though minimal, contributes to the destruction of forests and woodlands, which cover 38% (9.8 million km<sup>2</sup>) of the region's total land area (FAO, 2015). The potential for further expansion of arable land, other than into marginal areas, is becoming very limited. Recent statistics related to land resource data shows reduced forest cover in most countries in the region (FAO, 2015).

One of the challenges facing Southern Africa is to feed the growing population through increased agricultural production. For the majority of the population, such increases can only be achieved through the conversion of forests and grazing land, or irrigation. Due to the limited extent of suitable land, there is increasing pressure to use marginal lands for agriculture, a situation that exacerbates land degradation. The "food production-population imbalance" in the region's rural areas is forcing production increases through opening up of new and often marginal land to farming as well as over-cultivation, overgrazing, poor irrigation practices and deforestation (SADC, 2008a). The progressive deterioration of the natural and productive state of the land resource base results in social problems such as increased migration and marginalisation, higher risk of disputes over natural resources and increased poverty and vulnerability (Olsson *et al.*, 2019).

## Land administration and governance challenges

One of the biggest challenges faced by SADC countries is unequal land distribution due to the colonial legacy of land dispossession, which disenfranchised the native majority populations (UNECA, 2003). The socio-economic implications of these past practices are still evident today.

In many member states, there is a lack of clear frameworks, policies and strategies relating to land governance, and where they exist, they are generally weak. As a result, there are limited processes to facilitate the return of land or to address the issue of unequal distribution. Land tenure, value, use and development are key elements of land administration and governance which each present their own challenges in the SADC region.

Southern African countries share a number of land tenure challenges; key among these are land alienation, overgrazing, woodland clearing and unequal control. Reforming land ownership is fundamental to the transitional processes taking place in the region. In some cases, there are huge tracts of under-utilised land. Grazing lands, covering 45% of the region's total land (Naidu and Roberts, 2004), are diminishing due to land pressures resulting from inequitable ownership of land and limited use of technologies suitable for intensive production. As a result, over 45 million people in ten countries in SADC are facing acute food insecurity (SADC, 2021). While the trend of declining food production per capita is largely attributable to declining land-holding sizes, other factors have also shaped trends over the past 30 years (SADC, 2008). Drought is one factor that has caused a significant decline in the per capita food production index for Southern Africa (SADC, 2020; FAO, ECA and AUC, 2020).

An additional complicating factor in this food security conundrum is the competing land use needs of mining and current (and future) renewable energy projects. Both these sectors require vast tracks of lands, often in rural areas. Though the mining industry employs just 5% of the population, it contributes to 60% of foreign exchange earnings and 10% of gross domestic product for the SADC region (SADC, 2012c). It is projected that the SADC region will play a key role in supplying critical minerals for the green energy transition, in particular electric vehicles, renewable energy and battery technology (Cloete, 2020). These activities will place additional strain on land resources. In addition, prioritised decarbonisation strategies in the region indicate an increased need for land for the purpose of renewable energy projects (Muñoz Cabré, 2020).

## Land degradation trends

Soil erosion is the most widespread form of land degradation, as evidenced by the gullies and barren land that occur throughout Southern Africa; it is also one of the most important factors resulting in the decline of agricultural productivity. It is estimated that about 15% of the region's land is

degraded through soil erosion (SADC, 2008), a trend shared with sub-Saharan Africa (Katherine *et al.*, 2015). In addition to the knock-on effects felt by the mainland states, land degradation exacerbates the unique vulnerabilities of small island states to environmental challenges such as climate change, coastal erosion and sea level rise (UNCCD and FAO, 2020). This trend in land degradation is likely to continue over the next decades, due to population pressure, skewed land tenure systems and increasing demand for land from different sectors. The pressure being applied on land resources is causing widespread environmental degradation in the region (Darkoh, 2009).

The region's climate, which is mostly semi-arid to arid, with low and erratic rainfall, exacerbates land degradation. Droughts and floods – which are becoming common occurrences in Southern Africa – also contribute to land degradation. Communal grazing, which is generally not affected by stocking policies, is the norm over most of rural Southern Africa (Matowanyika & Marongwe, 1998). The lack of adequate resources limits livelihood choices, resulting in the overexploitation of the environment – which in turn worsens poverty by reducing agricultural productivity and food security at household levels. Land degradation severely affects people in as much as it affects biodiversity from land clearance and species overexploitation.

### Energy access and land use

Southern Africa's social and economic development is severely hampered by limited access to energy (Hafner *et al.*, 2018). Electricity access in Southern Africa is around 48% (IEA, 2020), slightly above the continental average of 43% (Blimpo & Cosgrove-Davies, 2019). Rural electricity access is generally lower than urban access, reflecting the challenge of expanding the electrical grid to distant and often sparsely populated areas (SAFCEI, 2014). The region has seen a significant investment in transmission inter-connectors and renewable energy projects in recent years, helping to boost electricity supply. The total share of renewables in power generation rose from 23% in 2015 to almost 39% in 2018 (IRENA, 2021).

Energy poverty in Southern Africa is most pronounced in rural areas where households lack access to modern energy sources. Rural populations who are resource-poor and live below the poverty line mostly rely on traditional energy sources, such as fuelwood from forests or woodlands (Action, 2014). Charcoal production hotspots in Southern Africa are mainly reliant on unsustainable harvesting of wood (Baillis *et al.*, 2015). Driven by rapid urbanisation and

population growth, charcoal production will lead to serious land use changes, especially dryland forest and woodland degradation (Liyama *et al.*, 2017). Localised deforestation due to charcoal around major cities in sub-Saharan Africa has also caused associated environmental degradation and reduced ecosystem services – resulting in lower agricultural productivity (Zulu & Richardson, 2013).

In terms of energy and its impact on land use planning and management, three key considerations are emerging from good practices across sectors:

- The vast tracks of land that are needed for renewable energy projects, such as solar, wind, biomass and hydropower;
- The significant amount of minerals that will be mined to implement the global green energy transition, and the relative abundance of these minerals in the SADC region; and
- The decommissioning and closure of coal-fired power plants and mining operations in the SADC region.

These energy-related factors need to be considered when strategising about how to leverage nexus gains to address the challenges associated with land degradation in the region.

### Water security

The SADC region has 15 transboundary river basins (Mabhaudhi *et al.*, Water 2016) that provide valuable shared water resources. As with sub-Saharan Africa, there is significant spatial variability in climate and water resources, with considerable temporal variability, especially in the drier countries of SADC (Malzbender & Earle, 2007). The variation in rainfall distribution changes from year to year and from country to country (Driver, 2014). Projections of economic development and population growth in the region have led to predictions that several SADC member states will become water-stressed by 2025 (SADC, 2006). The countries most affected include South Africa, Namibia, Botswana and Zimbabwe. Other projections suggest that only South Africa will reach physical water scarcity, with the rest of the region experiencing economic water scarcity (Seckler *et al.*, 1998). Physical water scarcity suggests that affected countries will not be able to meet expected water demands in 2025 in spite of any future adaptive capacity.

In addition to the effects of natural factors, human activities interact and converge to create pressures on water resources for which there are no substitutes (WWAP, 2014). These activities

are compounded by factors such as political, institutional and financial conditions, technological development and climate change across the region. These projections imply that regional water demand for agriculture and energy generation will increase. Despite being extensive, groundwater resources in SADC are often underdeveloped and undervalued. This is surprising considering that an estimated 70% of the SADC population are reliant on groundwater resources (World Bank, 2017). There are moves to map these resources and build a database (SADC-GIP) that can inform SADC member states on the future use and management of groundwater.

### Responses to land management

SADC recognises land management and sustainable development as key elements of economic prosperity, food security, climate resilience and environmental protection (SADC, 2004 and UNCCD and FAO, 2020). This commitment is integrated across a number of SADC protocols relating to forestry, shared watercourses and energy – and is given effect through strategies, notably the sub-regional action programme to combat desertification (SRAP) (SADC, 2015). Implemented by the SADC Secretariat, the priority areas of the SRAP include integrated management of ecosystems and selection of capable institutions to serve as centres of excellence or lead institutions for capacity building in specific areas of UNCCD implementation. SADC has initiated a large regional programme aimed at protecting land resources including biodiversity and water by involving communities in natural resource management. In addition, national strategies and commitments of SADC member states are increasingly acknowledging and accounting for the multi-sectoral nature of competing interests in land use planning and allocation.

## 1.3 Contents of the report

**Part A** of this report draws on multiple data sources to provide a snapshot of how the Southern African region is performing in terms of LDN when viewed in relation to national commitments. Based on a review of available documentation prepared by SADC member states, it is possible to assess the level of commitments in the region (e.g., NDC, LDN, SDG and NBSAP). Against this background, cross-cutting and integrated social, environmental and economic systems and related issues are discussed. People-centred issues speak to equity, land governance, diversity and inclusion in the context of transformational land processes, such as urbanisation and unplanned sprawl. Climate change, biodiversity conservation and ecosystem resilience

highlight the importance of natural capital in sustaining all life. Land and livelihoods are featured as the primary means of securing the necessities of life and advancing prosperity.

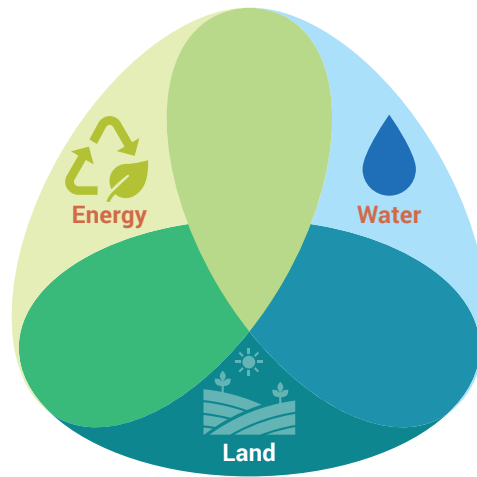
**Part B** of this report features aspects of landscape transformation by showcasing LWE synergies in advancing LDN. These insights and lessons are presented using a number of case studies drawn from across the SADC region (**Table 1**). They have been carefully selected to highlight the diverse array of regional initiatives developed and implemented to prevent, halt or reverse land degradation. Among the featured case studies are scoping studies on land governance in Southern Africa, trans-frontier conservation areas (TFCA), integrated water resources management and community-based natural resource management. Attention is also given to the Great Green Wall Initiative (GGW), using the lessons learned from the Sahel for the emerging Southern African GGW. Drawing on the case studies and associated literature, this report also highlights the drivers, risks and key priorities for advancing LDN.

Informed by the analysis and insights presented earlier in the report, **Part C** recommends strategic policy pathways to leverage LWE gains. These pathways are mapped by applying several ‘success’ criteria, such as their ability to ensure multiple benefits, promote responsible and inclusive governance, enable scaling out and up of projects and programmes, enhance sub-national ownership and capacity, and leverage innovative financing. Although not meant to be exhaustive or definitive, these policy considerations provide a platform for robust debate and can be used to inform future LDN and GGW actions in Southern Africa.

## 1.4 Holistic, systemic thinking and integrated solutions

Nexus thinking is essential given the strong links between the agriculture, water, energy and environment sectors. The LWE nexus is essentially local, but can have significant large-scale repercussions in vulnerable regions, such as Southern Africa. Holistic, systemic thinking and integrated solutions can thus help guide the development and implementation of initiatives aimed at achieving LDN. This would increase overall resource-use efficiency across the region and ensure that a top-down approach to the LWE nexus is developed alongside bottom-up initiatives, helping to build a knowledge base on best practice, policies, and solutions.

**FIGURE 1**  
Land, water, energy nexus



**FIGURE 2**  
SADC regional locality map



UNCCD, 2022

To date, over 120 countries have engaged with the LDN Target Setting Programme and considerable progress has been made since the 2030 Agenda was adopted in 2015. LDN represents a paradigm shift in land management policies and practices. It is a unique approach that counterbalances the expected loss of productive land with the recovery of degraded areas. It strategically places the measures to conserve, sustainably manage and restore land in the context of land use planning.

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**TABLE 1**  
**Featured case studies**

Case study	Country	Name	Organisations	Scale	Sub-themes
1	SADC mainland countries featuring Lesotho and Botswana	Promoting demand driven research – scoping of land governance in Southern Africa: Challenges and Opportunities	NELGA	Large scale regional	Gender equality, land governance
2	SADC Countries	Developing a GGW for Southern Africa	SADC, AU and AfDB	Large scale regional	Land restoration, biodiversity conservation, community-based land management, SLM
3	SADC Countries	Transfrontier Conservation Areas	SADC, PPF	Large scale regional	Land restoration, biodiversity conservation, community-based land management
4	SADC Countries	Management of water resources in Southern Africa	SADC-GMI, GWP-SA	Large scale regional	Integrated water resources management, transboundary catchment management
5	Namibia, Botswana, South Africa	The emergence of agrivoltaics	Research institutions (US and European)	Regional	Renewable energy, agrivoltaics, SLM
6	Tanzania	Matengo Highlands farming system	Tanzanian research institution	Local	Agriculture, soil and water conservation
7	SADC Countries	Integration of VGGT into the implementation of the UNCCD and LDN	UNCCD, FAO	Regional	Land governance LDN
8	Lesotho	Decision Support Sustainable Land Management (DS SLM) in Africa	FAO, WOCAT and GEF	National	Land restoration
9	Namibia	Country Pilot Partnership (CPP) Programme for Integrated Sustainable Land Management (ISLM)	UNDP, GEF	National	Land degradation, Ecosystem protection
10	Democratic Republic of Congo	Mampu project – Market development for secondary tree and non-timber forest products	Hanns Seidel Foundation	National	Forest and land restoration, bio-energy



## 2. INTRODUCTION

### 2.1 Expanding the GLO knowledge base

The Global Land Outlook (GLO) and associated publications of the UNCCD Secretariat have been instrumental in demonstrating the central importance of land quality to human well-being. The GLO's derivative products, such as regional reports and working papers, focus on current trends in land degradation and land use change as well as scenarios to map future challenges and opportunities. In 2019, four GLO regional thematic reports were published: Northeast Asia, East Africa, West Africa and Latin America and the Caribbean. These reports highlighted context-specific aspects of LDN that are pertinent for land management policy, planning and practice.

Within the African context, the GLO for East Africa illustrated the critical role of land governance in achieving LDN and the role of tenure security as a particular challenge for the region. The West Africa GLO regional thematic report analysed the challenges, constraints and assets of seven countries that comprise the region, highlighting past achievements and future opportunities to promote sustainable and inclusive development. In response to land degradation trends, the report featured good practices for Sustainable Land Management.

The UNCCD Secretariat in collaboration with the SADC Secretariat, is seeking to expand its knowledge base by preparing a GLO regional thematic report for Southern Africa. The report highlights cross-sectoral linkages of land-water-energy systems or nexus points that can be used to leverage gains in LDN. The nexus gains approach offers a useful lens through which to negotiate trade-offs and identify synergies for increasing overall resource-use efficiency at local, national and regional levels. Case studies drawn from countries across the Southern African region offer insights into the practical on-the-ground solutions and provide helpful signposts for the design and implementation of a southern Great Green Wall Initiative (GGW).

### 2.2 Harnessing mechanisms for change

Several vehicles exist to implement and scale up good practices in land governance, water stewardship and renewable energy, many of which are driven by the global agenda for sustainable development. Most notable is the UNCCD and its efforts to assist countries in achieving SDG target 15.3 to restore degraded land and soil. The UNCCD links the environment to sustainable development and advocates for integrated land and water management as the most efficient response. This process starts with integrated land use planning which accounts for water variables and land uses that are linked to energy considerations. Implementing these plans reflect a long-term vision and draw on several fields of expertise related to the sustainable management of land, groundwater and surface water. **Figure 3** features some factors that need to be considered for land, water and energy management during integrated land-use planning.

In the LWE nexus arena, mechanisms for collaboration already exist through regional consensus initiatives, international and continental commitments and national policy imperatives. A careful mapping of these mechanisms and their potential role in accelerating gains provides a window of opportunity to feature areas of synergy and cooperation – as well as to identify potential gaps in institutional policy and capacity to leverage collaborative efforts.

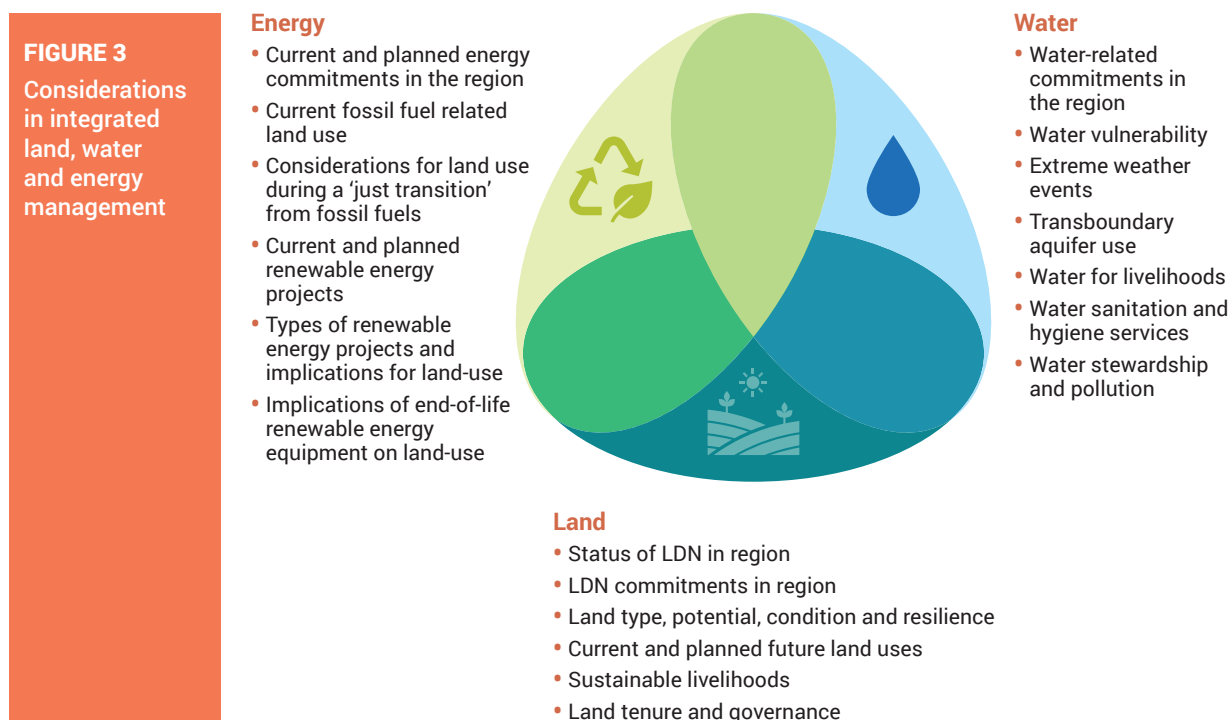
Within the LWE nexus perspective, land use practices stand out as foundation mechanisms that can be harnessed for mitigating and adapting to the impacts of climate change. Land-based mitigation options rank among the most cost-effective solutions to sequester carbon emissions. Economic evaluations of various climate change mitigation alternatives show that capturing carbon through restoring degraded lands (including degraded forests) is a cost-effective option that offers multiple co-benefits.

Figure 4 depicts a simplified representation of the LDN process.

LDN aims to avoid, reduce and reverse land degradation through a systematic process of planning, implementation and monitoring. Three indicators are used within this framework to measure baselines and impacts of interventions:

- Land cover changes;
- Land productivity changes; and
- Soil organic carbon changes.

Water is often described as an ‘enabler for change’; within the context of land management, it is certainly one of the key factors in preventing and reversing land degradation. Water as an enabler is also one of the areas most impacted by climate change. Extreme weather events, droughts, floods, water stress, water variability, competing ground and surface water needs, and the interplay between water and rising temperatures are all factors that must be taken into account when considering how both groundwater and surface water can pose challenges or provide opportunities for nexus gains.



OECD, 2017

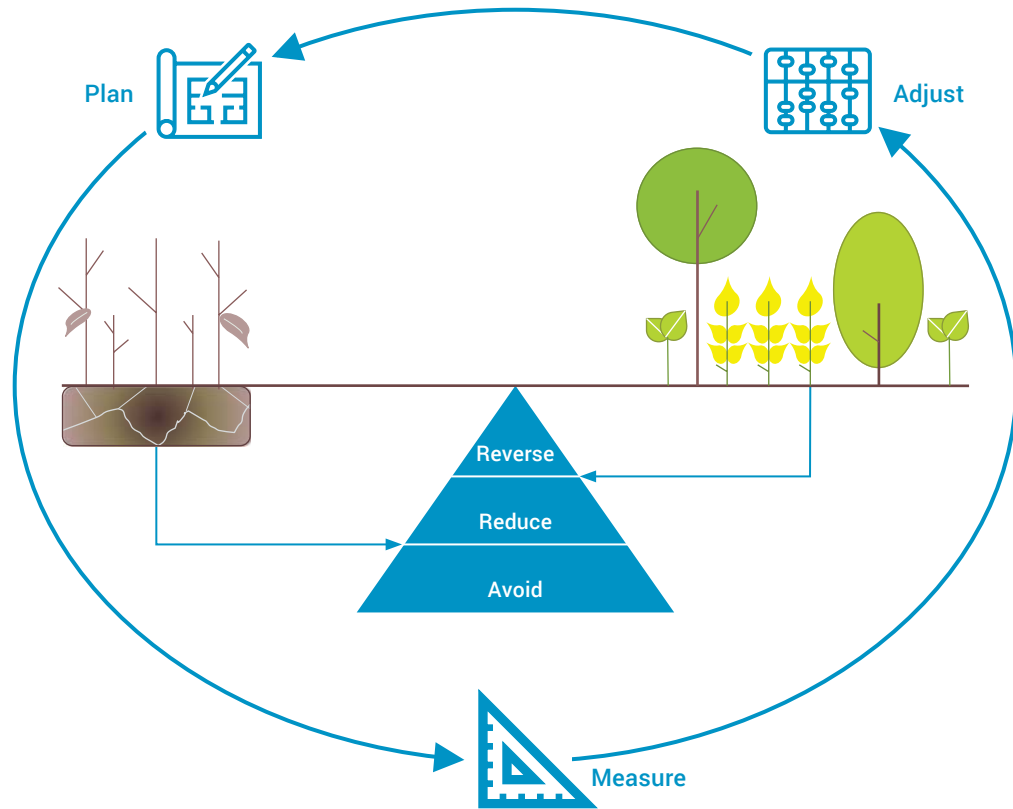
The growing interest in land-water-energy (LWE) nexus in recent years led to a growing appreciation that policies in each of these domains are inextricably linked and that to focus on just one bottleneck runs the risk of suboptimal outcomes whether in respect of effectiveness, efficiency or sustainability.

## 2.3 Regional consensus

There is regional consensus on the importance of fostering sustainable development in the SADC region. SADC is an organisation of 16 Southern African countries that aims to further the socio-economic, political and security cooperation among its member states and foster regional integration in order to achieve peace, stability and prosperity.

It provides a vehicle to implement sustainable development projects guided by a variety of strategies and policy frameworks (Figure 5). These frameworks align with the overarching goals and objectives in the SADC Vision 2050. Throughout this diverse region, socio-economic growth and sustainable development are top priorities that can only be achieved through effective implementation and good governance guided by action programmes.

**FIGURE 4**  
Schematic representation of the LDN process



Creating opportunities for achieving nexus gains depends on clear and comprehensive strategies and policy frameworks. The **SADC Regional Indicative Strategic Development Plan 2020-2030 (RISDP)** present a step-by-step guide to achieving milestones towards the vision of “a peaceful, inclusive, competitive, middle to high income industrialized region, where all citizens enjoy sustainable economic well-being, justice and freedom” (SADC, 2020).

The **Sub-Regional Action Programme to Combat Desertification 2015-2025 (SRAP)** provides a roadmap through which the SADC regional structures, member states, relevant stakeholders and relevant partners can collaborate to promote sustainable development (SADC, 2015). Through the alignment with various SADC protocols and the 10-year strategy of the UNCCD, member states can develop and implement projects and actions that respond to their National Action Plans in developing a sustainable sub-region. Priorities of the SRAP include increasing awareness on the effects of land degradation on the socio-economic growth of the region, and how communities can best benefit from sustainable practices to manage Desertification, Land Degradation and Drought (DLDD).

All SADC member states have adopted the SADC Water-Energy-Food (WEF) Nexus Framework (SADC, 2019) which draws on the RISDP and other

sectoral policies to develop better alignment in WEF policies, strategies and programmes. Based on a memorandum of understanding between the secretariats of SADC and UNCCD, partners have prepared a GLO thematic report for the region and drafted a strategy for the Southern GGW (SADC, 2021).

## 2.4 Global and continental commitments

The regional consensus on combatting land degradation and achieving nexus gains in a sustainable manner is driven by key continental and global commitments (Figure 5). The **African Union's Agenda 2063 and the United Nations (UN) 2030 Agenda for Sustainable Development**, represent the main policy commitments and offer a unique opportunity for the African region to achieve inclusive, transformative and sustainable development. Alignment of the African Agenda 2063 goals and priority areas with the Sustainable Development Goals (SDG) allows for this development path to be contextualised globally.

SDG Target 15.3 highlights the focus of combating land degradation to achieve LDN through restorative land and soil initiatives. The UNCCD enshrines this target and looks to all countries to adopt strategies

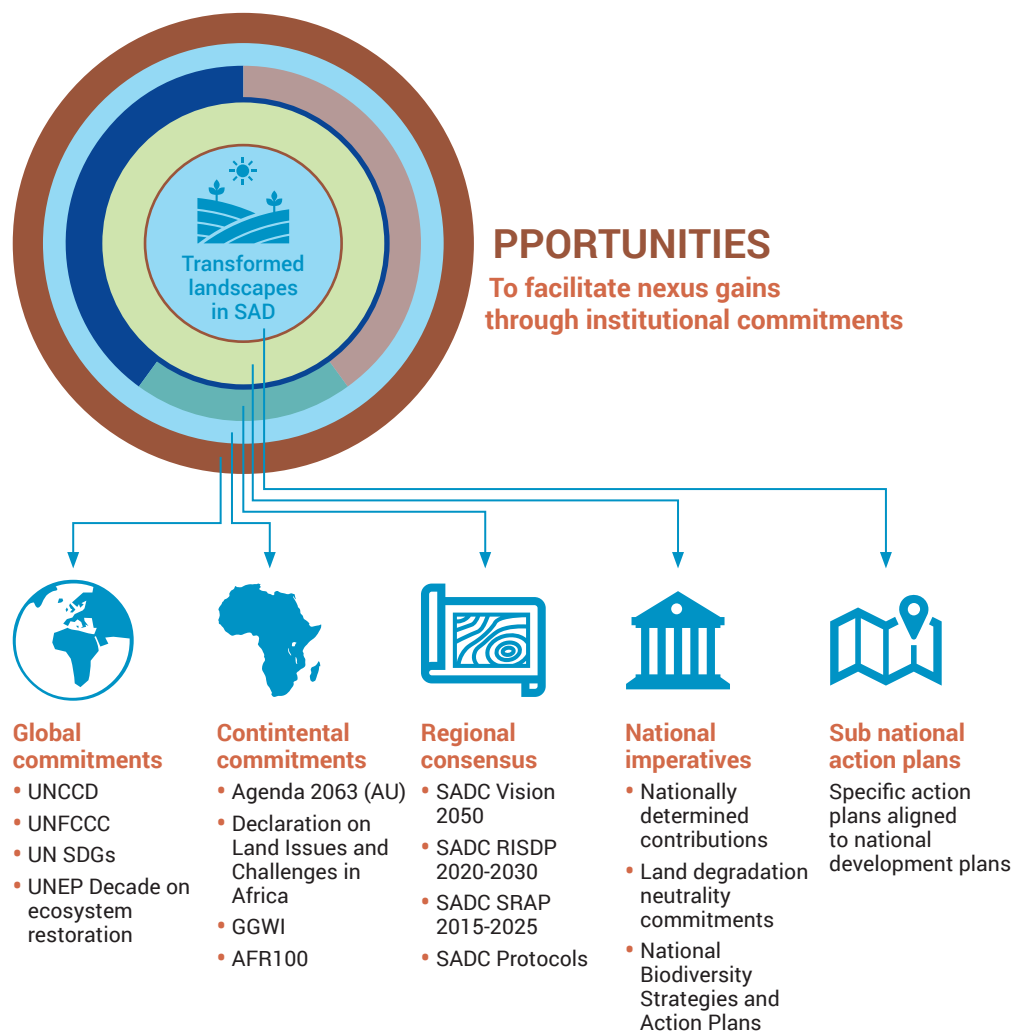
and action plans to achieve LDN targets. As we enter the **Decade on Ecosystem Restoration (2021–2030)**, other global agreements will coalesce around land restoration, including the UN Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the UN Environment Programme (UNEP).

The **UNCCD 2018-2030 Strategic Framework** places emphasis on combating DLDD while achieving SDG targets for land degradation, poverty and ecosystem services (UNCCD, 2017). Nations commit to LDN targets to achieve this vision, but restoration commitments within other global and continental mechanisms are also essential, such as the African Forest Landscape Restoration Initiative (AFR100) under the Bonn Challenge (AFR100, 2017).

## 2.5 National imperatives

SADC member states have an obligation to accelerate target achievement processes that consider their national role in their regional and continental contexts. For example, all SADC countries have committed to fulfil their obligation under the Rio Convention action plans (**NDC, NBSAP and LDN**) (**Figure 5**). These facilitate effective planning and management of different restoration initiatives at a national scale, using the UNCCD National Action Plans (NAPs), while collective national efforts can provide co-benefits at a regional scale. Alignment of NAPs between countries in SADC would enhance regional cooperation to address DLDD. Land administration and governance in SADC is key to economic transformation and the attainment of the SDGs. Member states are working hard to address legacy issues through improved approaches to land administration using available technologies and knowledge networks.

**FIGURE 5**  
Institutional mechanisms for nexus gains



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# 3. PART A: THE STATUS OF LWE

An overview of the status of LWE commitments in SADC requires robust qualitative and quantitative analysis (Box 2). Such interrogation highlights the broad thematic areas in LWE commitments. There are fundamental cross-cutting issues that can be showcased through the lens of the “people, planet and profit” development framework.

## 3.1 Status of LWE commitments in SADC

In line with the RISDP (SADC, 2020), SADC’s 16 member states have all committed, through various instruments, to accelerate land, water and energy transformation in the region. The status of LWE commitments in SADC can be analysed from various perspectives. Using source documentation such as LDNs, NDCs and NBSAPs, it is possible to analyse each member state’s public commitments (see Figure 7 and Figure 8).



## 3.2 Achieving alignment on LWE commitment reporting

It is readily apparent that there is a lack of cohesive regional target setting across all three commitment mechanisms (LDN, NDC and NBSAPs) among SADC member states. Targets are often expressed differently, especially those relating to NDCs and NBSAPs. The level of detail describing commitments and implementation plans also vary significantly, as explained in Box 1 below relating to good practice. This highlights the importance of strengthening policy coherence to support the coordination of national targets and alignment with regional implementation plans, which has been recently promoted (Bowa *et al.*, 2021). Interestingly, about a third of the countries do not feature water as a focus area in commitment documents, contrary to the public and policy attention given by SADC to this vital resource. As most countries confirm that water is a critical area of concern, it is vital that water-related commitments are reflected across the LDN, NDC and/or NBSAP documents to ensure alignment.

The analysis below highlights those countries that are giving prominence to response measures to address land productivity, soil organic carbon, water management and energy (Figure 6). A more standardised approach to target setting and reporting on NDCs and NBSAPs in the SADC region is required, and member states should prioritise the capacity and resources to achieve this. In terms of LDN, well-established science-based guidelines are available (Cowie, 2020), which can facilitate regional tracking against the commitments presented in Figure 6.

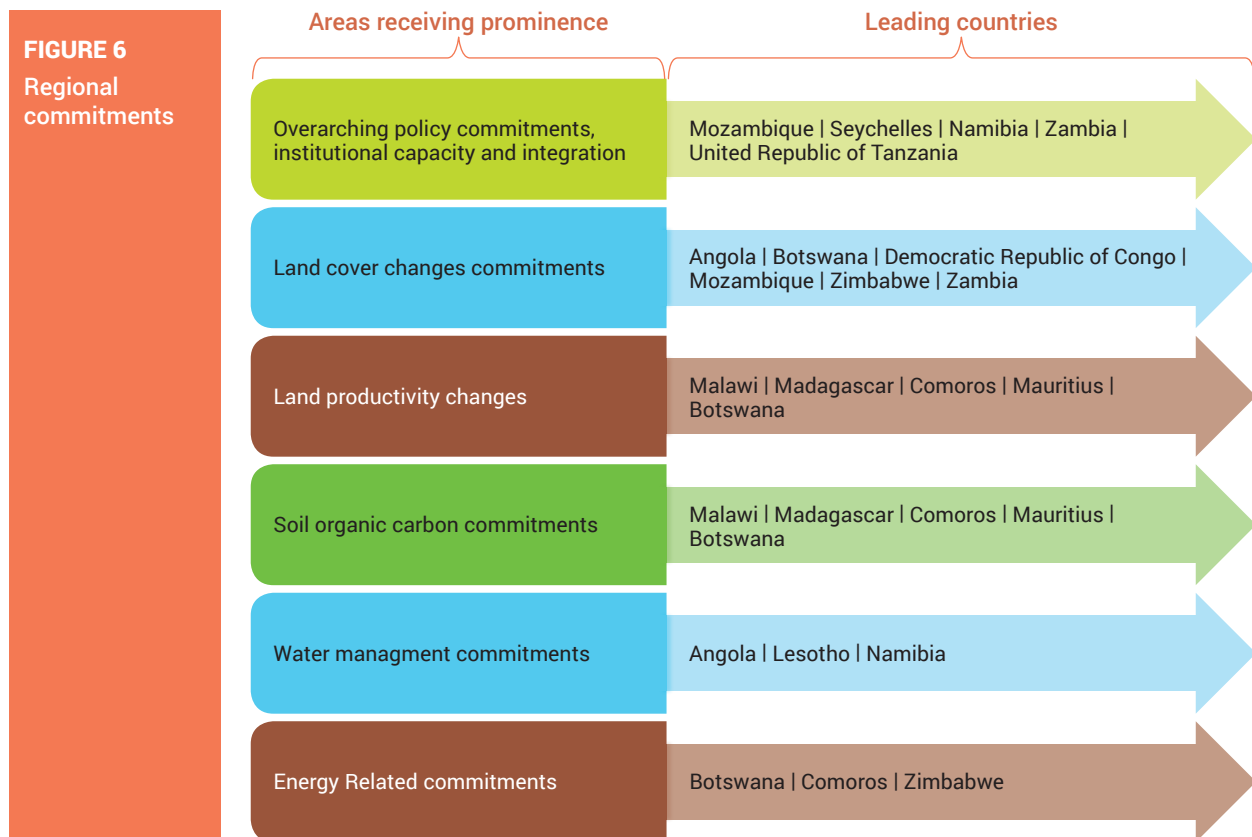
**BOX 1**  
**Regional good practice in target setting**

One of the limiting factors in determining regional commitments is the variability in target setting and reporting within SADC. For example, NDC commitment reports range from 120 pages with significant detail to high-level overviews of less than 15 pages. This makes it difficult to determine the comparative level of capacity and commitment in various countries.

Namibia’s 2021 NDC report sets a regional benchmark by providing robust data on the Agriculture, Forestry, and Other Land Use (AFOLU) emissions, mitigation and adaptation strategies. Namibia also links AFOLU mitigation measures to combatting desertification.

In terms of LDN commitments, Tanzania produced a report that showcases both quantitative and qualitative commitments. These commitments correlate well with those in Tanzania’s NDC report – indicating that the country is avoiding a siloed approach to target setting.

The NBSAPs prepared by the various SADC member states also vary in complexity, content and commitments on reducing ecosystem degradation and promoting sustainable management of biodiversity. The Malawi NBSAP II stands out as a comprehensive framework for action, with a clear indication of the strategy and implementation arrangements for biodiversity management in Malawi. Recognising that biodiversity loss and ecosystem degradation have substantial implications for both the country and its citizens, the report highlights mechanisms for addressing these factors across the five strategic goals.



## BOX 2

### Determining commitment categories

The commitments of SADC countries was analysed by considering their publicly available LDN, NDC and NBSAP documentation. All commitments were categorised as follows:

- Overarching policy commitments were those related to policy, capacity building, improved strategy and planning and inter-regional collaboration;
- Land cover commitments were those which would improve land cover through various mechanisms;
- Land productivity commitments would improve land productivity;
- Soil organic carbon commitments would improve soil organic carbon;
- Water commitments would improve water management; and
- Energy commitments would move countries towards a low-carbon economy.

#### Restoration commitments

A quantitative analysis calculated low, medium and high restoration commitments by considering the 16 member states' LDN, NDC, NBSAP and Bonn Challenge commitments in terms of hectares to be restored. The medium restoration commitment estimate was then divided by each countries' total land area; this gave a percentage of total land area that would be restored in terms of each country's commitments.

To indicate each country's capacity to effect change, the Human Development Index (HDI) was applied. The HDI indicates national capabilities for development, based on life expectancy, education and gross national income per capita. By comparing each country's HDI with their commitments, an approximate indication of its capability to deliver was calculated. It corresponds to the per country qualitative analysis (Figure 7 and Figure 8) by adding the total number of commitments in the LWE nexus as an indication of total type of commitments per country.

The challenge in the quantitative analysis was the possible duplication of per hectare targets across documents, as it was not clear if LDN commitments were replicated in NDCs, NBSAPs and the Bonn Challenge. Despite this limitation, it was possible to obtain an overview of the relative land restoration commitments across SADC (Figure 10).

#### Land requirements for renewable energy

The land needs of the following types of renewable energy projects were measured (in hectares):

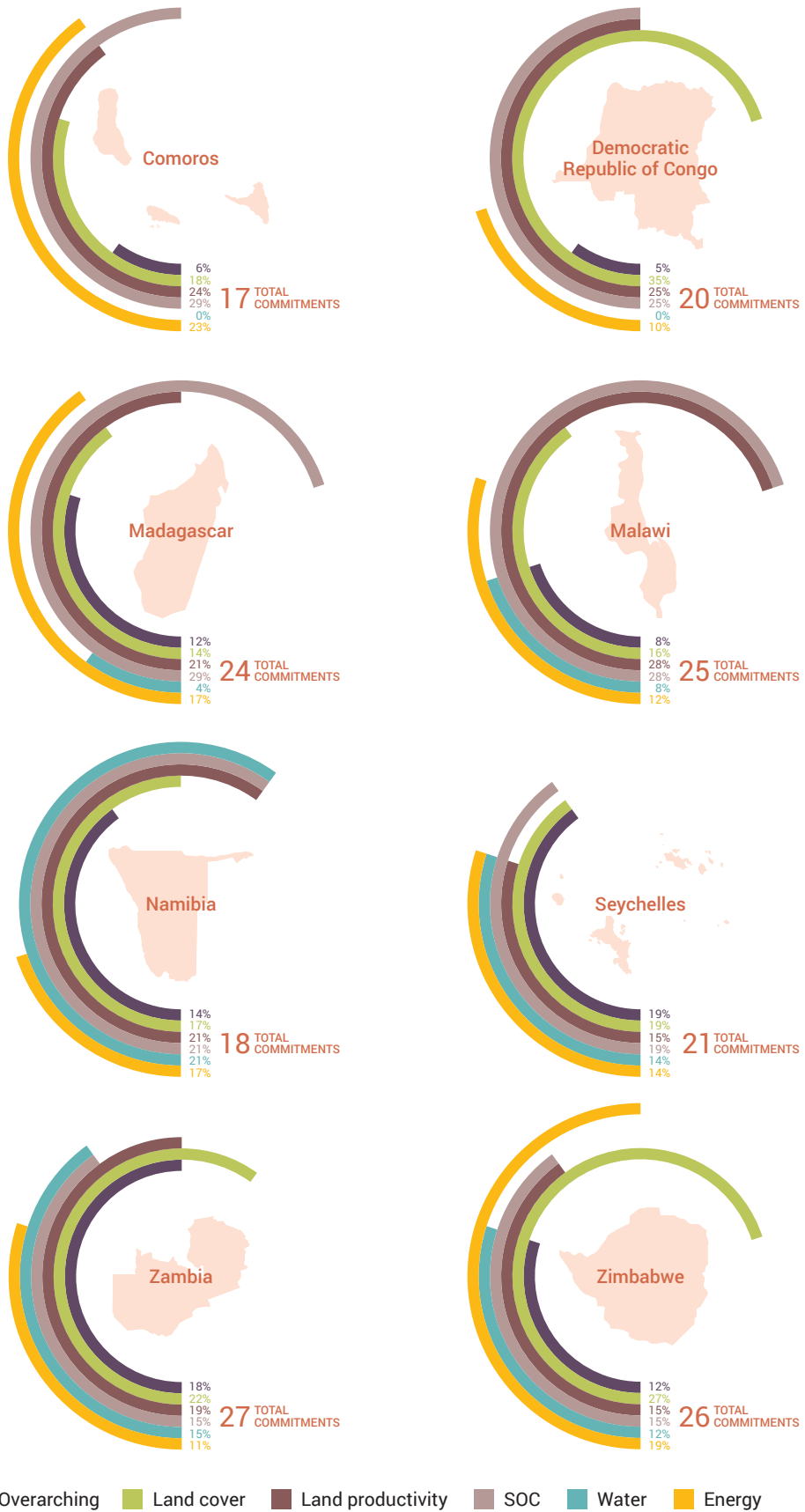
- Wind;
- Solar;
- Biomass;
- Hydro; and
- Geothermal.

This was done for projects under construction and operational (Group 1) as well as pipeline projects (Group 2) in prefeasibility and feasibility phases of development.

**FIGURE 7**  
Qualitative analysis of LWE commitments in SADC – A



**FIGURE 8**  
Qualitative  
analysis of LWE  
commitments  
in SADC – B





### Message for regional stakeholders

Despite showcasing the range and variety of NDC, LDN and NBSAP commitments, the following were identified as significant gaps:

- Minimal mention of mechanisms to effect changes in land tenure and governance that enable improvements in land cover, productivity and soil organic carbon
- Lack of integration between governmental departments and regional bodies, leading to siloed approaches to addressing land management challenges in the region
- Despite embedding livelihoods and food security in the commitments, drought resilience was notably absent from commitments across most countries
- Migration, urbanization and unplanned urban sprawl and the impacts of these processes on land resources are not addressed in country commitments
- With the exception of Tanzania, there is limited focus on transboundary renewable energy infrastructure development as a commitment
- Currently there is limited collaboration within the land, water and energy sectors across national boundaries preventing optimal harnessing of LWE nexus gains

### 3.3 Understanding the linkages between LWE and human development

LDN commitments, when viewed from a human development perspective, show the leading and lagging SADC member states. **Figure 9** and **Figure 10** provide an overview of the analysis against the HDI. The map in **Figure 10** shows that Comoros, Namibia, Eswatini and Malawi have committed to restoring over 30% of their total land area. In Malawi's case, the medium commitment scenario forecast translates into restoring almost 97% of the country's land, which may be the result of duplication across commitment documents. Of the four leading countries, Comoros has a high HDI, Eswatini and Namibia have a medium HDI and Malawi scores in the low band for HDI. This suggests that Malawi will likely require significant resources and additional capacity to fulfil its land restoration targets. Of the five countries that have committed to restoring between 20% and 30% of their total land area, only Tanzania has a HDI score that falls in the low band which will require increased resources and capacity to achieve its commitments.

Of the 16 member states, the Democratic Republic of Congo (DRC) and South Africa have committed to restore between 10% and 15% of their total land area. The DRC is in a low HDI index band. A further complicating factor for both countries is that their economies are heavily dependent on mining; in the case of South Africa, a just transition away from coal mining appears to be eminent. The DRC is rich in copper, cobalt and lithium, which will power the global green energy transition. About 78% of the

world's platinum (used in hydrogen fuel cells) are mined in South Africa (Cloete, 2020). Considering the competing land use requirements of the future, both South Africa and DRC will need to scale up land restoration commitments. Whereas the DRC has vast hydropower potential to mitigate its need for 'land take' to meet their power needs, South Africa will have to carefully integrate land use planning to accommodate increased demand for both renewable energy projects and mining. In addition, it will need to address the legacy of land degradation related to its extensive coal fields.

Five member states lag in committing to restore less than 10% of their total land area. Of these, Botswana has a high HDI, while Mozambique falls in the low band; the remaining countries fall within the medium HDI band. Zambia, Botswana and Mozambique are in a similar position to South Africa and the DRC, with a high endowment of minerals and metals needed for the global green energy transition (Cloete, 2020). The analysis suggests that Mozambique may require support to increase its land degradation commitments. In addition, Mozambique's coastal areas are particularly vulnerable to extreme weather events and flooding due to climate change, adding an additional layer of vulnerability.

Like most of the continent, Southern African countries are highly reliant on mining and agriculture in terms of gross domestic product and human development. However, these sectors present a double-edged sword as they are also major contributors to land transformation. By exploiting mineral resources, the DRC, Botswana, Zambia, Zimbabwe, South Africa, Angola and Madagascar

experience the impacts of mining on water resources and land use which are relied upon by multiple users. Managing water use and quality – considerably impacted by acid mine drainage and contaminated runoff (Simpson *et al.*, 2018) – would be greatly beneficial to the LWE process.

The agriculture sector is also of major social and economic importance in the SADC region, with the vast majority of the population depending on agriculture for food, income and employment. However, both subsistence and commercial agricultural practices are instrumental in

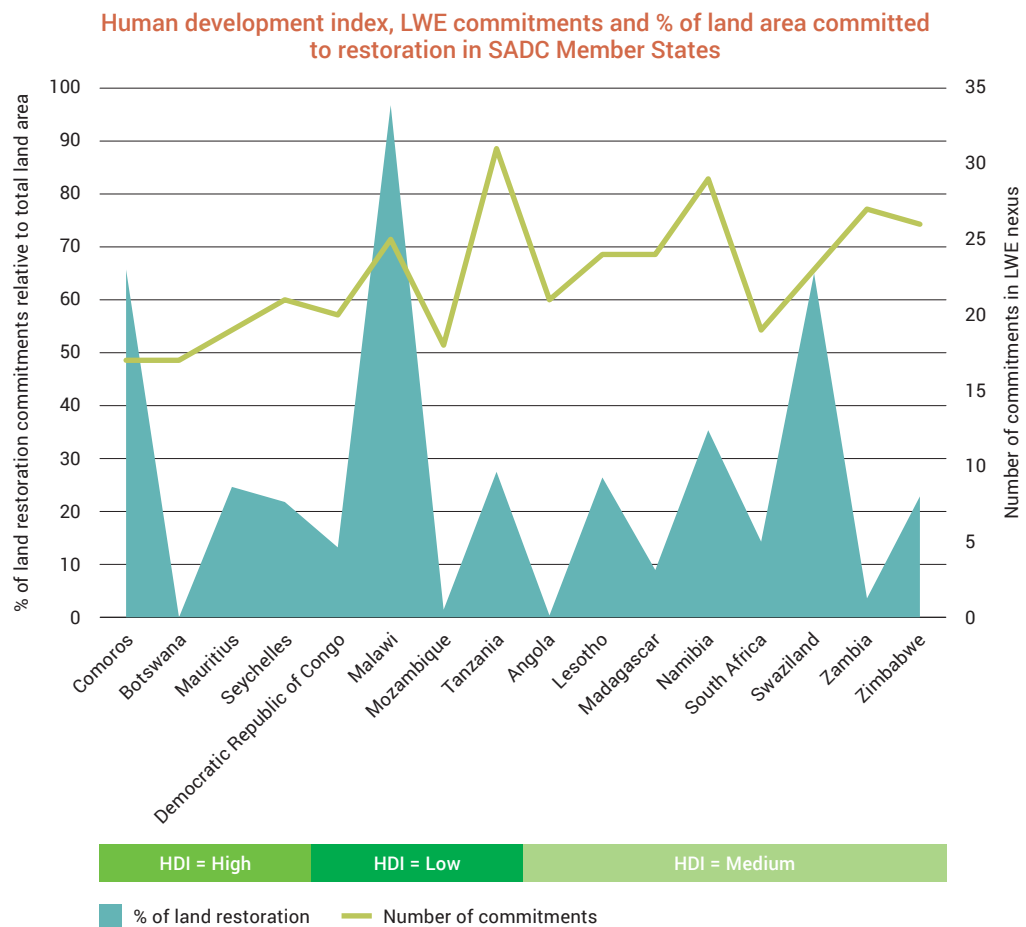
transforming land in various ways – including deforestation, biodiversity loss, soil degradation and pollution. The environmental impact of agriculture is determined by the effect that farming practices have on surrounding ecosystems. For instance, the impacts of large-scale commercial agriculture on water quantity and quality are well-documented, given the intensive use of water and the application of fertilisers. Against this background, countries such as Botswana, DRC, Madagascar and Malawi should consider integrating water management and conflicting water needs into land restoration commitments (Figure 9 and Figure 10).



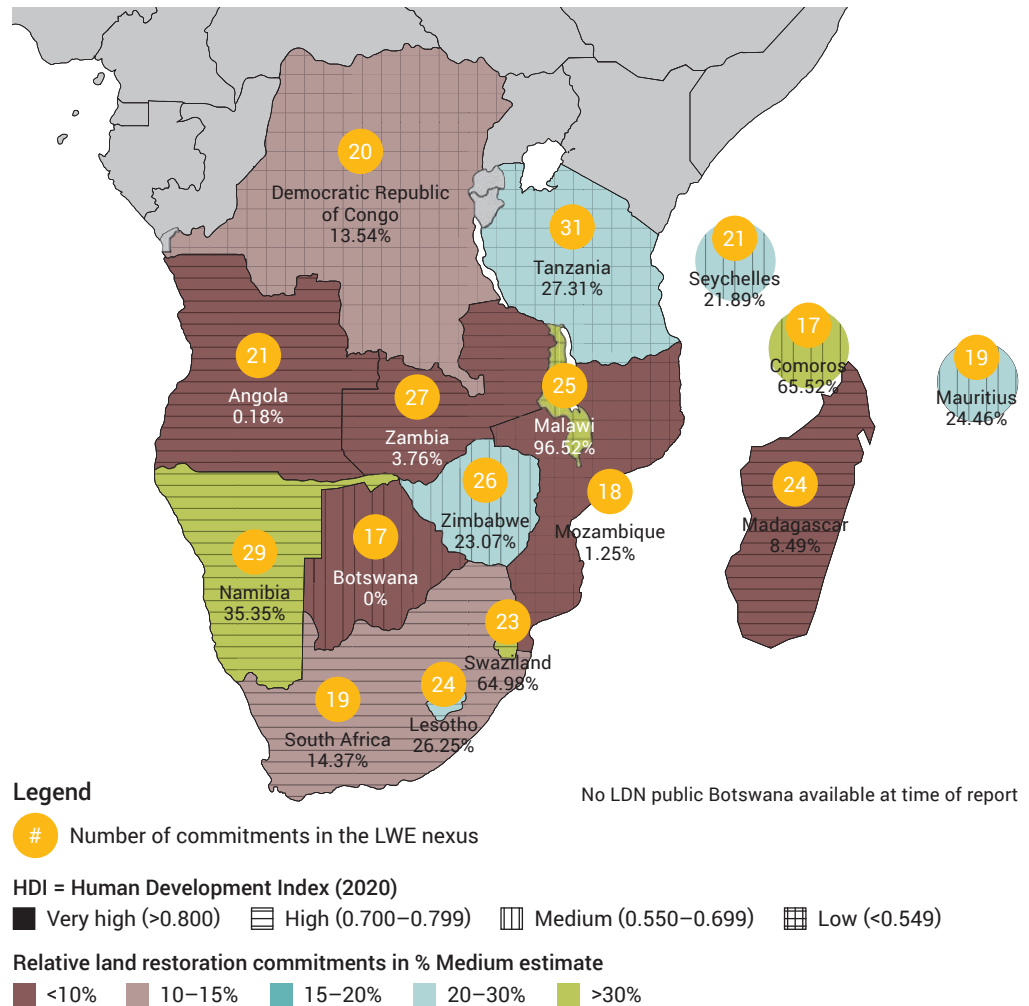
Message for regional stakeholders

- Attention needs to be given to abandoned mines due to the risk posed to water quality and availability for livelihoods.
- Botswana, DRC and Madagascar should consider the integration of water management and conflicting water needs into land restoration commitments.
- The mining and agriculture sectors pose both positive and negative developmental scenarios that should be carefully considered in LWE strategic planning.

**FIGURE 9**  
Summary of quantitative analysis of Member State Commitments



**FIGURE 10**  
Composite land restoration commitments in SADC relative to total land area – medium estimate



### 3.4 Special focus on renewable energy

The general energy shortage in SADC is well-documented and has been the topic of ongoing discussion since at least 2007. With global interest in decarbonising energy supplies, this constraint in the region is under renewed scrutiny. In addition to the land impacts associated with renewable energy projects in SADC, expansion in mining operations and decommissioning of coal mines and power stations will also have an impact on land use and degradation over the coming decade. Renewable energy planning – and the ways it relates to land use – warrants special attention.

It is projected that power from renewable energy sources will constitute over 39% of total generation by 2030 (IRENA). Achieving this goal will require significant investment in renewable energy projects, such as solar, hydro, wind and geothermal.

Table 2 provides valuable insights into the current and projected impact on land of renewable energy projects. Only 0.05% of total land area across

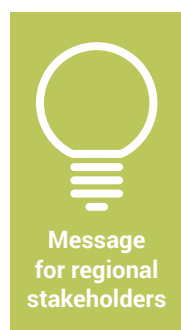
SADC is allocated to current and future renewable energy projects. There are significant differences in commitment levels between countries, despite the region’s vast renewable energy potential (Southern African Research and Documentation Centre, 2018). Current renewable energy projects in the region are illustrated in Figure 11, indicating a spread of wind and solar power projects, especially in Namibia, South Africa and Mauritius. Hydropower projects take precedence in the rest of the SADC countries. As is evident in Figure 12, SADC has significant photovoltaic output potential, which could be developed to boost diversification in the energy mix.

Within SADC structures, there are several governance and implementation bodies which coordinate the implementation of renewable energy projects in the region, including the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE), the Regional Electricity Regulators Association of Southern Africa (RERA) and the Southern African Power Pool (SAPP). The renewable energy mandate of these bodies is to promote market-based uptake and sustainability.

Despite an increase in renewable energy projects, the SADC region still lags behind other regions in Africa. Coal-fired thermal power plants contribute 85.7% of the power produced in Southern Africa, highlighting the urgent need for scaling up renewable energy projects. South Africa is the largest emitter of CO<sub>2</sub> in the SADC region due to its reliance on coal-fired thermal power (Bowa *et al.*, 2021), although there is a significant commitment to increasing renewable energy in its national power mix. While addressing current power supply constraints, renewable energy expansion will also reduce carbon emissions. Mauritius and Seychelles have committed to using

more land area than other SADC countries to diversify into renewable energy sources.

Based on public releases by the SADC Energy Thematic Group (ETG) – comprising SAPP, RERA and international cooperating partners – lockdown measures during the COVID-19 pandemic significantly slowed the implementation of renewable energy projects. There was reallocation of funding to pandemic responses and stoppages in construction and procurement processes (Ngucka, 2021) Planned expansions are expected to resume as the pandemic's impact in the region eases.

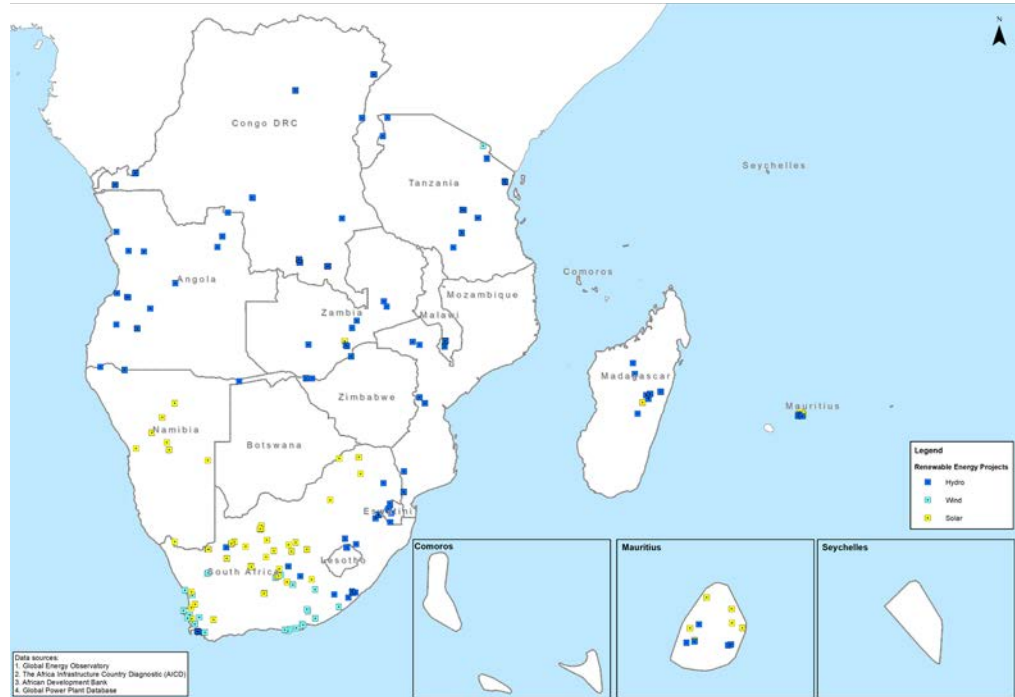


- While these commitments are necessary and timely, it is vital that integrated land use planning informs the selection of suitable land. The aim would be to avoid, mitigate and manage impacts on biodiversity, livelihoods and stakeholder groups.
- Improved coordination among countries to leverage significant investments in regional renewable energy projects is required for scaling up.

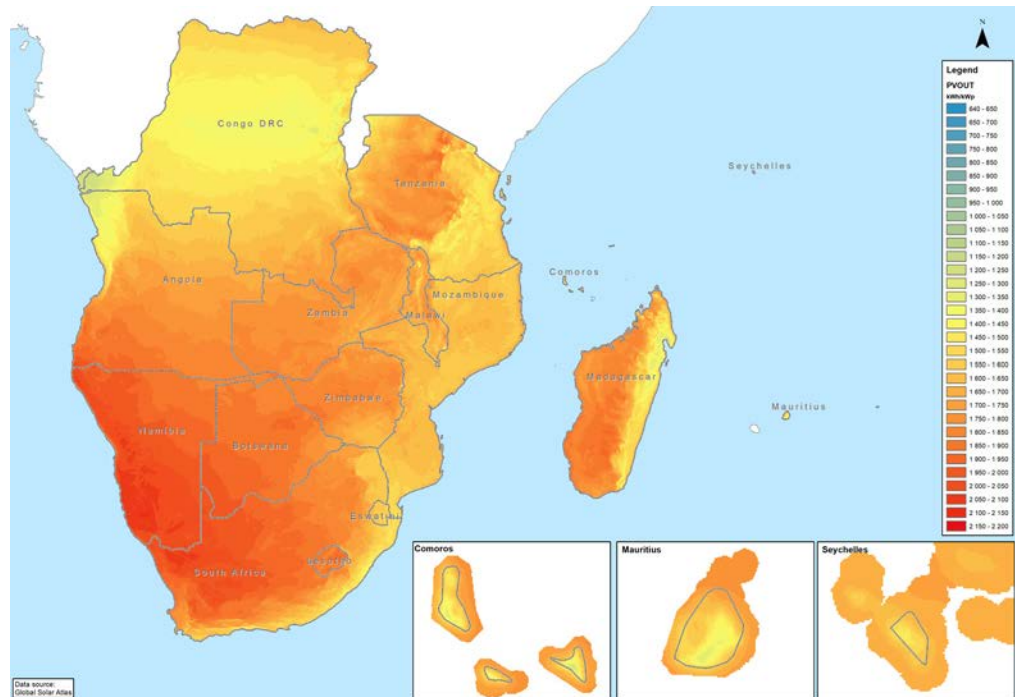
**TABLE 2**  
Land use needs for current and projected renewable energy project developments

Country	Total Land Area (Hectares)	Total hectares used for RE projects (in operation and under construction)	Total additional hectares projected to be used for RE projects	% of land area allocated to RE projects in total
Angola	124,670,000	500.090	2.100	0.000402815
Botswana	58,173,000	12.950	215.820	0.000393258
Comoros	186,200	6.500		0.003490870
Democratic Republic of Congo	234,479,900	350.070	1,637.790	0.000847774
Eswatini	1,736,400	158.960		0.009154573
Lesotho	3,035,500	51.209		0.001687004
Madagascar	58,704,100	88.810		0.000151284
Malawi	9,427,600	229.770		0.002437206
Mauritius	204,000	725.550	21.580	0.366240196
Mozambique	79,938,000	1,935.450	1275.455	0.004016744
Namibia	82,561,500	833.560	2730.120	0.004316394
Seychelles	45,700	228.150		0.499234136
South Africa	122,081,300	186,953.860	340284.960	0.431875168
United Republic of Tanzania	88,580,300	214.110	815.006	0.001161789
Zambia	75,261,200	531.790	1080.360	0.002142073
Zimbabwe	39,075,700	294.210	2677.050	0.007603856
<b>Total</b>	<b>978,160,400</b>	<b>193,115.039</b>	<b>350740.241</b>	<b>0.055599806</b>

**FIGURE 11**  
Current  
renewable  
energy projects  
in the SADC  
region



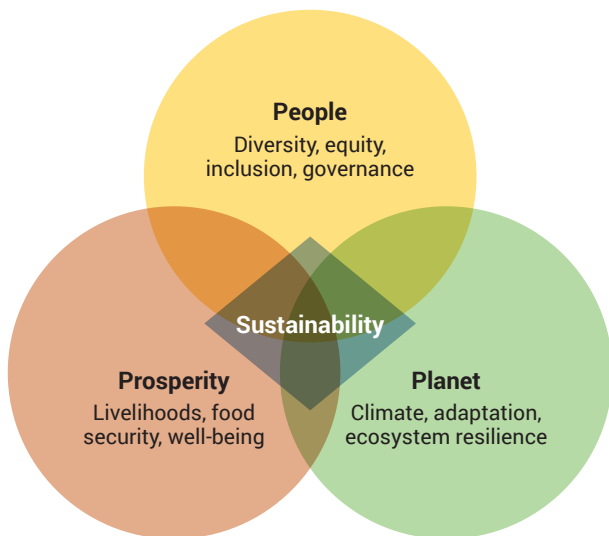
**FIGURE 12**  
Photovoltaic  
potential in  
SADC



### 3.5 Fundamental cross-cutting matters

The LWE nexus represents a multi-dimensional mosaic of interdependencies and linkages. Not only is water critical to land cover and productivity, but the reverse is also true. Land and water act as energy enablers, while energy bolsters land cover

and productivity. There are myriad interlinked and co-dependent elements. Within this mixture of factors, it is important to keep the three overlapping circles of sustainable development in mind. This will ensure that neither people, planet nor economic prosperity suffer as a consequence of realising nexus gains. Counterbalancing of gains and losses in implementing measures for LDN, NDC and NBSAPs is imperative.



### 3.6 People: Promoting diversity, equity, inclusion and governance

The global focus to ensure a just and equal society is shifting to include concepts of diversity, equity and inclusion. In the context of the LWE nexus in the SADC region, this requires mechanisms to ensure that:

- Diverse groups are included in the design and implementation of LWE initiatives. This implies that stakeholders are representative of different sectors of society in terms of gender, disability, ethnicity, sexual orientation and religion;
- Fair access is created for all stakeholder groups to realise opportunities and access benefits from gains in the LWE nexus. This ensures that stakeholder groups are treated equally; and,
- Stakeholder groups are included in decision-making processes and feel comfortable and safe to voice their opinions, perceptions and fears.

Where diversity, equity and inclusion are actively encouraged in planning and implementation, LWE nexus gains can be accelerated as part of a human-centred approach to planning and development.

#### Human rights considerations

In practical terms, diversity, equity and inclusion are often realised by applying international good practice standards in planning and developing

targets and interventions. SADC's Gender Policy advances gender equality for women in the region. Among the key issues in realising nexus gains are patriarchal land governance systems, access to water, sanitation and hygiene (WASH) services, disproportional access to electricity and exclusion from stakeholder engagement processes.

Within the LWE nexus in SADC, the following human rights-centred considerations are particularly important:

- Consideration of, and consultation with, indigenous people in project planning and development could lead to localised insights and innovations that may otherwise have been overlooked; and,
- Special focus on marginalised and vulnerable groups such as women, youth, aged and disabled who experience discrimination and social, political or economic exclusion due to unequal power relationships.

In practical terms, well-developed LWE nexus programmes would apply international good practice environmental and social safeguards to ensure that gains and losses are balanced and equitable for all stakeholder groups.

#### Strengthening land governance

Effective land governance is a foundation element that needs to be considered to promote diversity, equity and inclusion as it will inform and impact the success of many initiatives.

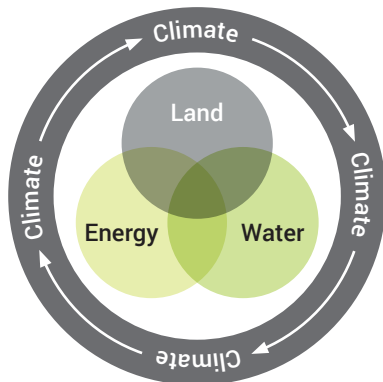
Several complex issues remain from historical governance within the region – spanning gender equality, unequal distribution of land, plural legal regimes, informal settlement encroachment on customary land, urban sprawl, and land grabbing of state, private and communal land. This has led to the disenfranchisement of the most vulnerable, with major impacts on land condition. The effects of climate change further exacerbate these challenges.

Due to the diverse cultures and political regimes in SADC member states, a 'one size fits all' approach will have little effect in addressing current 'flawed' land tenure systems that have their genesis in colonial times. Opportunity exists for governments to increase efficiency and transparency in their land governance, improving security of tenure through supporting laws to reform and formalise legitimate tenure rights for communal land.



### 3.7 Planet: Climate proofing, adaptation and ecosystem resilience

The developmental challenges facing SADC countries, exacerbated by poor economic and political governance, make the region highly susceptible to the effects of climate change. The increased frequency of floods, cyclones and droughts may damage infrastructure, destroy agricultural crops, disrupt livelihoods and cause loss of lives. In the region's most vulnerable countries, including the small island developing states (SIDS) of Mauritius, Comoros and the Seychelles, climate change is not only an additional development challenge slowing economic growth, but threatens some of the progress made over the last decades (SADC, 2015). In 2021, SADC revised its Climate Change Strategy and Action Plan to fully align with the Paris Agreement, SDGs and the African Union Agenda 2063. This strategy aims to harmonise national efforts to combat climate-related challenges.



In the coming decades, the region is expected to experience higher land and ocean surface temperatures – which will affect rainfall and winds as well as the timing and intensity of weather events (Intergovernmental Panel on Climate Change – Hoegh-Guldberg *et al.*, 2018). These events will undoubtedly impact all elements of the LWE nexus due to the interconnections between hydrology and water systems, natural and human land use, energy resources and climate within the region (Gosling *et al.*, 2020).

#### Advancing climate adaptation

The development and implementation of climate adaptation strategies will be critical to ensure community resilience and can offer joint opportunities for achieving LDN in SADC. **Box 3** highlights the LDN case where opportunities for SIDS, such as Mauritius and Seychelles, have been applied. It is encouraging that member states have been proactive in developing their respective strategies with their development partners, but integration of climate change as a cross-cutting and universal thread throughout LWE policies and strategies, remains significantly underemphasised.

In the African region, there has been a move to strengthen the continental strategy on climate change (UNECA, 2021). As a result, SADC has developed a single cross-sectoral climate change strategy with all sectors participating and held accountable. LWE management needs to feature as a key building block to develop the ecosystem resilience which supports the livelihoods and subsistence needs of the majority of SADC's population.

#### Capacity building in conservation and land use planning

In protected areas, – which are a cornerstone of global conservation efforts – the potential for ecosystem conservation and restoration is high yet faces several challenges. In the SADC region, the level of conservation and protection vary between nations. Factors that continue to negatively impact conservation efforts in these areas include deforestation, unsustainable agricultural practices and over-exploitation of natural resources. Some of these issues stem from weak management practices and a severe lack of technical capacity (IUCN, 2020). A lack of suitable technical capacity to plan and manage protected areas have knock-on effects in terms of funding, development and eco-tourism. Varying forms of land rights associated with protected areas make it more challenging to effectively co-manage biodiversity resources.

When viewed from a Land Use Planning (LUP) perspective, there are similar capacity constraints at all administrative levels. Effective and integrated LUP is hampered by a lack of trained professionals and limited expertise. This situation creates a challenging environment for public-private partnerships to deliver viable land management solutions and funding sources (NELGA, 2019). To date, only seven countries in SADC have prioritised LUP as part of their commitment to landscape restoration. However, some initiatives are underway. For example, the DRC is implementing a LUP policy that optimises the use of both land and forest resources, while reducing impacts and promoting sustainable development at a national and local scale. The introduction of a LUP technical support unit and capacity building plan at the level of administration has encouraged uptake across the country.

### Integrated water resources management

The nexus concept has its roots in integrated water resources management (IWRM), and SADC member states have been working on promoting water governance for well over two decades. Using a water 'lens' in the nexus approach, IWRM promotes the coordinated development and management of water, land and related resources, now firmly placed on the international political agenda. Given the primacy of water for life, water continues to lie at the heart of the 2030 Agenda for Sustainable Development and LWE nexus approach.

The 15 major transboundary river basins in Southern Africa serves as a catalyst for IWRM uptake across the region. As the region's scarce water resources need to be shared between different basin states, negotiation and cooperation are required to ensure equitable distribution and no harm. The Zambezi River Action Plan (ZACPLAN) prompted the development of IWRM-style national legislation among SADC member states (Mohamed, 2003). IWRM and the nexus concept took root in the idea that sectoral and national policies and associated initiatives are needed to protect water resources – due to their strong linkages with land management, food security and ecosystem functioning. IWRM also highlights the need for cooperation and alignment at different scales and between multiple uses.

The galvanising milestone for the SADC Protocol on Shared Watercourses was the establishment of river basin organisations (RBOs) from the year 2000 onwards, which enjoys strong donor support. In recent years, the SADC Regional Strategic Action Plan (RSAP 4) and Climate Change Adaptation in

the Water Sector provide additional policy tools to support the uptake of IWRM. The contribution of RBOs to fostering regional cooperation cannot be underestimated.

With implementing agencies of IWRM initiatives active in Southern Africa since 2000, the regional network of the Global Water Partnership (GWP-SA) has been a dynamic force – supporting the establishment of the SADC Water Day and Annual Water Research Symposium. GWP-SA was originally appointed by SADC as an implementing agent for stakeholder participation and RBOs dialogue under RSAP II. The regional network manages activities and convenes stakeholders in the SADC region and at a pan-African level, addresses issues that impact water security (GWP-SA, 2021). WaterNet was established over 20 years ago as a regional network of university departments and research and training institutes specialising in water (WaterNet, 2021). Collectively, GWP-SA and WaterNet have supported regional water-related processes by conducting training and raising awareness of the importance of IWRM in regional development.

### Ways to advance IWRM that can support LDN initiatives:

- Strengthening of political will through advocacy and communication: Without high-level political support, countries will not achieve sustainable water resources management.
- Action planning: Countries can develop IWRM Action Plans, or similar initiatives, to focus, prioritise and coordinate efforts.
- Coordination and alignment: Coordination within the water sector – and with other sectors – needs to be prioritised and strengthened.
- Financing: Various financing options need to be pursued using IWRM coordination mechanisms and stakeholder participation approaches as a tool for coordinating multiple interventions across sectors.
- Basin and aquifer management: Prioritise the development of basin and aquifer organisations with clear mandates and strong links to relevant local government departments and agencies. Technical capacity to monitor water resources and their use must be boosted, and commensurate funding secured.
- Capacity development: Identify and address the capacity gaps within and between key institutions and create incentives to retain qualified staff and encourage gender balance and empowerment.

- Data and information management: Various options need to be pursued to develop, organise, harmonise and share water data – making it accessible and easily understandable to all stakeholders.
- Inclusive participation: Apply best practices to promote inclusive stakeholder participation and ensure the fairness and sustainability of water management that are context specific.
- Legal frameworks: Develop or update laws to reflect progressive, coordinated water resources management approaches, and ensure policy alignment between existing or new legislation related to the use or pollution of water.
- Transboundary cooperation: Promote the value add of transboundary cooperation to national and riparian counterparts to ensure political backing and resources. A useful approach can be to draw upon regional and global frameworks to enhance political buy-in at the basin and aquifer level.

### BOX 3

#### Opportunities for LDN in SIDS – facilitated by UNCCD and FOA at UNCCD COP 13

Small islands such as the Seychelles, Mauritius and the Comoros have unique challenges and vulnerabilities that are exacerbated by land degradation. During COP 13, the Global Mechanism of the UNCCD and FAO strengthened their collaborative efforts to support SIDS to set national targets to achieve LDN. Several key opportunities were identified to address the common challenges facing SIDS including:

- Promoting sound land use planning to address competing demands for land;
- Increasing resilience to natural disasters and climate change;
- Enhancing national capacities and mobilizing innovative financing mechanisms;
- Improving the availability of LDN data and knowledge management; and
- Promoting sustainable agriculture.

Seychelles is featured as an example of a SADC SIDS which prioritised LDN in land use planning to create a strong balance between economic development and environmental sustainability in an effort to improve climate resilience.



Message  
for regional  
stakeholders

#### Key messages for regional stakeholders:

- The development and implementation of climate adaptation strategies will be critical to combat the impacts of climate change and unlock opportunities for achieving LDN.
- It is necessary to address the lack of technical capacity and land rights challenges when developing strategies for protecting natural resources in the region.
- Integrated LUP needs to be prioritised at national levels in the region.
- In the context of shared watercourses, IWRM offers an important pathway for regional cooperation on SLM and LDN that is central to the LWE nexus approach. The water networks (for example, GWP-SA and WaterNet) can be used for training and capacity building initiatives in support of LDN. Given the strong interlinkages between water, land and energy, it should be possible to integrate and align efforts.
- Concerted efforts are required to expand IWRM practices to regional and transboundary landscape levels.

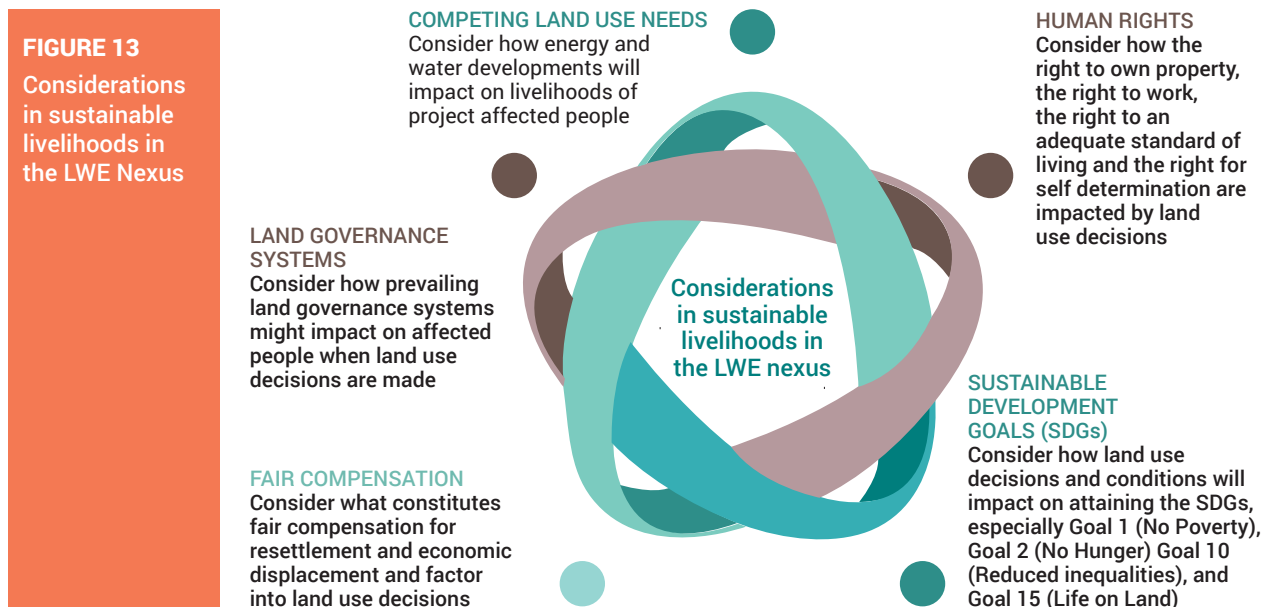
### 3.8 Prosperity: Enhancing livelihoods, food security and well-being

#### Enhancing Livelihoods

When considering counterbalancing gains and losses in the LWE nexus in SADC, it is important to keep the intricate linkages between land and livelihoods in mind. Agriculture is a major economic activity in most SADC member states, providing livelihoods to around 70% of the region's population. Its contribution to the gross domestic product across countries varies widely. This suggests that a sizeable portion of farmers in SADC practice subsistence agriculture (Matema & Prinsloo, 2021).

The sustainability of agricultural practices in SADC is vulnerable to climate change impacts and biodiversity loss, as well as equity and inclusion considerations, especially gender. It is estimated that African women constitute 40% of the agricultural workforce and produce up to 70% of the continent's food (Ngumbi, 2019).

When considering land conditions and land use decisions in the LWE nexus in SADC, several factors should be considered in decisions about gains and losses (Figure 13). Taking account of livelihoods in LWE decision making processes will ensure that people's rights to make a decent living are not infringed upon. In addition, fair and transparent compensation frameworks should be considered.



#### Food security and drought

Food insecurity poses a significant challenge to lives and livelihoods in the SADC region and is often exacerbated by issues such as poor policy frameworks, underdeveloped agricultural sectors and barriers to markets. This reality prompted the development of the SADC Food and Nutrition Security Strategy (2015-2025), which aims to holistically address issues of food and nutrition security from a multi-sectoral perspective (SADC, 2014). The effects of globalisation, disease and infections, and severe weather events, such as drought, also need to be considered. Within SADC, Angola, Madagascar, Malawi, Namibia and Zimbabwe are most severely affected by food insecurity with widespread nutrition vulnerability (SADC RVAA, 2021).

To support the building of resilience in the face of drought in SADC, UNCCD recently launched the regional project on drought risk management for Southern Africa in collaboration with the International Union for Conservation of Nature (IUCN), the Food and Agriculture Organization (FAO), SADC Secretariat and IWMI. The main aim of this project is to develop regional capacity for drought monitoring and early warning, as well to develop a drought risk management and mitigation strategy. The project aligns with UNCCD's Drought Initiative to which 35 African countries subscribe as part of developing their national drought plans through using the UNCCD's Drought Toolbox.

Within the SADC region, five countries (Botswana, Eswatini, South Africa, Zambia and Zimbabwe) have completed their National Drought Plans which have been validated by UNCCD as examples of good

practice planning. Further development of country plans and regional coordination are sorely needed as Southern Africa faces the most severe drought conditions in several decades (NASA, 2019).

A close link exists between livelihoods and land governance – securing land tenure for vulnerable groups is increasingly seen as a sustainable mechanism to increase food security. In rural areas of Southern Africa, access to and control of land is often a crucial element in the livelihood strategies of poor households. Within this context, land governance and secure access to land and water resources can act as an enabling factor in securing sustainable livelihoods and social protection (Tanner & Groppo, 2016). For women active in subsistence, more secure land tenure could have a transformational effect as women in this region are traditionally marginalised in decisions regarding land use.

### The challenges of urban sprawl

Africa's urban transition is proceeding rapidly, with the accumulated relative growth rate of its cities now among the highest in the world. By 2050, almost two-thirds of its population growth is expected to occur in urban areas (UN Habitat, 2014). Southern Africa is the most urbanised region of sub-Saharan Africa and is projected to reach an overall region-wide urban majority around the end of the current decade. With approximately 41% of Southern Africa's population living in urban agglomerations (Davis-Reddy & Vincent, 2018), urbanisation rates are predicted to grow rapidly over the next two decades. South Africa, Botswana and Angola have urban majorities, with the lowest urban populations found in Malawi and Lesotho. The main drivers of this urbanisation are population growth, rural-urban migration (including climate change refugees), circular and seasonal labour migration, international migration, conflict and war, changing and decaying rural landscapes, land reform, and a perception of plentiful economic opportunities, housing and services in the cities (Mercandalli *et al.*, 2019; UN-Habitat, 2014; UN ESA, 2018, IOM, 2021). The negative externalities of urban growth – especially urban sprawl, pollution and the development of informal settlements on vulnerable land – have been found to damage the environment and to cause land degradation (Hatcher, 2017).

Peri-urbanisation is a key feature of urban sprawl and slum urbanism. Located at the interface between the city and the countryside, these areas form a hybrid landscape with rural and urban characteristics. These areas are characterised by urban slums, a lack of regulation and planning, severe lack of

services, contested land tenure rights, uncoordinated conversion of productive farmland to housing, and intensified resource exploitation (Marshall *et al.*, 2009). Many city governments in Southern Africa are finding it difficult to keep pace with the demand for housing and services by urbanising populations. Unplanned urban sprawl and slums are a central feature of most of the region's urban centres and pose many environmental, health, food and land management challenges. They contribute to a loss of fertile and productive land, reduced green spaces, greater air pollution, higher energy consumption, decreased aesthetic appeal of landscape, loss of farmland, reduced diversity of species, increased runoff of stormwater, increased risk of flooding, excessive removal of native vegetation, and ecosystem fragmentation.

Conservation planning and practice will increasingly need to account for direct and indirect impacts of the continent's urbanisation (Gunalp *et al.*, 2017). The expansion into surrounding agricultural land can lead to food shortages while the loss of open spaces and wetlands are likely to reduce cities' resilience to natural hazards, especially as the effects of climate change become more pronounced. Urban centres lacking access to adequate infrastructure and basic services are more likely to be impacted by natural disasters (Saghir & Santoro, 2017).

Linkages between urban and rural areas through circular migration processes have been identified as critical to comprehending land management and sustainable development within SADC. Given the limited livelihood opportunities in rural areas, households are diversifying their use of space to include urban or peri-urban areas. Informal settlements in these areas are used as an urban entry point to economically support rural households (Vearey *et al.*, 2009). The phenomena of peri-urbanisation and circular migration necessitate an issue-based participatory strategy to sustainable development and environmental protection that transcend administrative boundaries (Hatcher, 2017). Appropriate responses and responsible policy setting and planning in SADC countries will need to account for the risks of urban sprawl and internal migration when managing land resources and food security.

By committing countries to make cities and human settlements inclusive, safe, resilient and sustainable by 2030, SDG 11 provides an opportunity for SADC governments to change the negative perception of cities as the source of all problems, to cities as accelerators and facilitators of sustainable urbanisation and development. There is scope for new, wide-ranging urban and migration policies and strategies which will turn cities and towns into



engines of sustainable structural transformation. In addition to broadening the focus of town and regional planning to account urban-rural linkages, there may be a need to contain unplanned urban development. This could be achieved by establishing distinct boundaries that serve to manage urban sprawl as well as attain sustainable development, focusing on efficient land use and

preservation of rural functions and ecosystem services. Policies and planning will need to factor in small and medium-sized towns, which play an important role in regional development as they often provide key services to rural populations. They also provide non-farm diversification opportunities and absorb the stress on larger cities, which rural migrants tend to target.



**Message  
for regional  
stakeholders**

- Taking account of livelihoods in LWE decision making processes will ensure no infringement on people’s rights to make a decent living.
- Avoiding, reducing and reversing land degradation coupled with responsible governance of tenure are pivotal for the progressive realization of people’s right to food and a healthy environment, the achievement of national and international climate targets, and the conservation of biodiversity.
- Drought monitoring and early warning should be used to mitigate risks related to water supply and food security.
- Proactive drought risk management needs to be given increased attention in national commitments.
- Sustainable development of urban areas, surrounding rural areas, and especially the peri-urban interface, requires an integrated approach to LUP.
- Special attention needs to be given to small- and medium-sized towns to broaden and strengthen key services for rural populations and provide non-farm diversification opportunities.
- Conservation planning and practice will increasingly need to account for direct and indirect impacts of the region’s urbanisation and migration patterns.
- A targeted, flexible, differentiated and contextual approach to climate change adaptation is required to reduce settlements’ exposure to natural disaster events.
- Governments should provide the infrastructure and services for informal settlements to become fully-fledged, self-sustaining and dignified components integrated into the city.

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# 4. PART B: INSIGHTS INTO LANDSCAPE TRANSFORMATION

Landscapes in Southern Africa are ever-changing. Changes are driven by natural and anthropocentric processes and informed by land governance regimes that influence people's access – both legal and cultural – to the land as well as their engagement with the land. Land governance is essential in achieving inclusive economic growth, sustainable development and food security.

Growing and competing demands for land resources in recent decades has contributed to significant landscape transformation and has led to environmental degradation. These changes vary from loss of woodlands and forests to slash-and-burn subsistence agriculture practices and bush encroachment due to overgrazing.

Insights into these changes are important as they offer an understanding of the fundamental constraints, highlighting areas where LWE nexus mechanisms can be harnessed to slow and reverse negative transformation.

## 4.1 Land-water-energy synergies

It is evident from the analysis presented in Section A that SADC member states have pledged a range of commitments aimed at addressing land degradation and have adopted the SADC Water-Energy-Food (WEF) Nexus Framework (SADC, 2019). Despite some progress, however, there is still much scope for improvement. This section takes a deeper dive into mapping the action-orientated themes to highlight potential synergies within the array of LWE commitments (Figure 14). It is useful to view these potential areas of synergy against the drivers of change in the SADC region, as well as the risks and opportunities related to key LWE nexus priorities. These risks and opportunities are demonstrated in the regional case studies below (case study 1-5).

## Areas of high potential nexus gains

Recent LDN, NDC and NBSAP documentation prepared by member states indicate a total of 362 thematic commitments. Of these, 73 were related to land cover changes, 79 dealt with land productivity changes and 77 with the improvement of soil organic carbon. Improvements in energy related matters, water management intervention and overarching matters made up 49, 41 and 42 commitments, respectively. The importance of interventions in the agricultural sector is well-represented in the land productivity theme and reflects the importance of agriculture for land use in the region.

## Land cover

When it comes to addressing land cover changes, member states have collectively prioritised afforestation and reforestation activities. This is evident from the fact that it is the most frequently stated commitment. Closely linked are activities aimed at reducing deforestation, which are the second most cited commitment.

## Land productivity

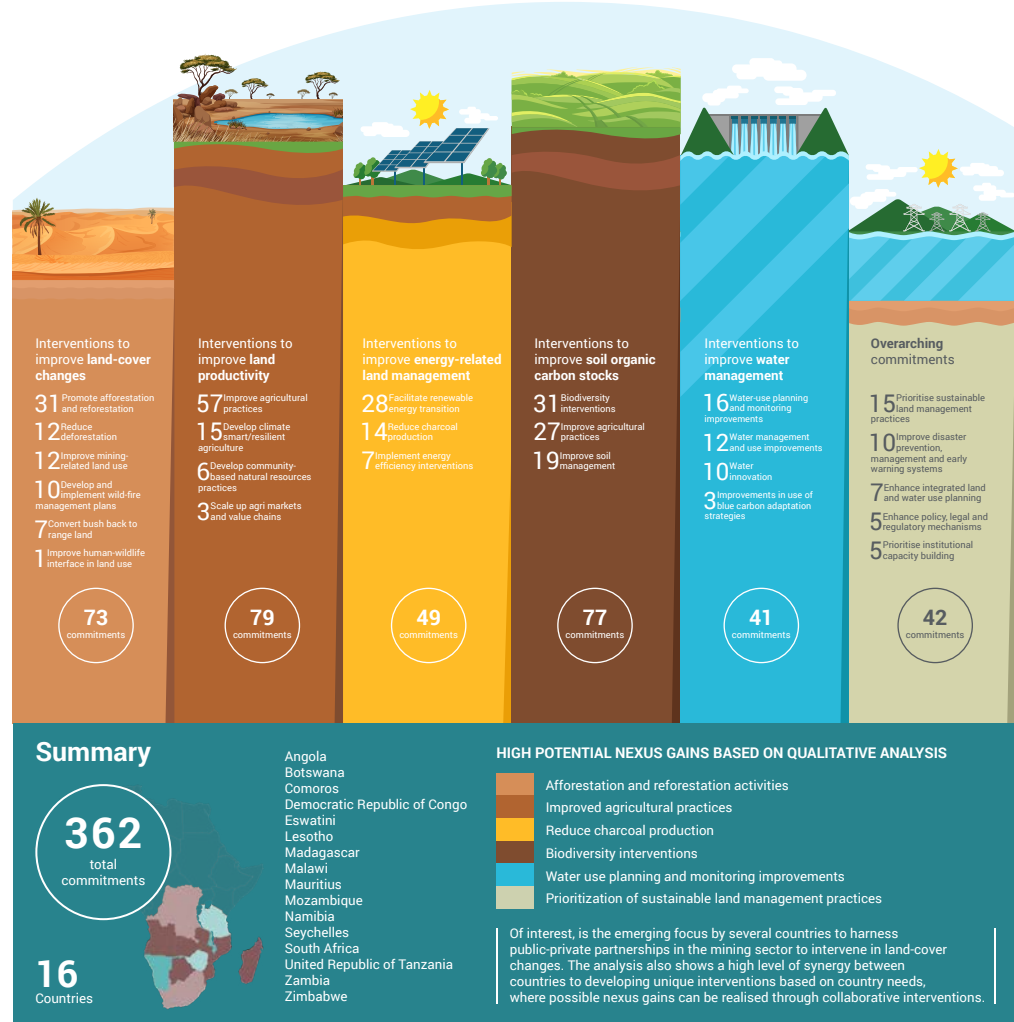
In terms of interventions to improve land productivity, agricultural practices that respond to climate change-related factors are prioritised by all countries. Six countries prioritised community-based natural resource programmes. Considering the high number of subsistence farmers in the SADC region, this intervention might have high potential to leverage ecosystem services to improve land productivity and livelihoods.

## Soil organic carbon

Biodiversity interventions such as increased protected areas and active ecological restoration were prioritised by most member states. Improved farming practices and soil management were also listed as important commitments across the SADC region.

**FIGURE 14**  
Integrated LWE commitments in the SADC region

Land water energy commitments in SADC region (Qualitative analysis)



**Energy-related land management**

Energy-related land management interventions can be divided into activities that support the transition to renewable energy, and interventions to reduce carbon-fuel based practices. The energy dichotomy is most evident in the production and use of charcoal in SADC, which contributes to deforestation and soil degradation and increases carbon emissions due to widespread household use. Charcoal production and its use are intractable challenges within the LWE nexus, as fuelwood contributes significantly towards livelihoods in the short-term. This is compounded by poor regulatory frameworks, lack of alternative livelihood options, and the absence of accessible, acceptable alternatives for cooking (Kayambazinthu & Oeba, 2019).

**Water management**

Across the region, water use planning and monitoring were cited as the most significant interventions that member states could undertake to improve water management. Advances in this area are seen as a critical enabler for interventions in land cover, productivity and soil organic carbon interventions. These should be prioritised across the region to lay the foundation for realising LWE gains. This was evident in work undertaken for SADC’s Groundwater Management Institute, which captured the lessons learned from its previous Sustainable Groundwater Management in SADC Member States Project (SADC GMI, 2020). These insights were used to inform the development of a new regional groundwater programme aimed at improving livelihoods and strengthening transboundary catchment management in the SADC region (SADC GMI, 2021).

## Big data for LDN gains

The review of qualitative and quantitative analyses highlighted the lack of a cohesive system of databases across the LWE nexus in SADC. From an LDN point of view, 2021 marked significant progress in this regard. The Group on Earth Observation Land Degradation Neutrality (GEO-LDN) announced LUP4LDN (land use planning for land degradation neutrality) as the winner of its international technology innovation competition. The purpose of the competition was to find a suitable tool in the marketplace that can be used to support land use planning for LDN.

LUP4LDN was developed by SCiO and is in the process of being scaled up into an operational tool. LUP4LDN will support users to gain insights on where to focus land restoration efforts and which sustainable land management interventions will be optimal in that region to achieve LDN. The development of similar tools for NDC implementation, energy and water management and the integration of tools across sectors could provide invaluable management insights for leveraging and harnessing LWE gains.



Message  
for regional  
stakeholders

- Widespread unsustainable use of fuelwood needs to be addressed as a matter of urgency at the local level to pave way for the transition away from fossil fuels.
- Advancement of water use planning and monitoring could enable effective intervention in land cover, productivity and soil organic carbon.

## Overarching commitments

In terms of overarching commitments, member states prioritised improvements in disaster prevention, management and early warning systems. These are critical focus areas that are receiving increased attention in the light of extreme weather events that have plagued the region over the last five years. Underlying each of the 362 commitments within the LWE nexus in SADC is the dire need for real-time, reliable data on the various indicators at the foundation of each of the themes. Although not stated as a country commitment, monitoring is implied in the proposed interventions and its underlying science-based methodologies.

## 4.2 Advancing LDN through integrated LWE gains

With the potential thematic areas for LWE gains established through qualitative analysis and contextualised through quantitative analysis, it is important to understand which factors will drive change in the SADC region, what are the key risks and opportunities, and which interventions should be prioritised to achieve LWE nexus gains.

## Drivers of change

Several global, continental and regional factors are currently driving change in SADC.

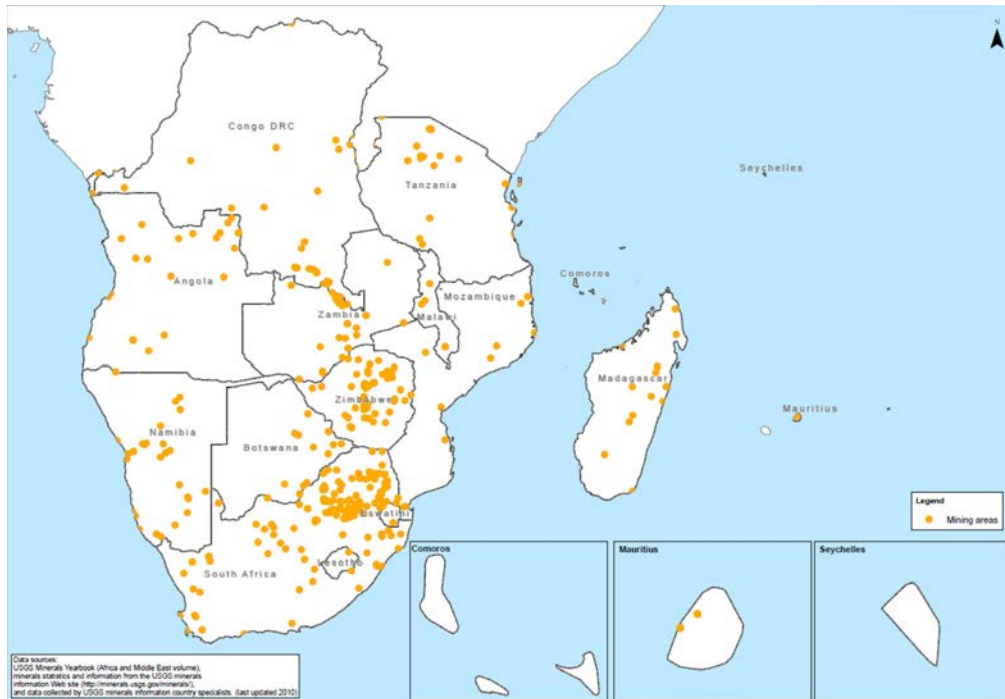
The main factors include:

- Renewed **global commitment** to reduce greenhouse gas emissions and to maintain and strengthen net carbon sinks in countries.
- Increased impacts of **extreme weather events** on livelihoods and water vulnerability in the region.
- **Population growth** is rapid by contemporary international standards (annual increase of 2.6% per year), causing increased pressure on natural resources and in particular land use needs (Simkins, 2021).
- **Food security** has been a long-standing challenge in the SADC region and has been exacerbated by restriction of movements during the global COVID-19 pandemic (African Portal, 2020).
- **Continuing drought** conditions in member states are likely to challenge already struggling food supply chains and subsistence farmers (NASA, 2019).

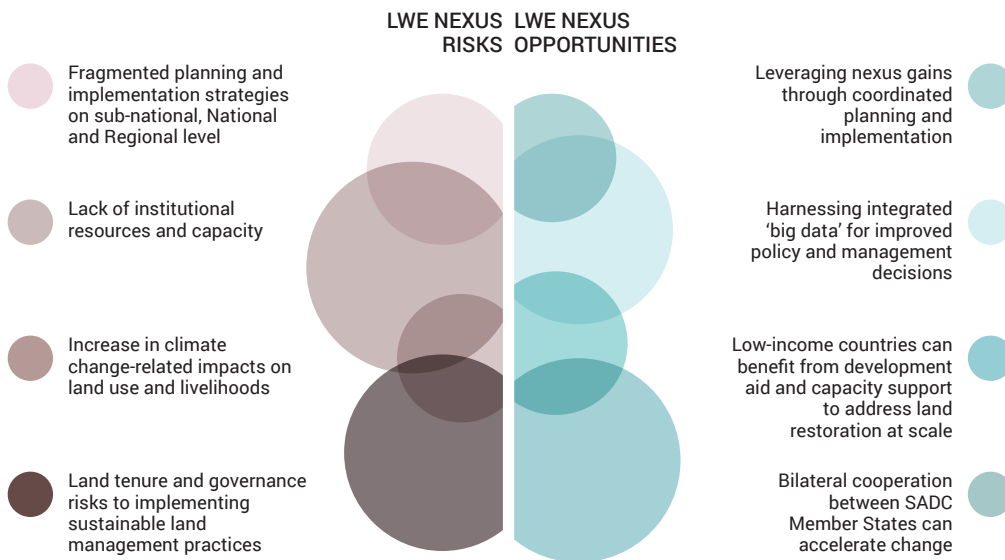


- **Competing land use needs** for land-based renewable energy projects, as well as for new or expanding mining projects that will deliver the minerals needed for the green energy transition. Formal and informal mining is practiced throughout SADC and is likely to continue as demand for minerals and metals grows.
  - **Recent land reform initiatives** have attempted to redress unequal land distribution as well as gender inequity, widespread tenure insecurity and protect local populations against land grabbing and privatisation (NUST-NELGA, 2019).
  - **Expansion in the number of closed and abandoned mines and artisanal mining practices.** For example, in South Africa there are an estimated 6,000 closed or abandoned mines placing ecosystems, water quality, soil health and livelihoods at risk (Winde, 2017).
  - **Increased availability of 'green' financing** as international development agencies and donors focus their attention on the responsible development of renewable energy projects.
  - **Increased pressure on the private sector** from financiers and shareholders to deliver on Environmental, Social and Governance (ESG) commitments through collaborative change.
  - **Increased availability and integration of data** will serve as an important catalyst for making management decisions from a multi-dimensional data perspective.
  - **Migration** due to conflict, the impacts of climate change and extreme weather events are putting increased pressure on land use needs and food security by driving urbanisation (Migration Data Portal, 2021).
  - **Urban sprawl** is being experienced in many towns and cities, resulting in the emergence of unplanned slums, land tenure conflicts, transformation of agricultural land for housing, reduction in open spaces, and pollution problems.
- Although not exhaustive, this list of drivers of change are the most salient in the current Southern Africa context and must be understood in the framework of risks and opportunities for LWE gains in SADC.

**FIGURE 15**  
Current mining areas in the SADC region



**FIGURE 16**  
LWE Nexus Risks and Opportunities

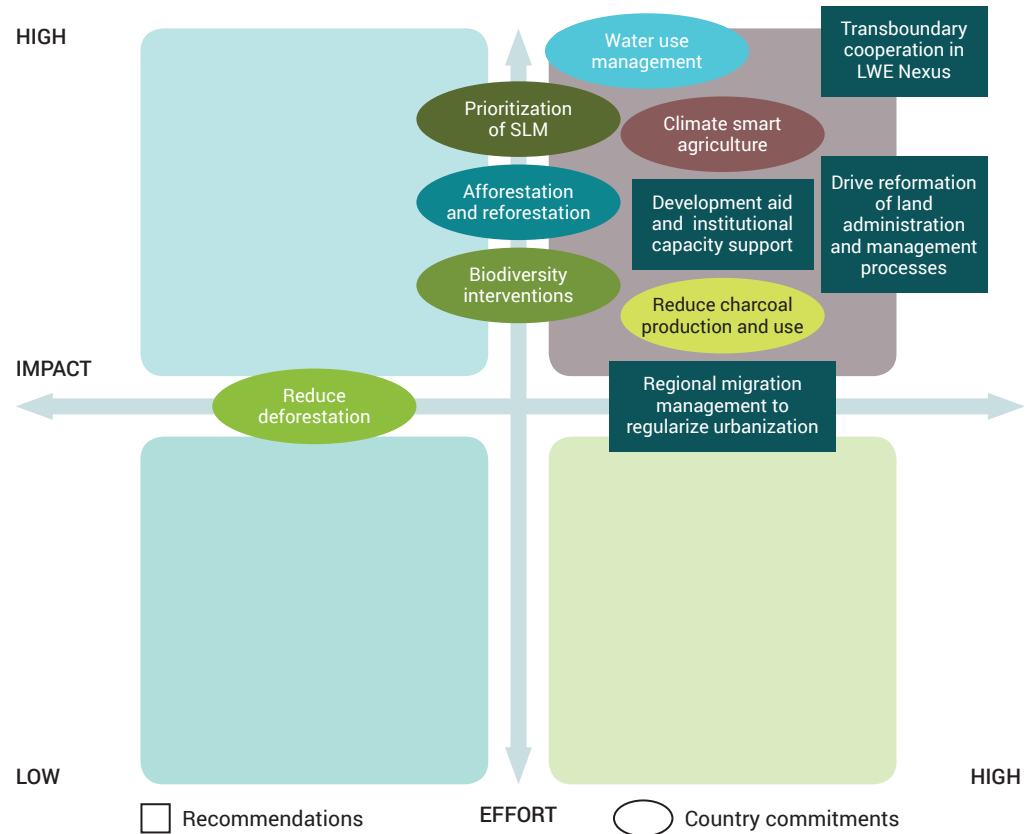


### 4.3 Risks and opportunities in LWE gains

Risks often represent opportunities in disguise, and in the context of LWE nexus gains, this certainly holds true. The key risks and opportunities in realising LWE nexus gains in SADC (Figure 16) are threatened by a lack of sectoral coordination and cohesive implementation strategies. This could be managed through the use of integrated data dashboards to inform management decisions to accelerate nexus gains.

Lack of community resilience as a risk warrants specific mention. As large-scale landscape change in the SADC region increases, achieving LDN will need to put communities front and centre. People who are already systemically vulnerable due to economic, legal, political, cultural or other factors (including a lack of access or rights to land), could be disproportionately affected by changes required to achieve LDN. In this case, it is helpful to use a human-centred multi-pronged approach to the designing and implementing of LDN projects and programmes.

**FIGURE 17**  
Key priorities  
in LWE nexus  
gains



#### 4.4 Key priorities in LWE gains

When prioritising LWE gains, it is helpful to view each potential commitment against what its impact would be on LDN and how much effort would be required to fulfil the commitment in a coordinated and cohesive manner. To achieve this, the impact versus effort matrix (Figure 17) provides an indication of which LWE nexus gains should be prioritised.

Several linkages and dependencies exist in realising the prioritised LWE nexus gains for LDN in SADC. Water resource management and the prioritisation of sustainable land use practices both serve as enablers to advance other priorities. Once water is managed more efficiently, and sustainable land management mechanisms are prioritised, member states' will be better able to implement 'climate smart' agriculture, to increase afforestation and reforestation, and to give due attention to biodiversity conservation. Other difficult priorities include the reduction of charcoal production and deforestation which have strong linkages to livelihoods, inequality, poverty and lack of access to electricity.

Land is increasingly recognised as an important governance issue in the SADC region, where historical aspects around land management have resulted in a plethora of challenges. Conventional technical approaches to land administration will not be adequate to address these issues. Key priorities include:

- Equitable access to land and natural resources;
- Provision of security to tenure to all members of society;
- Measures to ensure access to land by women;
- Transparent decision making;
- Application of the rule of the law to all;
- Decentralised land administration;
- Policy decisions and administrative action that do not compromise the social, economic and environmental needs of future generations.

The prioritisation of water use management and sustainable land management, both well-represented in integrated land use planning, can serve as enablers for other high potential nexus gains and should be prioritised as a matter of urgency.

## 4.5 Key opportunities for large-scale regional initiatives

### Case study 1: Promoting demand-driven research – scoping of land governance in Southern Africa: Challenges and Opportunities

The Land Governance in Southern Africa scoping project was undertaken in ten countries within the SADC region, funded by the Network of Excellence on Land Governance in Africa (NELGA) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). As an overarching objective, the project aimed to promote demand-driven research on land policy issues, connecting scholars and researchers across SADC through academic networks (NUST-NELGA, 2019).

The countries within mainland SADC share a diverse history of colonisation which gave rise to a legacy which continues to impact land governance regimes today. Land in SADC is a principal source of livelihoods and a basis of economic development. Most countries rely on agriculture and natural resources – whereas other land-based activities such as mining, tourism and urban development all contribute to livelihood, employment and income for rural and urban populations.

The study looked at key land governance challenges within the ten countries and the findings (Figure 19) were discussed at the Land Governance Symposium held in Windhoek, Namibia in September 2019. This allowed for comparisons between countries (see Lesotho and Botswana studies) as well as learning from best practices. This encouraged further research collaboration and innovation aimed at finding solutions to the key challenges faced by the countries in the region.

#### Purpose and objectives of the Scoping Study on Land Governance (NUST-NELGA, 2019):

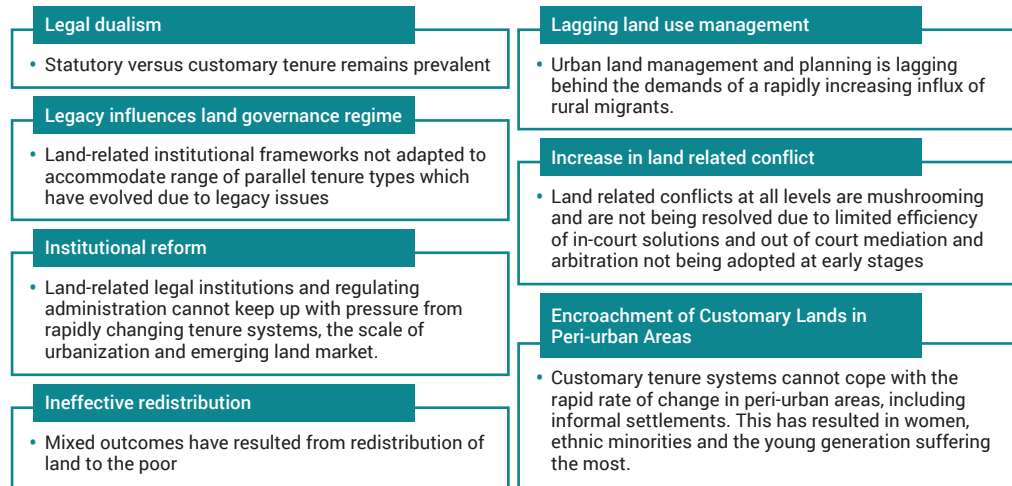
- To facilitate networking between the NELGA partners within the region.
- Encourage research and education within the land governance area.
- To provide a baseline of land governance within the region.

**FIGURE 18**

Women  
harvesting  
crops on  
customary  
farmland

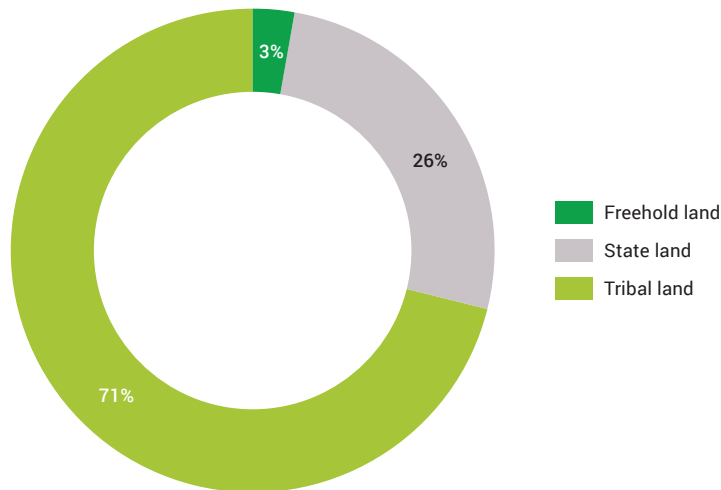


**FIGURE 19**  
A synopsis of the key findings from the study



Source: NUST-NELGA, 2019

**FIGURE 20**  
Division of land per tenure category in Botswana



**Feature study 1:**  
**Botswana land governance country assessment – challenges and opportunities**

Land is the most basic of all resources available for social and economic development in Botswana. Approximately 63% of land is available for its citizens, with the remaining 37% dedicated to game reserves, national parks and wildlife management areas. Land tenure is divided into three tenure categories (Figure 20). State land and freehold land tenures are administered by the Department of Lands, while tribal land falls under the Department of Land Boards. Both departments operate under the Ministry of Land Management, Water and Sanitation Services (SLGA, 2019).

**Land governance challenges**

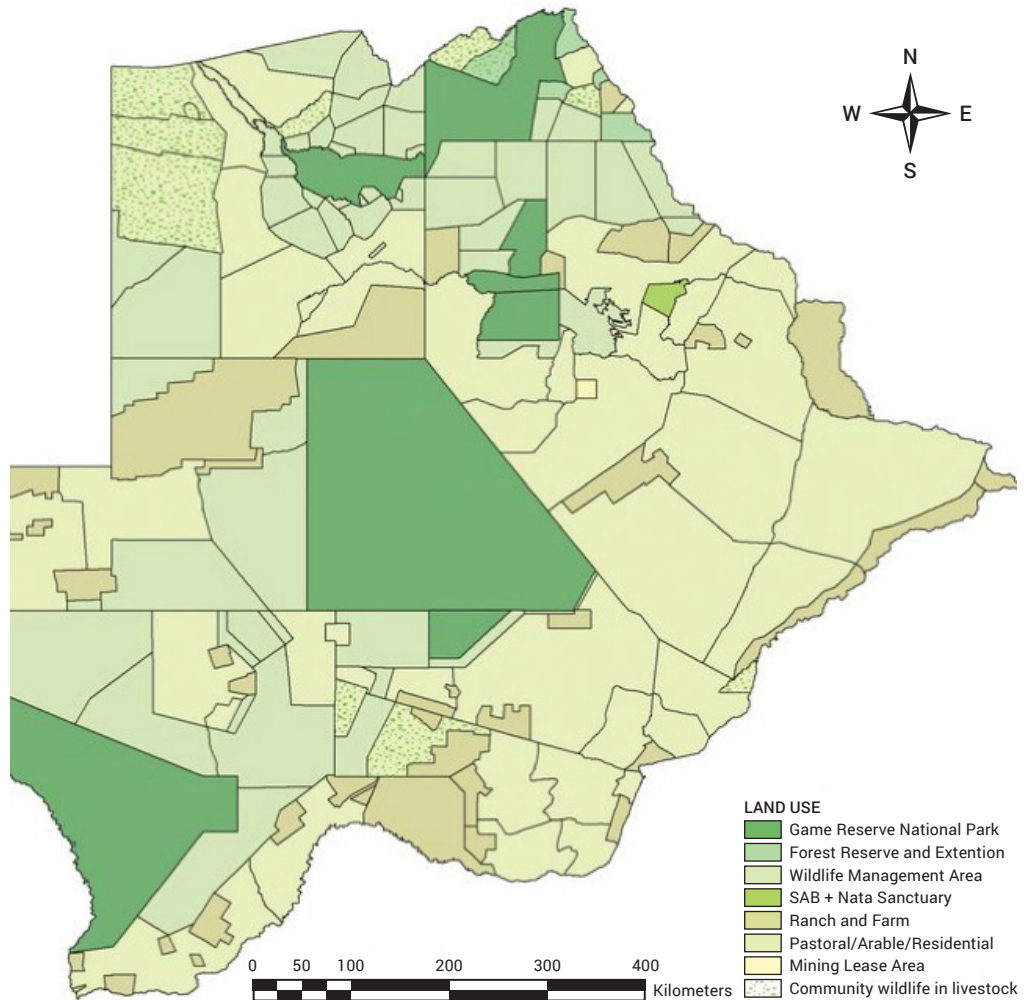
For many years, the waiting lists for land allocation in Botswana have increased due to poor record-keeping, corruption and the high demand

for land, especially in the urban areas. Delays in land allocation is primarily due to limited private sector involvement – resulting in a lack of basic infrastructure, shortage of funds for the provision of services to available land, increased development costs, encroachment of agricultural land, and lengthy acquisition processes (Adams *et al.*, 2003).

**Opportunities to improve land governance**

In recent years, the government of Botswana has attempted to improve land administration processes. Since 2009, the government has been enhancing the Land Administration Processes, Capacity and Systems (LAPCAS) with the desire to improve the land administration system in the country (Tembo, Kampamba, & Nkwae, 2014). One such opportunity for improvement is the enhancement of a computerised Deeds Registry to expedite transactions.

**FIGURE 21**  
Land use  
Botswana



**Overview of land problems in Botswana (SLGA, 2019)**

<b>Challenges</b>	Residual effects of colonial land policy
	Poor service delivery by land boards
	Land scarcity in spite of idle lands
	Worsening land pressure
	Illegal selling of tribal land
	Mismanagement of land development
	Land governance has not been adequately mainstreamed in policies, strategies and programmes

Source: Winterbach H (2014)

**Feature study 2:**  
**Lesotho land governance country assessment  
for NAIP – challenges and opportunities**

In Lesotho, all land belongs to the state, so land that is used for housing and agriculture is leased from the state for periods ranging from 10 years to 99 years (NUST-NELGA, 2019). This is not freehold land, rather it is considered state land which is used for private purposes. Unlike other member states, the survey and registration functions are carried out by the Land Administration Authority, as opposed to being managed through a more transparent Deeds Registry process. Women may not own land and fixed property. However, the passing of new laws in 2006 and 2010 has increased the rights of women significantly. In terms of land markets, Lesotho has the least active formal market, with most of the land unregistered. From a land use planning and control perspective, rural development planning is the mandate of the Ministry of Agriculture, for which no legal framework exists.

### Land governance challenges

Lesotho has a long history of contestation within their land allocation and tenure systems. Corruption and poor administration continue to be a constraint at many levels of society, although in recent years the services provided by the Land Administration Authority have improved. However, many landowners and users tend to fall back on emerging market mechanisms that are only partially legitimated and regulated by the official system of land transactions. Formal and informal land access mechanisms continue to operate side by side (Satgé, 2021).

### Opportunities to improve land governance

In 2011, the Lesotho Land Administration Authority (LAA) was established by the Land Administration Authority Act 2010 to modernise and improve land administration services and to reduce land transaction costs and time. Despite ongoing challenges, the LAA continues to improve on their mandate. Further work is still required in rural areas, where customary tenure arrangements govern most of the land and gender equality is not yet effectively realised. Improvements can be achieved with the active enforcement of relevant legislation, but this will require substantial capacity building at a local and national levels.

**FIGURE 22**  
Typical rural landscape in Lesotho



### Overview of land governance challenges in Lesotho (SLGA, 2019)

Challenges	Institutional and policy overlaps and conflicting mandates between government agencies
	Poor enforcement of environmental protection
	Lack of land use planning capacity
	Incomplete land registration specifically in rural areas
	Lack of a unified compensation policy
	National policy and legal frameworks, specifically those in place to advance gender equality, are largely ignored
	Land governance has not been adequately mainstreamed in policies, strategies and programmes

### Case study 2: Developing the Great Green Wall for Southern Africa

The Southern African landscape is complex and diverse, with approximately 84% of the land area being comprised of dry lands (including hyper-arid, arid, semi-arid and dry sub-humid) (FAO, 2019). As in the Sahel, land degradation in the SADC region has been historically driven by multiple human activities, such as over-cultivation, over-grazing and deforestation, exacerbated by the overexploitation of natural resources and the impacts of climate change.

To address these challenges by leveraging the lessons from the Sahel Great Green Wall Initiative (GGW) (Box 4), the SADC Secretariat and its member states have drawn up a regional approach for a GGW for Southern Africa (Figure 23). The key objective of this initiative is to address and combat land degradation by building on existing land-based

initiatives and programmes to advance socio-economic development and promote environmental sustainability. As can be seen on the map, there is some overlap with existing conservation areas, notably national parks, conservancies and transboundary protected areas. For example, almost half of Namibia (43.87% of the land area), is under conservation management,

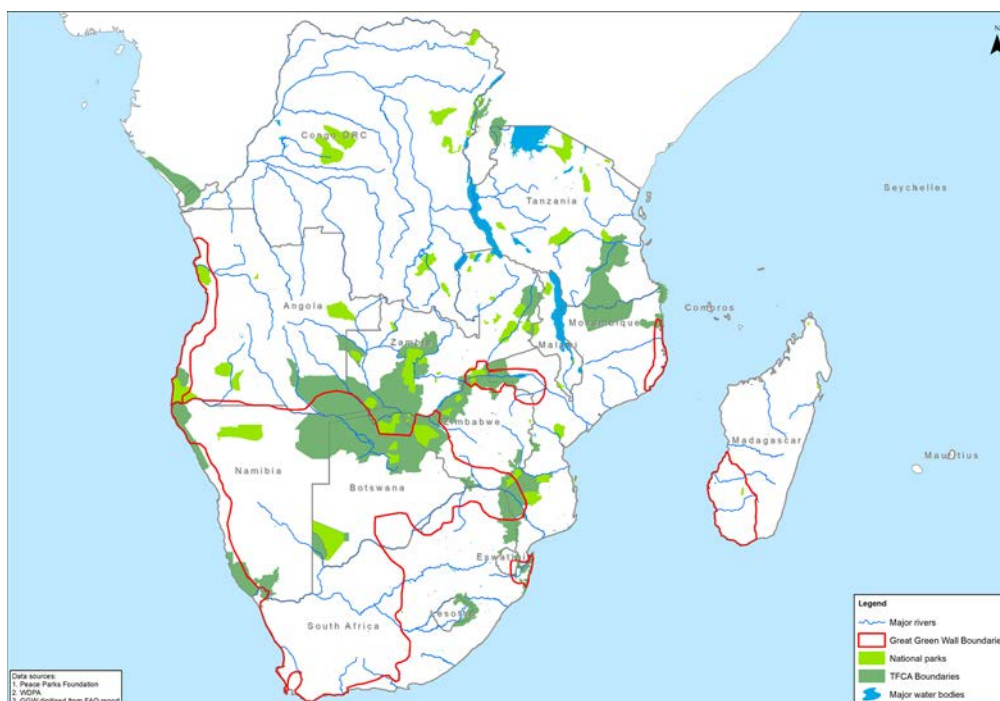
including community conservancies (GRN, 2021). However, there are still large areas of land that have no formal protection.

The restoration potential of the GGW for Southern Africa includes a land area of approximately 228 million hectares of dry and degraded land (FAO, 2021) comprised of several sub-regions (Figure 24).

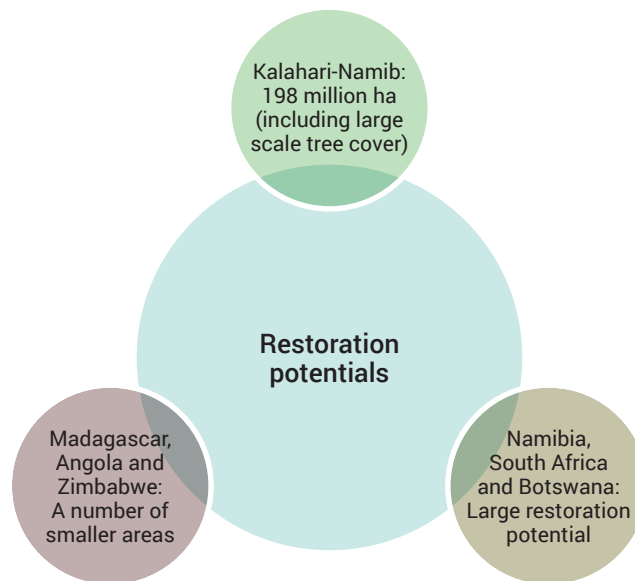
### Objectives of the Southern Africa GGWI:

- Combat desertification and land degradation and mitigate the impact of drought while successfully implementing the objectives of the UNCCD, African Union Agenda 2063 and the SADC subregional Action Programme to combat desertification.
- Reduce ecosystem vulnerability and climate change impact, as well as increase the resilience of communities to climate change factors.
- Improve livelihoods of communities enhancing socioeconomic growth at all scales.
- Develop a knowledge sharing platform for SLM best practices and how to combat DLDD effectively to assist with enhancing the implementation across all land restoration initiatives and community-based land management approaches in the region.

**FIGURE 23**  
Proposed Southern African Great Green Wall in relation to existing conservation areas



**FIGURE 24**  
Restoration potentials within specific SADC member states



Source: Bastin *et al.*, 2019 and FAO, 2021

### Current obstacles to the implementation of the southern GGW

The implementation of the GGW in Southern Africa faces multiple challenges which would hamper SLM processes. Addressing these challenges is vital to the successful implementation and longevity of landscape restoration in the region. They relate to a lack of funding, human resource constraints, coordination and ineffective management, lack of political support, bureaucratic differences between member states, and conflicts over natural resources.

It is helpful to reflect on the key challenges and lessons in implementing the GGW in the Sahel region to determine which should be avoided or emulated in the SADC region. Regional similarities include increased population growth, conflict over natural resources, unsustainable agricultural practices and lack of sustained finance. Other challenges reflect the differences between the regions. The countries of the Sahel region display political and cultural diversity while from a biophysical perspective, there is general uniformity in terms of an arid landscape with little land carrying capacity. Southern Africa, on the other hand, displays a diverse mix of landscapes – from tropical rainforests in the DRC to deserts in Namibia. By adopting lessons learned, the GGW for Southern Africa can overcome and manage many of the challenges mentioned above.

It will be necessary to adopt interlinked initiatives and activities where projects focus on achieving multiple benefits for a range of stakeholders at different scales. Attention also needs to be paid to capacity building through data collection and

knowledge sharing, to utilise the most appropriate restoration approaches and to create public-private partnerships that can operate effectively. Capacity building will be vital for scaling on-the-ground results. This can be achieved by implementing traditional or indigenous farming techniques in large-scale restoration projects, as seen in the Sahel. For example, Zai pits were used in Niger, Mali and Burkina Faso to maximise the capture of rainwater, reduce run-off and increase infiltration and soil fertility (Maisharou *et al.*, 2015). These projects proved very successful in encouraging and replicating farmer-managed natural regeneration.

There is currently a severe lack of funding for large-scale land restoration projects in the SADC region. Funding is one of the biggest obstacles but also one of the biggest opportunities. A coordinated large-scale restoration mechanism, such as the southern GGWI, would incentivise stakeholder and funder buy-in. **Table 3** unpacks potential criteria for success based on the Sahel GGWI experience and how this could be applied in Southern Africa.

### A road to success

Although still in its conceptual stage, the GGWI for Southern Africa can draw on the lessons and results from the GGWI in the Sahel and propose the way forward to overcome potential challenges to achieving specific objectives. The implementation of the southern GGWI will need to build on current programmes and initiatives in the region to increase stakeholder participation as well as public and private sector support.

The GGW for Southern Africa goes beyond just the restoration of degraded land by planting trees. Capacity building comprising awareness raising and education and management of biodiversity and soil organic carbon to enhance land productivity are important activities that could kick-start this large-scale regional initiative. The southern GGW offers several potential benefits for the region.

These could include an accelerated implementation of the SADC SRAP for SLM, development of resource mobilisation and funding sources, enhancing political buy-in to scale up SLM and restoration initiatives. These would support and help deliver regional, subregional and national commitments to LDN, biodiversity conservation and climate change mitigation and adaptation.

**TABLE 3**  
**Lessons learned from GGW in Sahel in understanding opportunities for Southern Africa**

Criteria for success	Experience in GGW Sahel	Lessons and opportunities for a GGW in Southern Africa
Political stability	Political instability within and between nations threatens collaboration.	Relative political stability within SADC structure, with some localised challenges for land and water resources. Bureaucratic differences need to be addressed to promote effective cooperation.
Land governance	Complexities of customary and statutory land tenure rights combined with traditional pastoral lands hinder the implementation of projects.	Similar complexities in terms of land rights, however these can be addressed at national and local levels through land reform and cooperation between stakeholders.
Biophysical diversity	The Sahel is a generally uniform arid landscape and ecosystem with few exceptions.	A vast diversity in landscapes ranging from tropical forests to arid deserts to sensitive wetland and large riverine ecosystems.
Protected areas	A lack of protected areas and conservation approaches result in loss of vegetation and degradation of soil organic carbon.	Many formally protected areas and thriving eco-tourism can drive conservation efforts such as conservancies, Transfrontier Conservation Areas and national parks.
Transboundary water resource management	Little transboundary water resource management. Lacking the capacity to utilise vast transboundary underground water sources creates economic water scarcity.	Regional and national management strategies for shared transboundary water resources are well-established. Effective capacity development would lead to sustainable management of this resource through organisations and networks such as SADC-Groundwater Management Institute, GWP-SA and WaterNet.
Ability to address regional conflicts and cooperation	Political instability and ideologically motivated conflict over territory and natural resources threaten the implementation of project on the ground. Although the region has the AU as a conflict resolution mechanism, regional conflicts continue.	General cooperation throughout the SADC region provides a sound platform to develop large-scale initiatives and manage recent and historical conflicts by individual groups.
Monitoring and tracking progress	Difficulty in monitoring and tracking progress with a lack of adequate platforms and capacity development.	Platforms exist where knowledge can be shared and used to determine success and infer change. Individual nations need to commit to tracking progress and collaborating with research institutions.
Population growth	High population growth rate putting pressure on natural resources leads to degradation. Increased urban sprawl link to population growth rate puts added pressure on landscape capacity.	A high population growth rate in the SADC region is contributing to urban sprawl, slum urbanism and circular rural-urban migration that place pressure on productive agricultural and natural land. Understanding of the nature of urbanisation would assist in developing suitable policies and strategies to manage peri-urbanisation.

Criteria for success	Experience in GGW Sahel	Lessons and opportunities for a GGW in Southern Africa
<b>Demand for food</b>	Poverty and famine drive unsustainable agricultural practices further degrading landscapes. Agriculture is an essential livelihood aspect but when compounded by climatic and socio-economic factors, it becomes unsustainable.	A heavy reliance on subsistence farming for livelihoods drives extensive rural small holder farming. Related to poverty, often poor agricultural practices are adopted leading to increased land degradation. Sustainable practices need to be adopted through an economically sensitive approach.
<b>Access to natural resources for subsistence and livelihoods</b>	Lack of water access drives unsustainable extraction. Scarcity of pastoral resources due to land degradation and fragmentation.	The diversity of the region means that some areas (central and eastern areas) have better access to natural resources however these are being over exploited. Poor rangeland management, deforestation and water extraction are key issues arising from this. South-western areas are victim to low annual rainfall and therefore have low landscape carrying capacities.
<b>Social diversity</b>	Many different cultures and religions over a vast geographic area create complexities for implementing regional initiatives. A single project methodology was not effective.	Many different cultures and indigenous groups across a diverse SADC region need to be respected and included as key stakeholders to ensure protection of traditional natural resources. Consultation on traditional land management practices could prove useful for restoration initiatives. A tailored approach to the project methodology needs to be adopted to include social diversity and vulnerable groups.
<b>Funding</b>	An under-estimation of the scale of the initiative resulted in not much progress and the need for the GGW Accelerator initiative.	Building partnerships between nations, stakeholders and funding organisations is essential for success of project on the ground.



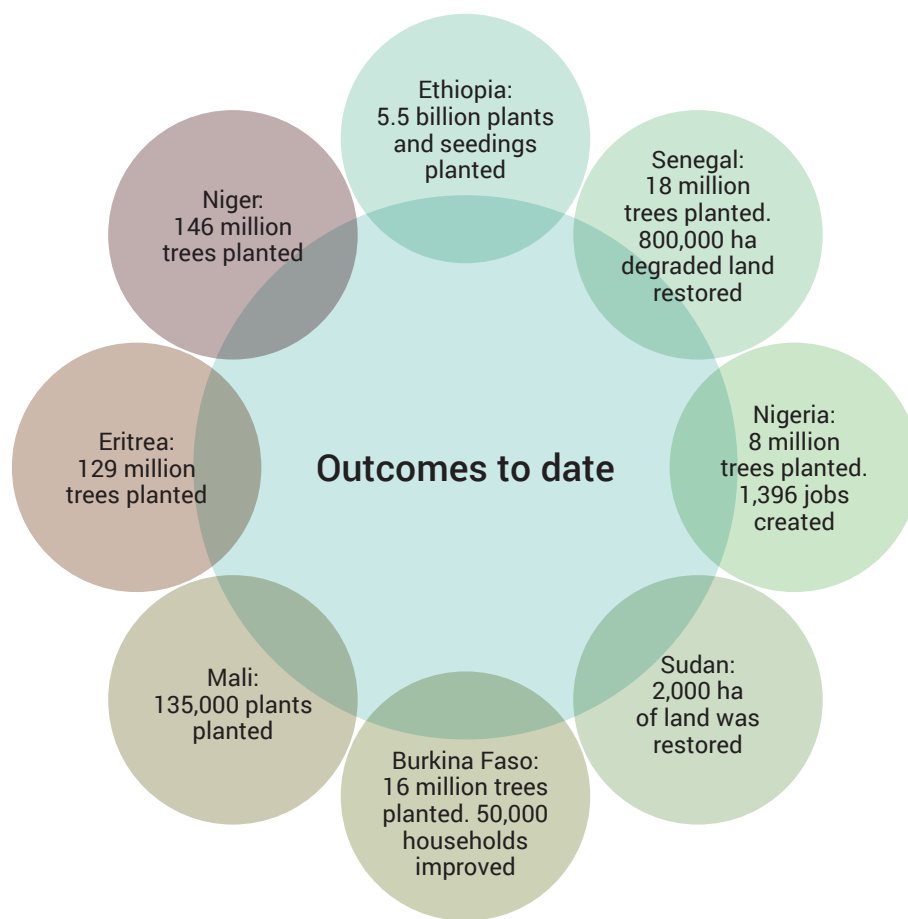
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**BOX 4**  
**Background to the GGWI in Sahel**

The Great Green Wall Initiative (GGWI) commenced in 2007 within the Sahel region through the support of several funding programmes. The overarching objective of the GGWI was to restore 100 million hectares of the region’s degraded landscapes and provide a solution to climate change, drought, famine, conflict and migration by 2030 (Climatekos, 2020; UNCCD, 2021).

The Sahel region faces threats of climate change with millions of people currently facing the consequences of persistent drought, lack of food, conflicts over availability of natural resources and mass migration to Europe. Approximately 80% of the population within the Sahel region rely on rain-fed agriculture as a source of income, however 65% of the land is degraded due to the effects of climate change as well as over-farming and unsustainable land management practices (UNCCD, 2021).

The initiative goes beyond just planting trees. It aims to create 10 million green jobs and support communities living in the Sahel to build climate resilience. Although much still needs to be achieved, the project has seen successes as set out in the figure below.



### Case study 3: Trans-Frontier Conservation Areas (TFCAs)

The Trans-Frontier Conservation Areas (TFCAs) (Figure 25) programme was implemented by SADC to safeguard the region's rich and biodiverse natural resources. In many cases, these overlap international boundaries and are considered shared assets that could contribute to biodiversity conservation and socio-economic development (SADC, 2019).

TFCAs identify areas of conservation intensification and promote the development of relevant initiatives and programmes at various scales. TFCAs ultimately aim to achieve sustainable development in rural communities while restoring ecosystems and protecting biodiversity. There are currently 18 existing and conceptual TFCAs throughout the SADC region. The first of these, the Kgalagadi Trans-Frontier Park, was established in 2000 (SADC TFCA, 2018).

The key objective of the TFCAs is to create a community centred, regionally integrated and sustainably managed network of world class trans-frontier conservation areas. This aligns with the SADC vision of fostering socioeconomic

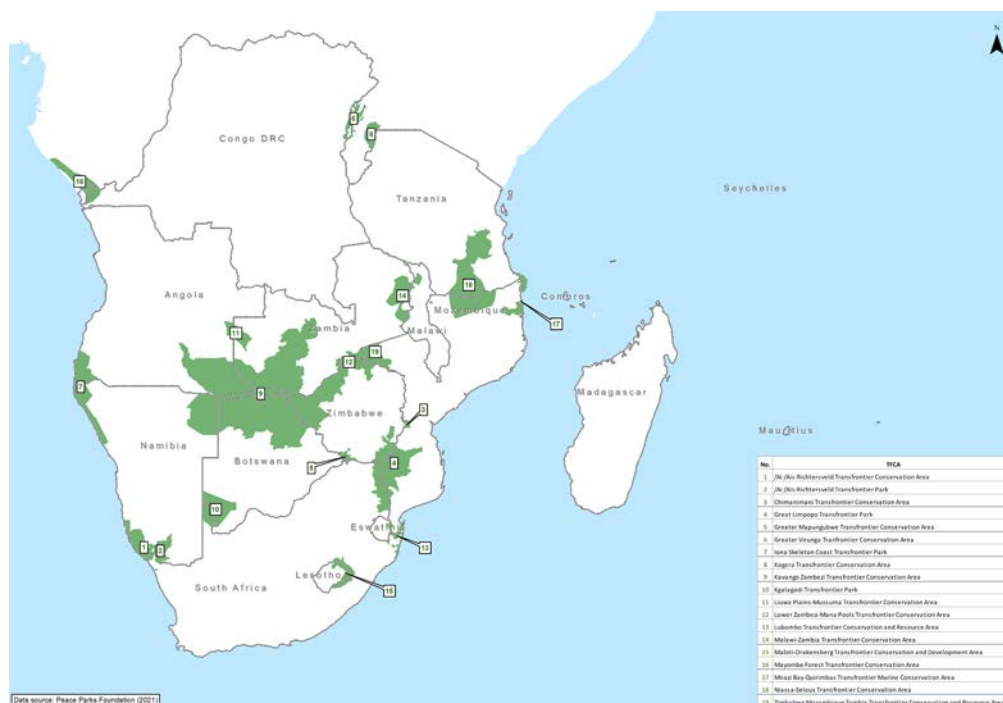
development for the region in a sustainably co-managed manner.

With the implementation of the TFCAs Programme in 2013, there has been adequate time for success stories and positive impacts to emerge (refer to Box 5-8 for case examples). Many achievements can be more keenly felt at the community level, rather than at regional level. However, these community-based initiatives and success stories can be incorporated into management approaches for large-scale regional programmes.

#### Objectives of the TFCA:

- Policy harmonization and advocacy
- Sustainable financing
- Capacity building
- Data and knowledge management systems
- Local livelihoods
- Climate change vulnerability

**FIGURE 25**  
Locality of  
TFCAs in SADC



### **BOX 5**

#### **Community-based management – the Kavango-Zambezi (KAZA)TFCA**

The KAZA TFCA is the largest of the TFCAs in the SADC region, covering an area of approximately 520,000 km<sup>2</sup> across the converging border areas of Angola, Namibia, Botswana, Zimbabwe and Zambia (PPF, 2020).

Approximately 2 million people live within the KAZA TFCA, so there is a large interface of human activity, natural resources and wildlife. Community-established and managed conservancies are important in ensuring the conservation of this ecologically diverse area. The Simalaha Community Conservancy, on Namibia-Zambia border, is one such example of community-based management – supported by the World Wildlife Fund Germany and the Peace Parks Foundation. Multiple small-scale projects were implemented to promote conservation agriculture while youth were engaged for reforestation, helping to ensure food security and lessen the pressures on natural resources.

### **BOX 6**

#### **Community-centred conservation and development programmes – The Sioma Ngwezi National Park and Ngonye Falls Community Partnership Park in south-west Zambia**

These programmes highlight the importance of the communities' role in avoiding human-wildlife conflict and the overexploitation of the natural resources. The Sioma Ngwezi National Park and Ngonye Falls Community Partnership Park in south-west Zambia, with funding and support assistance from KfW and Peace Parks Foundation (PPF), are examples of a community-based approach. These projects include the development of wildlife conservation infrastructure and education on sustainable agricultural methods such as those to mitigate crop damage from elephants leading to reduced human-wildlife conflict. Ecotourism plays a pivotal role in the community-centred approach, providing employment and stimulating local economies – in turn alleviating the reliance on natural resource exploitation, such as charcoal production.

### **BOX 7**

#### **Ecosystem based adaption and mitigation in Botswana's communal rangelands**

Rangeland degradation in Southern Africa is a major concern in Botswana's dry regions. Ecosystem-based adaption and mitigation strategies in Botswana prioritises the restoration and management of communal rangelands. It also focuses on the climate resilience of vulnerable populations in semi-arid areas. The TFCAs, such as the Greater Mapungubwe TFCA, KAZA TFCA and Kgalagadi Trans-Frontier Park, are important project focal points in this regard. Donor funding and support from the Green Climate Fund is directed to restorative approaches that promote the reduction of GHG emissions. Beginning in 2021 and running to 2029, it paves a way forward for adapting to increased climate pressure for agricultural communities and wildlife refuges in the region.

**FIGURE 26**

Peace Parks Foundation has distributed treadle pumps to local communities living in the Simalaha Community Conservancy in Zambia. This has improved food production and security and provided an extra income as excess produce is sold in the market.



**BOX 8**

**Community-based natural resource management through nature-based tourism in Etosha-Kunene, Namibia**

In 1998, Namibia championed community-based conservation by enacting legal provisions for communities to manage natural resources, including wildlife. These community conservancies are often set up and run as nature-based tourism enterprises in partnership with private investors. Visitors to the Kunene area conservancies are rewarded with free roaming wildlife and authentic local experiences. However, mounting environmental and social pressures threaten the conservancy way of life. Issues such as human-wildlife conflict, growing numbers of domestic cattle in conservancy areas, dust caused by road travel and uneven distribution of opportunities and benefits of nature-based tourism are challenges that are in the process of being addressed. Currently, over 65,000 people are living in conservancies in the Etosha-Kunene region. During the 2017 travel season, this region had the highest bed occupancy rates (47.7%) in Namibia. (Lendelvo, 2020) (Namibian Ministry for Environment, 2017).

**The way forward**

Since its implementation, it has been established that the success of the TFCAs has been achieved through the cooperation between member states as well as through integrated approaches for planning, management and monitoring. This integration, together with other lessons learned, can successfully promote the sustainable conservation and use of shared natural resources. Success stories and their methods can be replicated and enhanced through the approaches and lessons learned from the TCFA programme. This would help achieve more tangible results in terms of resource and wildlife conservation in future programmes while scaling up sustainable development.

**Lessons Learned**

The Monitoring and Evaluation (M&E) framework implemented by SADC is an important system for tracking the progress of TFCAs and providing a reporting mechanism. This system targets individual TFCAs as well as understanding the progress in the region (SADC, 2017).

Community-based conservation and resource management has been an essential component for implementing and effectively maintaining the TFCAs. This targets the specific area within the individual TFCA however there needs to be a scaling up and out approach to achieve greater connectivity in the wider landscape. Regional integration between stakeholders and member states can be achieved by sharing ideas and strategies through means such as the TFCA Portal.



#### Case study 4: Management of water resources in Southern Africa

Water security in the SADC region has been affected by climate change and severe weather events, which have impacted the livelihoods of a significant proportion of the region's population. Groundwater is a highly utilised resource in all SADC member states and serves as a critical livelihood support which needs to be carefully managed to ensure its sustainability in the face of climate change threats.

SADC therefore views water management as requiring transboundary and regional cooperation, including harmonisation of legislation, policies and strategies (see **Box 10**). The SADC Water Division addresses water resources management issues through the Revised Protocol on Shared Watercourses (2000), the Regional Water Policy

(2005) and the Regional Water Strategy (2006). SADC is active in supporting member states to address the challenges of water resources management, particularly those of a transboundary nature. IWRM implementation has been a priority throughout SADC. **Box 9** demonstrates the significant commitment of countries to work towards implementing IWRM in the context of the SDGs.

SADC-GMI commissioned a project, "Consultancy Services for Capturing Lessons Learnt and designing a new SADC groundwater programme", to capture lessons learned from the previous project (SGM) and to develop a new regional groundwater programme. Drawing on a multi-faceted methodology and expert assessments and analyses, the process of identifying these lessons and emerging issues resulted in key recommendations that need to be considered when developing a new regional groundwater programme.

#### Establishment of SADC-GMI

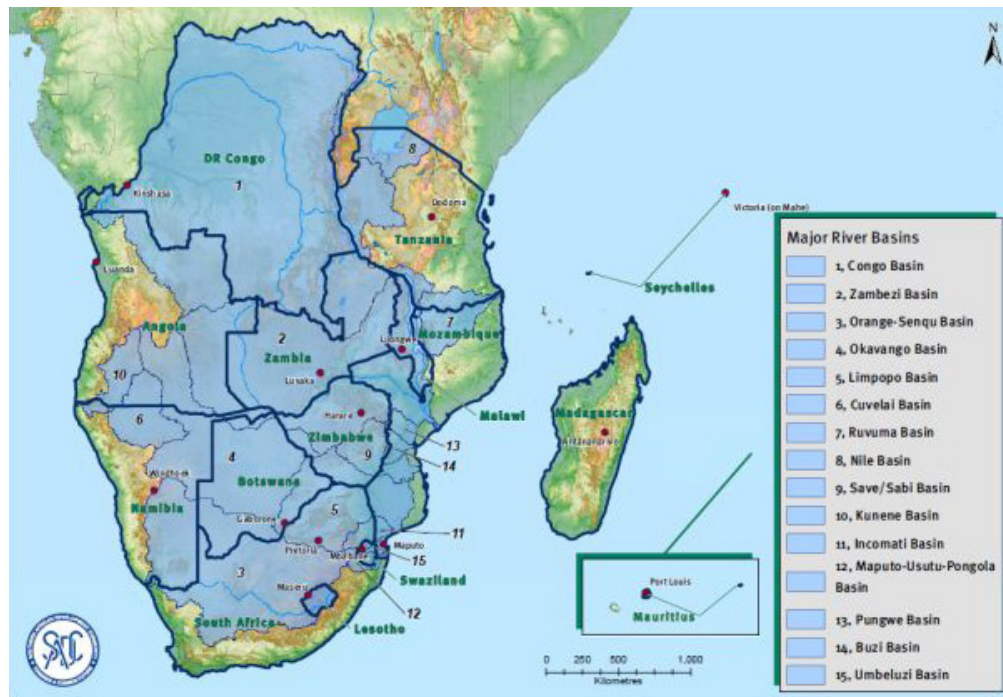
The SADC-Groundwater Management Institute (SADC-GMI) was established in 2011 with a mandate to promote sustainable groundwater management and provide solutions to groundwater challenges across the SADC region.

## Challenges on the transboundary aquifers (TBA) initiative

Part of the new regional groundwater programme will continue to focus on the joint management of water resources, such as TBA, based on lessons learnt from previous experiences. This will help reduce vulnerability, improve climate resilience and protect aquatic and terrestrial life, as well as optimise water productivity and environmental

sustainability. Despite the importance of transboundary groundwater cooperation in the context of river basins, there is little data collected and exchanged between SADC member states on shared aquifers. Moreover, the protocols, mechanisms and IT- solutions for groundwater data exchange need strengthening in the context of River Basin Organisation (RBO) (SADC-GMI Regional Gap Analysis, 2019).

**FIGURE 27**  
Major river basins in SADC



### Lessons Learned

Conjunctive use advocacy should take place where river basins and aquifers straddle common boundaries.

Sound data is required to plan and manage cross boundary conjunctive use.

Integrated transboundary planning is still based primarily on hydrological boundaries, but consideration of groundwater is becoming more common. Linking transboundary and conjunctive use planning is complex, requiring technical and institutional cooperation.

Transboundary RBOs provide a useful platform for institutionalizing and sustaining cooperation. Groundwater requires more attention in RBOs.

TBA is a useful tool to promote transboundary convergence and cooperation, and to inform strategic action planning. These tools have been used in the Shire pilot.

Transboundary and conjunctive use planning is a progressive and time-consuming enterprise.

Information gaps may constrain understanding and cooperation around shared aquifers. It may be necessary to develop and implement monitoring systems early in transboundary projects.

Key constraints to collaboration in this context include lack of harmonizing data, lack of political will, different national priorities, lack of data collection and monitoring practices and limited funding.

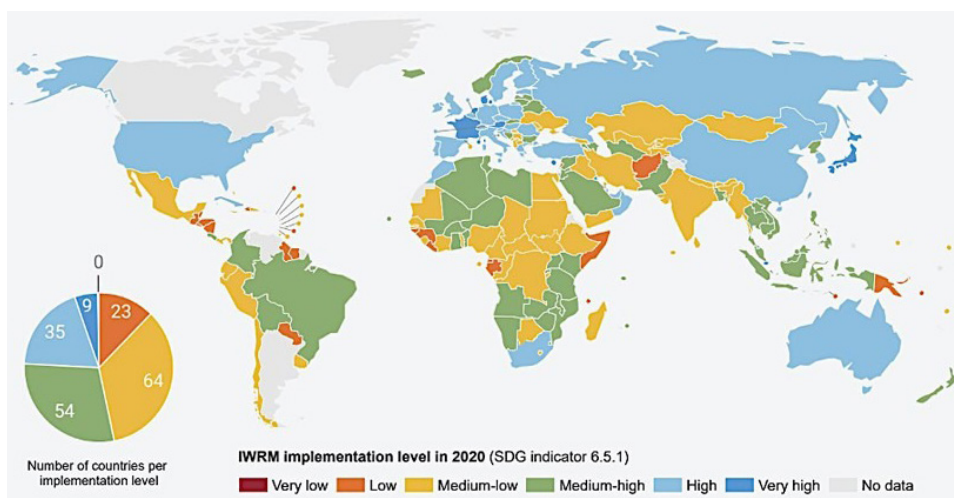
## BOX 9

### IWRM implementation: why business as usual is not an option

In 2020, 171 countries invested significant effort to complete the SDG indicator 6.5.1 survey, with most countries organising multi-stakeholder consultation processes. For most, this was an update of baseline reporting completed in 2017. This demonstrates the significant commitment of countries in working towards implementing IWRM in the context of the SDGs.

The global call for IWRM implementation was formalised in 1992. Almost 30 years later, 87 countries (47%) still report “low” or “medium-low” levels of IWRM implementation as seen in the figure below. Among SADC member states, nine countries reporting “medium-high” and above provide valuable lessons in advancing the various aspects of IWRM. These countries are generally implementing IWRM as part of longer-term efforts. Individual countries must decide on the course of action that will best suit their needs, and for many, strong political will to promote change is essential to make the progress required.

#### IWRM implementation level by country (2020)



**The challenge:** Human pressures on water resources are increasing at the same time as climate change impacts are increasing water scarcity and drought conditions. Unfortunately, the world is not on track to achieve sustainable management of water and sanitation (SDG 6) by 2030. Water demands are increasing to feed growing populations, meet our increasing energy needs, service expanding urban areas and satisfy industrial needs. Compounding these challenges, climate change is increasing water variability and causing more frequent and extreme floods and droughts, disproportionately affecting the most vulnerable (UNEP, 2021).

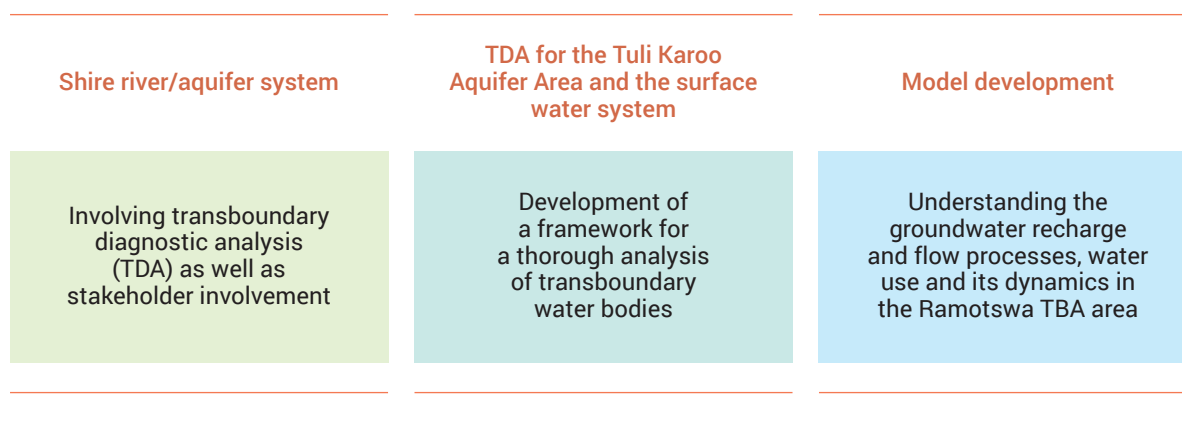
**Part of the solution:** Improvements in the way we use and manage our water resources are urgently needed to sustain economic development. Addressing the complexity of competing and increasing demands and stresses on water resources requires coordinated action on financing, policy and legal frameworks, transparent management of data and information, and multi-stakeholder planning across all sectors and at all levels. In other words, there is a clear need to implement IWRM, as evaluated by SDG indicator 6.5.1, to be able to balance competing social, economic and environmental demands and impacts on water resources, and at the same time work towards broader sustainable development objectives and climate resilience (UNEP, 2021).

## BOX 10

### Transboundary aquifer management challenges

The inter-dependence between river and groundwater flows is a priority focus for transboundary cooperation on shared watercourses. This is especially important in shallow alluvial aquifers. Surface water flows can contribute directly into groundwater resources, often in high-flow or high-rainfall periods/events. Equally, groundwater can be the 'influent' to surface flows. Understanding the flows between the two is particularly important with respect to drought, pollution and the sustainability of groundwater dependent ecosystems and communities.

To date, there is limited data available and insufficient research being undertaken to provide an in-depth understanding of trans-boundary aquifers (TBAs). As a result, there are many gaps in the understanding of TBAs. This is further exacerbated by disparate information systems which manage groundwater data throughout the SADC region and inadequate institutions to monitor groundwater due to scarce financial and human resources. The hydrogeological capacity in public institutions, such as government departments, is a major concern and regulations to protect groundwater resources are often not in place (SADC-GMI Regional Gap Analysis, 2019). Recognising these challenges, SADC-GMI partnered with various key stakeholders (SADC member states, international cooperating partners, regional partners and universities) in order to address the transboundary aquifer knowledge gaps through several research projects:



### The way forward

Most of the groundwater in Southern Africa is stored in 30 major transboundary aquifers. This means that a regional approach and shared understanding of groundwater dynamics is essential for its large-scale and sustained utilisation (CIWA Blog, 2020). Integrated transboundary planning is still based primarily on hydrological boundaries, but consideration of groundwater is becoming more common. Linking transboundary and conjunctive use planning is complex, requiring technical and institutional cooperation. Information gaps may constrain understanding and cooperation around shared aquifers. It may be necessary to develop and implement monitoring systems early in transboundary projects. Further engagement of SADC-GMI with relevant institutions can facilitate this while ensuring capacity building for improved groundwater management.

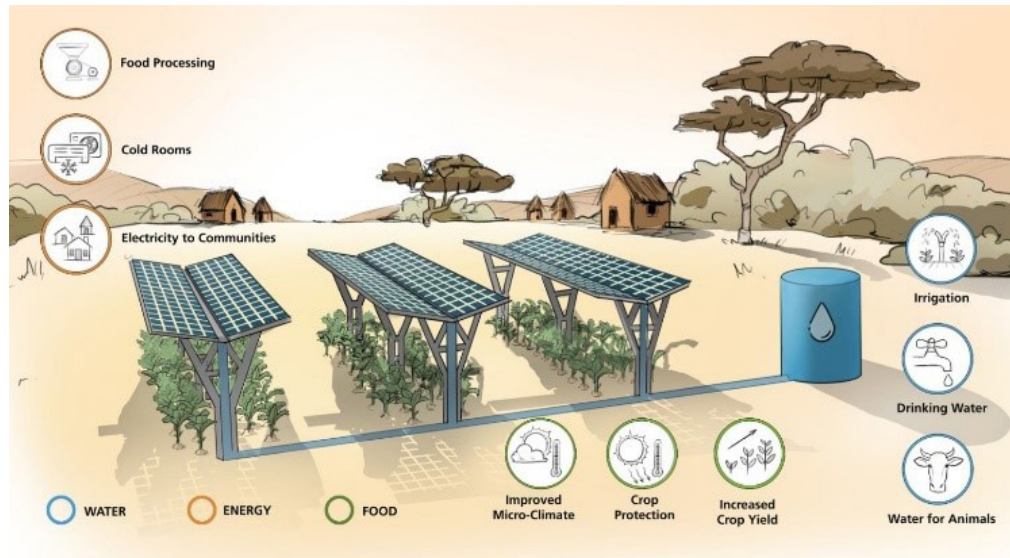
### Case study 5:

#### The emergence of agrivoltaics

There has been a marked increase in the number of solar power projects in SADC, and this trend is likely to continue as countries in the region invest in the renewable energy sector (REN21, 2018). It is well-known that these photovoltaic plants take up significant space. A one-megawatt (1MW) facility requires approximately 1 hectare of land. In the past, this has meant that the land used by solar farms became unavailable for other land uses, including agriculture. Solar energy on agricultural land has become possible, with proven results (Box 11) through a process known as 'agrophovoltaics'. It also provides another stream of income for farmers while allowing for multiple land use options (Figure 28).

**FIGURE 28**

Schematic diagram of sustainable electricity production by integrated food, energy and water systems



Source: Fraunhofer ISE

### BOX 11

#### Advantages of dual-use solar installations

The following results have been observed from programmes which have been implemented in the northern hemisphere, which could be replicated in the SADC region:

- Foraging plants, like grasses, generated about 90% compared to the crops not covered by solar panels.
- Other plants besides grazing grasses, such as peppers, tomatoes, beans and cilantro performed well when solar panels were placed with one metre gaps between them.
- Researchers in Minnesota have grown native plants under solar panels to encourage pollination (MPRNews).
- The solar panels provide energy for farmers reduces production costs.
- Agrivoltaic-friendly solar energy does not hinder livestock from grazing, if elevated at least two metres above the ground.
- Small animals, such as free-range chickens, require a mixture of sun and shade, which the panels provide. In addition, the chickens can easily access grasses and insects.
- Larger animals, including most livestock breeds and some horses, benefit from solar panel installations. Cows or sheep are also shaded while grazing.
- Relieves pressure on ecosystems and biodiversity due to dual land use.
- Reduces GHGs from agricultural sector.
- Improves land use efficiency and crop yields (Elnaz *et al.*, 2019).
- Increased economic value of agrivoltaic farms.

Agrivoltaic energy (also known as agrophotovoltaics) consists of using the same area of land to obtain both solar energy and agricultural products. In other words, solar panels coexist with crops or livestock on the same surface. This technique was originally conceived by Adolf Goetzberger and Armin Zastrow

in 1981, but the concept did not become popular until the last decade.

Researchers have been making significant progress in determining what parameters are optimal for improving crop yields as well as increasing solar

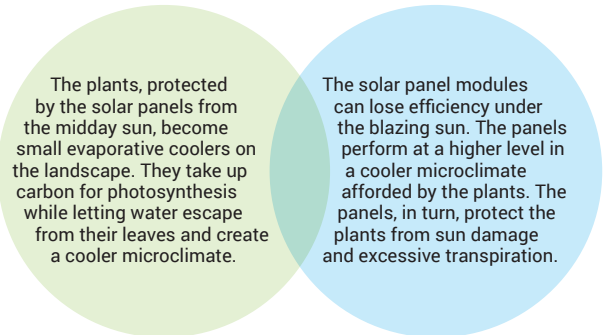


array performance. By simply elevating panels at approximately 2 metres above the surface it is possible to avoid any disruption to the soil. Research has shown that if installers leave enough space between the solar panels sunlight can reach the plants below.

Within the Food-Energy-Water nexus context, agrivoltaics has been found by scientists to deliver the following solutions (University of Arizona, 2018):

### The way forward

In the drier countries of SADC, agrivoltaics can boost food production, water savings and power efficiency. Building resilience through joint renewable energy and food production is a fundamental challenge in the region. Although there are few studies that have monitored all aspects of the associated food, energy and water systems in the dryland areas of Southern Africa, research has tested the technology in other desert environments.



Countries with abundant solar energy potential, such as Namibia, Botswana and South Africa, can optimise those resources through growing animal feed or grazing under solar panels, increasing land use efficiencies. It is predicted that rainfall variability will become more pronounced in SADC, constraining agriculture potential in dry and marginal areas. Agrivoltaics could be a win-win if it is proven to support food production while generating much-needed power for the region.

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# 5. PART C: STRATEGIC PATHWAYS FOR REALISING LWE NEXUS GAINS

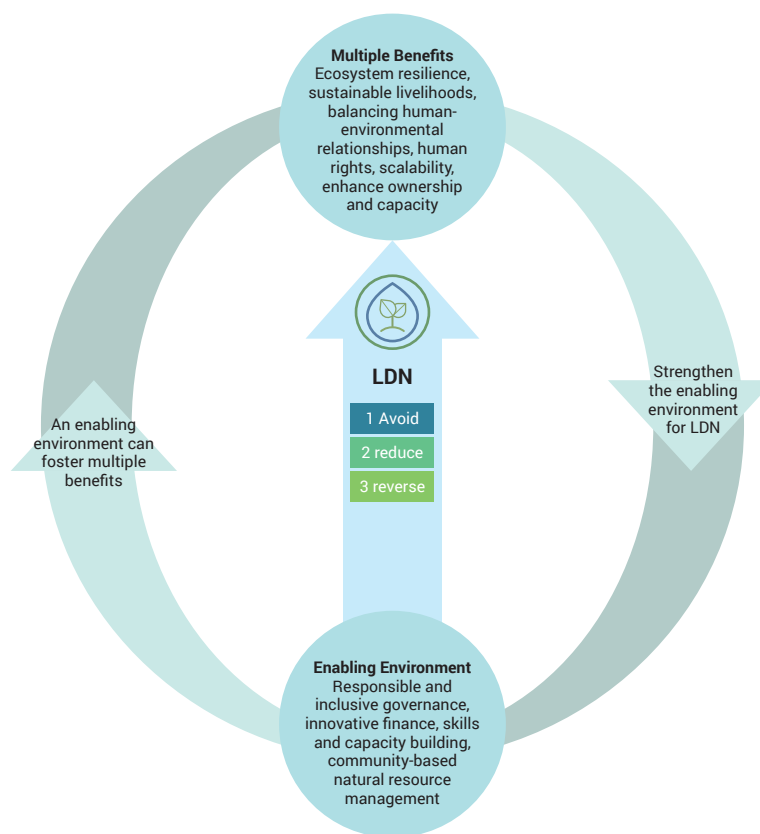
## 5.1 Setting sights on the goal – Achieving LWE Nexus Gains in SADC

The goal, as set out by the UNCCD, is ‘to combat desertification and mitigate the effects of drought in countries experiencing serious land degradation particularly in Africa’. Achieving this bold goal necessitates tactical thinking and concerted efforts to effect regional change. Such change can assist member states in realising their LDN and NDC commitments – whether these are related to land, water or energy management.

Part C sets out a multi-dimensional framework that links strategic focus areas to the thematic issues that have emerged in LWE literature and analysis. This high-level roadmap is augmented by key considerations and selected case studies that illustrate implementation mechanisms across the SADC region. Operationalising the LWE nexus gains framework requires decision-makers to account for the linkages between land degradation neutrality and the enabling environment to achieve multiple benefits (Figure 29).

**FIGURE 29**

Conceptual framework of linkages between LDN, the enabling environment and achievement of multiple benefits



Source: Adapted from Verburg *et al.*, 2019

## 5.2 Key considerations for pathway implementation

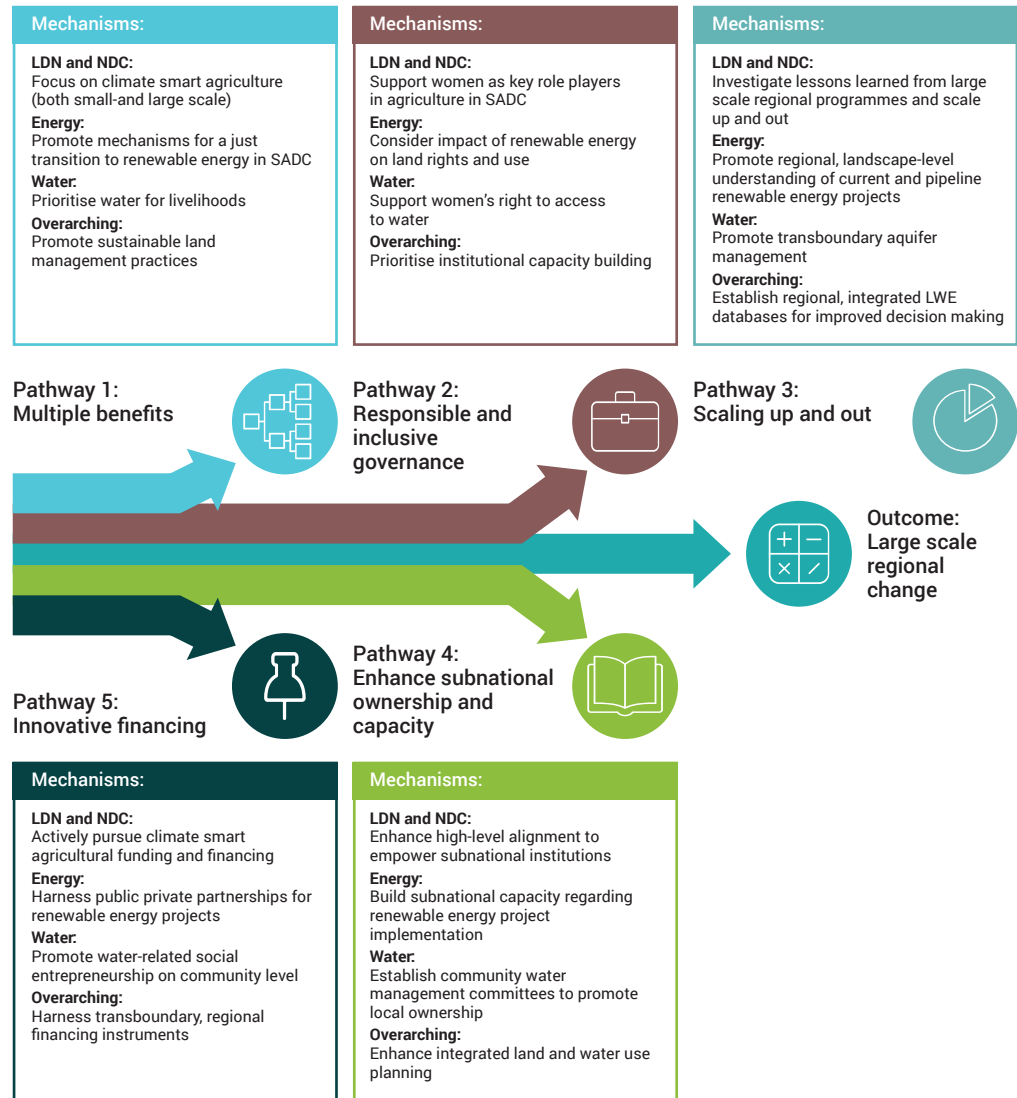
Based on the key messages that have emerged, it is evident that there are several key considerations to be mainstreamed in the implementation of LDN initiatives, regardless of which pathways are most relevant to the national context:

- **Legitimate tenure rights:** Lawful access to and use of land and resources, including at individual and community level, is a major constraint across the SADC region. It plays a key role in sustainable agriculture investments and integrated natural resource management in both urban and rural areas. To advance LDN, more secure tenure will need to be central in all pathways to ensure buy in and participation of all.
- **Human rights-based approach:** In many contexts, the most vulnerable people are often disenfranchised or discriminated against on the basis of gender, ethnicity, age and disability. In order to avoid power imbalances and ensure that LDN interventions reach the marginalized segments of the population, decisions on land use and management need to be human rights-based. This approach applies to all pathway mechanisms and stages of land restoration project and programme design, implementation and monitoring.
- **Consultation and participation:** Good practices relating to consultation requires engagement with project stakeholders that is broad, inclusive and continuous throughout the lifecycle of LDN and other restoration initiatives. This inclusive approach to stakeholder engagement will help strengthen buy-in from decision-makers and allow project partners, including local communities, to meaningfully participate in decision affecting the design and implementation of the LDN initiatives.
- **Capacity building focus:** It is evident that nature conservation and land resource management in SADC suffers from a lack of suitable skills and resources. It is for this reason that many SLM programmes focus on building local capacity. When designing and implementing LDN initiatives associated with LWE pathways, special attention should be given to increasing organizational capacity, physical and communication infrastructure, and individual and group knowledge and skills. Increased capacity can help build project sustainability and implementation success.
- **Community-based natural resource management (CBNRM):** It is generally acknowledged that if people are allowed to be custodians of their resources, better management of the resources will result. To ensure the success of land restoration and management activities in the region, it is imperative that communities be empowered and placed at the centre of these projects and programmes. CBNRM has long been employed to integrate the conservation of the natural resource base, water, soil, trees and local biodiversity, and development to overcome poverty, hunger and disease. When coupled with ecotourism, CBNRM initiatives offer high potential opportunities that could lead to significant LWE nexus gains.
- **Integrated planning:** The goal of LDN is to maintain the land resource base so that it can continue to supply ecosystem services while enhancing the resilience of the communities that depend on the land. Achieving this in any land management project will require careful consideration of multiple dimensions, such as geographic scale, biophysical, socio-economic and stakeholder dynamics. By integrating these factors into pathway development, it will be possible to be more systematic and participatory in devising solutions to ensure sustainable, long-term outcomes.
- **Private sector involvement:** It is broadly acknowledged that government has a key role to play in setting the policy direction and regulatory environment for land management issues. However, the success of these policies is heavily reliant on the cooperation among diverse stakeholders, including the private sector. Public-private partnerships will be central to the success of many LDN initiatives.

## 5.3 Unfolding the pathway approach to implement LDN initiatives

Realizing LWE nexus gains towards achieving LDN in SADC, will only be realized through concerted and coordinated efforts to integrate LDN objectives with land administration, land use planning and land, water and energy resource management. It is imperative that this be underpinned by a sound understanding of the human-environment system and effective governance mechanisms (Cowie, 2020). A set of strategic pathways and associated action mechanisms will be required to achieve LWE nexus gains regionally. The pathways also need to consider the diverse governance, biophysical and socio-economic contexts of SADC member states.

**FIGURE 30**  
Key focus areas and strategic pathways for large scale regional change



The five pathways represented in Figure 30 offer an integrative approach to overcoming challenges related to the cross-cutting LWE nexus matters in the region. These pathways have been informed by an extensive literature review of lessons learned, case studies, good practices and targeted e-consultations. They are to be pursued through a set of action-oriented mechanisms that focus on land, energy, water and overarching governance aspects. All five pathways have universal applicability and hence can inform diverse stakeholders involved in LDN projects and programmes at varying geographic scales, from local and national to regional. Key considerations for the implementation of the southern GGW are proposed for each pathway.

## 5.4 Pathway 1: Multiple benefits

### Rationale:

Although various interactions exist between land degradation, biodiversity conservation and climate change, there is a need to capture the multiple benefits of LDN actions for more robust developmental outcomes and greater efficiencies. It is also necessary to capitalise more effectively on these synergies in policy, investment and reporting.

The delivery of multiple benefits to the SDGs sits at the core of successful action to achieve LDN (UNCCD, 2017). Adopting a territorial or landscape approach is useful to achieve significant benefits across several sectors, improve livelihoods, reduce poverty and contribute favourably to climate and biodiversity outcomes (IUCN, 2018).

## Strategic mechanisms for success:

- **LDN and NDC** – by focusing on climate-smart agriculture, whether at small- or large-scale, it will be possible to realise multiple benefits. This will ensure greater resilience and sustainability of food production practices across the region, thereby securing valuable land resources.
- **Overarching** – by fostering and facilitating sustainable land and water management practices, it will be possible to protect ecological resources and thereby maintain the multiple goods and services they provide.
- **Energy** – by harnessing mechanisms in a just transition to renewable energy, sustainable socio-economic development can be prioritised while reducing the reliance on non-renewable sources of energy.
- **Water** – prioritising the management of water resources is essential for sustaining livelihoods and ecological function throughout the region. These and other benefits will advance LDN and promote development.

## Pathway considerations for the southern GGW:

Enhancing multiple benefits at the regional, national and project level requires:

- Identifying hotspots of land degradation where LDN interventions can be most impactful
- Ascertaining the unique mix of mechanisms that would enhance implementation success
- Engaging early with stakeholders and beneficiaries
- Designing programmes and projects to optimise the benefits.
- Enhancing political will.

## Matengo Highlands farming system, Tanzania

The Matengo (Ngolo) highlands farming system project is in the Mbinga District in the southwest of Tanzania. This system makes use of a specialised indigenous cultivation technique that conserves soil moisture while minimising soil erosion. The Matengo community developed this system due to a shortage of arable land, and forced to cultivate on steep slopes (ranging from 10 to 60 degrees) for their survival.

### Project focus

This scheme makes use of a soil and water conservation system to enhance soil fertility and crop yields through mixed cropping and composting. It consists of a series of pits 2m × 2m in size and 30 cm deep. The beans (or legumes) seeds are sown on small ridges and covered with soil. Sowing of maize is done after the harvesting of the beans. The farmer lightly rakes the soil to remove weeds and crop residues, before planting maize and cowpeas. Seeds are sown at intervals of 15 cm for legumes and 30 cm for maize.

### Project benefits

Challenges associated with this system is that it is time-consuming to set up. However, once the system is up and running, the labour costs are reduced significantly, and the pits are only reformed yearly.

This system has multi-functional benefits including maintenance of soil fertility, weed control and soil conservation. While the socio-economic benefits include allowing the community to sell the crops they harvest to earn and income.

This system has been proven to be environmentally sound and productively sustainable, so farmers in other regions have been encouraged to adopt a similar approach.

## 5.5 Pathway 2: Responsible and inclusive governance

### Rationale:

Achieving LDN requires responsible and inclusive governance to support the transition to sustainable food and agricultural systems. Transparent, accountable and inclusive governance mechanisms – which form part of a coherent normative framework – are necessary to create an enabling environment that supports regional initiatives advancing LWE nexus gains. Successful examples include school feeding and public procurement programmes, market regulations allowing for labelling of differentiated agroecological produce, and subsidies and payments for ecosystem services.

Land and natural resources governance is central to addressing human vulnerability, poverty and gender. Most of the world's rural poor and vulnerable populations directly rely on terrestrial and aquatic biodiversity and ecosystem services for their livelihoods and yet they lack secure access to these resources and services. Ensuring equitable access to land and natural resources is key to human rights. A lack of secure land tenure for rural and peri-urban populations across the SADC region constrains sustainable livelihood opportunities as people are forced to use increasingly marginal lands for their subsistence. Governance systems that are suitably responsible and inclusive will provide incentives for the long-term investments to protect soil, biodiversity and ecosystem services.

Agroecology is best supported by responsible governance mechanisms at different scales. Many of the SADC member states have already developed national level legislation, policies and programmes that reward sustainable land and water management. These efforts are coordinated at regional scale by SADC governance structures. At local level, traditional and customary governance plays a critical role in fostering cooperation between stakeholders to maximise LWE nexus synergies – which in turn enhance biodiversity and the provision of ecosystem services.

Territorial, landscape and community level governance, such as traditional and customary governance models, are also extremely important to foster cooperation between stakeholders, maximising synergies while reducing or managing trade-offs, and minimising conflicts.

### Strategic mechanisms for success:

- **LDN and NDC** – in order to strengthen land governance, LWE nexus initiatives would need to support women and child-headed households as key role players in the region, including in agriculture.
- **Overarching** – building governance in the LWE arena will require institutional capacity building at all levels – local, national and regional – to strengthen transparency and accountability.
- **Energy** – the expansion of the renewable energy sector must consider the impacts on land rights and use given their substantial land requirements.
- **Water** – to ensure inclusivity, water resource programmes must take account of and support women's rights to access water. This will help facilitate more equally distributed outcomes.

### Pathway considerations for the southern GGW:

Enhancing responsible and inclusive governance at the regional, national and project level requires:

- Ascertaining the land governance weaknesses and constraints to achieving LDN and how these can be overcome
- Facilitating the reform of outdated and ineffective land laws and frameworks to enable and support the LDN interventions
- Implementing mechanisms that optimize access to land resources and address security of tenure
- Establishing a system to identify and respond to grievances relating to governance failures, notably human rights-based issues
- Designing projects and programmes that aim to build inclusiveness and strengthen stakeholder buy-in.

## Integration of VGGT into the implementation of the UNCCD and LDN

Access to and control over land resources – tenure security – by individuals and communities is a fundamental part of sustainable land use and management. It is recognized as an incentive that can trigger investments in land degradation neutrality (LDN) and other development priorities. Weak land governance is a challenge to achieving sustainable development and addressing land degradation through LDN initiatives. In alignment with the UNCCDs LDN framework and with the outset of the UN Decade on Ecosystem Restoration (2021-2030) an integrative approach to tackling land governance challenges was required.

The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security (VGGT) are an essential approach to effective and improved governance of land, fisheries and forests with the ultimate goal of achieving food security and poverty eradication. In response to land governance challenges at all scales, the UNCCD in collaboration with the FAO produced a technical guide to how VGGT can be integrated into the implementation of the UNCCD and LDN. This served to make policy makers aware of how legitimate tenure rights and responsible governance could contribute to LDN commitments.

Drawn from three key considerations (legitimate tenure rights, consultation and participation, and gender-responsive approaches) and guided by the VGGT principles and UNCCD COP decisions, nine action-oriented pathways were developed to address land tenure related challenges.

---

### Pathways for governance of tenure to achieve LDN

1. Enhancing policy and legal framework
2. Establishing targeted coordination mechanisms
3. Securing women's tenure rights and access to land and natural resources
4. Setting up accessible and transparent grievance and dispute resolution mechanisms
5. Designing and implementing tenure-responsive, participatory land use planning
6. Supporting LDN through land administration tools
7. Recognising and documenting legitimate tenure rights on public lands
8. Recognising and documenting tenure rights for the sustainable management of commons
9. Allocating and strengthening rights and duties on private land

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The pathways were also formulated in a generic way for the adaption and implementation to different national and local contexts. Pathways 1 through 4 are universally applicable to all LDN initiatives while pathways 5 through 9 are context specific and can be applied based on the land tenure assessment and relevance to specific LDN initiatives. This technical guideline lays out each pathway in a manner that would engage with policy makers but presenting the rationale behind each pathway and describing the implementation mechanisms at both national and local levels.

## 5.6 Pathway 3: Scaling out and up

### Rationale:

It is imperative that land use and management takes place at scale, so that it can effectively tackle interconnected regional challenges such as population growth and migration, climate change, biodiversity loss, and the degradation of land and water resources. The successful scaling up and out of SLM projects and programmes, would need to overcome many socio-cultural, institutional and policy barriers.

Informed by past lessons, there is growing agreement on the need to adopt a new scaling framework that analyses the contexts in which specific SLM interventions can be scaled up and out. This would allow scalable SLM options to be screened and adapted for these contexts, piloted and disseminated. The ultimate objective is to help countries in SADC to achieve LDN and make progress towards many other SDGs.

### Strategic mechanisms for success:

- **LDN and NDC** – investigate lessons learned from local climate-smart agricultural programmes to scale out and up based on contextual analysis. This will help identify barriers or constraints to scaling and find solutions to remove them.
- **Overarching** – it is necessary to establish integrated, regional LWE databases to share and disseminate knowledge about lessons and good practices to improve decision-making.

- **Energy** – facilitate regional understanding and implementation of current and future renewable energy projects to enhance land use synergies. Renewable energy projects can leverage livelihood opportunities for rural populations heavily reliant on land resources.
- **Water** – in the light of the dependency on groundwater resources, promote and actively develop programmes in conjunctive use and management of transboundary surface and groundwater. It will be necessary to track performance of interventions based on monitoring and evaluation.

### Pathway considerations for the southern GGW:

Boosting the scalability of LDN initiatives at the regional, national and project level requires:

- Learning from the experiences and lessons on previous land management projects to understand contextual circumstances that influenced implementation
- Highlighting LWE projects and programmes in the region that are suitable for scaling up and out
- Sharing lessons and successes on LDN projects and programmes among regional stakeholders
- Leveraging and harnessing processes and networks established through regional initiatives such IWRM and TCFAs
- Setting up a monitoring and evaluation framework to track performance and adjust to improve the performance of interventions.



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Decision Support for Mainstreaming and Scaling up of Sustainable Land Management (DS-SLM) can be an effective mechanism for achieving successful land restoration initiatives and scaling up initiatives at subregional and regional scales. DS-SLM is driven by multiple partners, such as FAO, WOCAT and GEF, with a focus on individual country SLM initiatives. It has yet to gain effective traction in Southern Africa. Currently implemented across 15 countries globally, there is an opportunity to integrate DS-SLM or similar approaches into many other countries struggling with land degradation.

### Purpose of project

The DS-SLM project is focused on increasing the understanding of land degradation and creating various decision-support tools to promote SLM and enhance food security. It links land degradation and SLM assessment tools at different levels to assist in strategy development for scaling up SLM (FAO & WOCAT, 2016). The project goal is to assist in combating and reversing land degradation by scaling up and out effective SLM practices through the support of better decision-making processes at all scales.

The DS-SLM project has three components of delivery:

- National and local decision support on combating DLDD through upscaling of SLM best practices;
- Global DLDD and SLM knowledge management and decision support platform; and
- Monitoring, evaluation and dissemination of results.

The decision support framework has seven modules for implementation of effective SLM best practices:

- 1 An operational strategy for mainstreaming and scaling up SLM and integrating into national policy and financial decisions;
- 2 National or subnational level assessment of land degradation and SLM measures using the Land Degradation Assessment (LADA -WOCAT) tool;
- 3 Selection of priority landscapes for intervention based on national or subnational assessment results;
- 4 Landscape level assessment to identify land use pressures, impacts and possible SLM solutions at local and landscape level utilising a suite of WOCAT tools;
- 5 Territorial planning based on landscape level assessment results to identify responses considering existing implementation mechanisms.
- 6 SLM implementation and scaling out of selected best practices through raising awareness and capacity building; and
- 7 A knowledge management platform that compiles all information for public availability so that SLM best practices can be exchanged globally.

Scaling up and out of SLM best practices can be a vital approach in combating DLDD and restoring large areas of degraded land while enhancing sustainable agricultural practices.

### Southern African project experience

There has been little traction with DS-SLM in Southern Africa, however success stories from Northern Africa, point to an opportunity for implementation across the sub-region. Lesotho has committed to implementing DS-SLM into their sub-national land restoration initiatives to assist in restoring and managing larger areas of agroecological land along river catchments. It is vital to sustainably manage this land as Lesotho has very sparse usable land due to its topography. This same approach can be implemented in other areas of Southern Africa that experience similar land degradation associated with agricultural practices.

FAO & WOCAT (2016) Decision Support for Mainstreaming and Scaling out SLM. FAO. Rome.

## 5.7 Pathway 4: Enhance subnational ownership and capacity

### Rationale:

In order to enhance ownership and capacity at the subnational level, SLM initiatives will need to adopt an integrated approach that involves key stakeholders at local and national level. This will contribute to increased awareness regarding natural resources planning that embraces social, economic and environmental considerations in land use management.

To ensure buy-in, SLM projects and programmes need to involve training and capacity building that is tailored to the specific policy, institutional and environmental contexts of the SADC member states. Coordination of SLM capacity building efforts should be promoted across the region to share lessons and inform decision-making.

By engaging potentially fragmented institutions with limited knowledge of applying integrated approaches to natural resources management, this approach can assist in generating interest in and support for SLM projects and programmes. In addition, more effort should be made to ensure training capacity is directed at the right people in land management institutions.

### Strategic mechanisms for success:

- **LDN and NDC** – it is necessary to develop SLM projects and programmes that are more cohesive and aligned with high level targets. This will enhance ownership, thereby strengthening their implementation.

- **Overarching** – in order to enhance integrated water, land and energy use planning, it will be essential to build local capacity for implementing SLM practices.
- **Energy** – partnerships and strategic cooperation will be required to investigate and develop transboundary renewable energy projects in the region.
- **Water** – local ownership and expertise can be enhanced through capacity building and investments in community-based water management.

### Pathway considerations for the southern GGW:

Strengthening ownership and capacity for LDN initiatives at national and project level requires:

- Designing programmes/projects to ensure alignment with the national LDN commitments and targets and establish buy-in from policy and decision makers
- Strengthening identified skills and resource gaps in LWE planning and management
- Sharing lessons and successes on LDN projects and programmes among regional stakeholders
- Forging strategic public-private partnerships to advance LWE nexus gains, notably those focusing on agriculture production, energy access and supply and integrated water resources management
- Building grassroots support for LWE projects and programmes by employing community-based natural resource management processes.



## Country Pilot Partnership (CPP) Programme for Integrated Sustainable Land Management (ISLM) in Namibia

### CPP projects in:

Over the years, various CPP approaches have been tested to make SLM a reality on the ground. These approaches have included:

1. National-level Country Partnerships Programs (CPP) with the objective of increasing visibility of SLM in the development agenda, developing institutional capacities, and setting up technical and financing mechanisms to deliver SLM.
2. Development of a robust portfolio of SLM projects under Sustainable Land and Ecosystems Management Programs in Asia and Africa, notably Tanzania.
3. Building on the lessons from the previous two programmatic approaches, Namibia has in the recent past begun including the LDN concept into its national framework for addressing land degradation and desertification.

The findings, lessons learned and recommendations from the UNDP/GEF supported CPP programme for integrated sustainable land management in Namibia have been included to showcase how SLM was realised through its stakeholders, implementing partners and programme staff (MET, 2012).

### Objectives of the Namibian CPP:

1. Build and sustain capacity (systematic, institutional and individual level)
2. To ensure cross-sectorial and demand-driven coordination
3. Implement SLM activities
4. Identify cost effective, innovative and appropriate SLM methods which integrate environmental and economic objectives.

The goal of the CPP in Namibia was to combat land degradation using integrated cross-sectoral approaches to enable Namibia to realise one of its Millennium Development Goals (MDG #7) of environmental sustainability and to assure the integrity of dryland ecosystem services. The CPP Programme was comprised of four sub-projects (of which only three materialised) of varying duration and areas of operation and was implemented by the Ministry of Environment and Tourism (MET) and Ministry of Agriculture, Water, and Forestry (MAWF) in collaboration with seven government ministries, the National Planning Commission UNDP, the European Union, GTZ and the NGO community in Namibia.

**Table 4** summarises the key outcomes of the three sub-projects.



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**TABLE 4**  
**Outcomes of the three CPP Programme Sub-Projects**

Sub-project and duration	Sub-project Outcome
Sustainable Land Management Support and Adaptive Management Project (SLM-SAM) (2007-2017)	<ul style="list-style-type: none"> <li>• Establishment of the Sustainable Development Advisory Council (SDAC) as the main official advisor to the Environmental Commissioner of Namibia</li> <li>• Development of institutional capacities through inter-sectoral planning and implementation approach</li> <li>• Development of individual capacities through support and training of young professionals</li> <li>• Demonstration of SLM practices at 23 pilot sites across 12 regions to show linkages with economic gains</li> <li>• Sharing of best practices through the development of various studies, concept studies and documentaries.</li> </ul>
Enhancing Institutional and Human Resource Capacity Through Local Level Coordination of Integrated Rangeland Management and Support (CALLC) project (2007-2013)	<ul style="list-style-type: none"> <li>• Established FIRMs across 14 pilot sites, nine Farmers' Associations in nine constituencies across the North-Central Regions, nine LLMS for each farmers' Association, and 43 kraal committees</li> <li>• Guidelines preparation for the establishment of livestock kraal committees</li> <li>• Formation of Livestock Marketing Committees</li> <li>• Preparation of integrated work plans and livestock marketing calendars for the Northern Central Regions(NCRs)</li> <li>• Infrastructure provided to support and enhance the capacities of local farmers to sustainably manage rangelands and market quality livestock</li> <li>• Piloted best practices in SLM to expose beneficiary communities to new and improved farming technology in various alternative livelihood options in bee keeping, guinea fowls, vegetable, and fruit tree farming</li> </ul>
Climate Change Adaptation (CCA) Project: aimed to reduce vulnerability of farmers through livestock improvement, dry-lands crop farming, horticulture production, and livelihoods diversification and improvement (2006-2013)	<ul style="list-style-type: none"> <li>• Demonstrated conservation agriculture on 100 sites in Omusati region, using ripper furrow implements and drip irrigation systems</li> <li>• Supported 10 vegetable farmers along Etaka Canal with fuel driven water pumps, drip lines, and fertilizers</li> <li>• 212 Boer goat rams were introduced to improve livestock breeding and production</li> <li>• 30 women beneficiaries were provided 66 guinea fowls for livelihood diversification</li> <li>• Drought tolerant crop breeds such as Okashana # 2, Kangara Sorghum were introduced for higher yields</li> <li>• Provided six tonnes of improved pearl millet seeds to 1,200 households with orphans, visually impaired, unemployed women, and flood-affected people</li> <li>• 75 Agricultural Extension Technicians (AET) in the North Central Regions were trained in climate change adaptation measures, seasonal rainfall outlook, and community toolkit</li> </ul>

Source: MET, 2012 and MAWF, 2012

### Lessons and solution

The CPP ISLM Programme responded to the constraints by addressing policy harmonisation, mainstreaming SLM into policy development, developing individual and systemic capacities, testing economically attractive approaches to SLM, and disseminating information on SLM best practices.

related processes and thematic areas through which funding can be mobilised. Key funding sources could include the public, private sector, market-based mechanisms, trade organisations, foundations, civil society organisations, and other financing mechanisms for climate change adaptation and mitigation, biodiversity conservation and sustainable resource use.

## 5.8 Pathway 5: Leverage innovative finance

### Rationale:

Innovative financing for SLM can be considered as an umbrella approach. It comprises a range of sources, mechanisms and instruments, as well as

In order to strengthen UNCCD implementation and LDN advancement in the region, SADC structures and member state institutions would need to coordinate their efforts in sourcing funding. Public-private partnership arrangements should also be considered to leverage additional investment.

### Strategic mechanisms for success:

- **LDN and NDC** – funding and financing should be sought to promote climate-smart, regenerative agricultural projects and programmes.
- **Overarching** – regional financing instruments and mechanisms need to be established and/or strengthened.
- **Energy** – public-private partnerships should be explored when developing renewable energy projects in the region to optimise funding sources and streams.
- **Water** – to support water resource management projects at local level, innovative financing could be realised through crowd funding and social entrepreneurship particularly at the community level.

### Pathway considerations for the southern GGW:

Leveraging innovative funding for LDN initiatives at regional, national and project level requires:

- Prioritising or repurposing public funds that could then be used to leverage further support and funding
- Aligning the objectives of projects and programmes with regional and national development goals to mobilise private sector and donor support
- Identifying and addressing any institutional and capacity constraints preventing funds from reaching projects and programmes
- Identifying development partners and funding sources and mechanisms that can be accessed to support LWE programmes and projects
- Identifying private sector partners that are interested in or currently actively supporting LWE projects and programmes that promote LDN
- Encouraging social and green entrepreneurship and projects that optimise community investment and local benefits.



## Innovative financing for Forest Landscape Restoration

Forest Landscape Restoration (FLR) goes beyond planting trees. FLR promotes stakeholder cooperation and seeks to find innovative financing solutions, as well as knowledge and technical support solutions (Besacier *et al.*, 2021). Principles that define FLR focus on landscape, stakeholder engagement, restoration for multiple benefits, maintenance of natural ecosystems, tailored approaches to local scale, and adaptive management to achieve long-term resilience (Mansourian & Berrahmouni, 2021). Alignment of ecosystem and human focussed objectives assists in achieving multiple benefits.

### Mampu project in DRC – Market development for secondary tree and non-timber forest products

The forests of Central and Southern Africa are under increasing pressure. Reliance on forests as a source of subsistence livelihoods has resulted in the loss of more than 1.3 million hectares of natural forest between 2010-2020 (Global Forest Watch, 2021).

For example, deforestation in the Plateaux Batéké near the DRC capital, Kinshasa, is driven by traditional charcoal production and slash-and-burn cultivation. This has reduced soil fertility and degraded savannah habitat. Kinshasa consumes up to six million tonnes of bioenergy equivalent per year, mainly charcoal and firewood from non-renewable sources. These consumption patterns are influenced by a lack of access to more sustainable energy sources.

The Mampu project was initiated in 2004 by the Hanns Seidel Foundation to restore the landscape and improve livelihoods and food security. Covering an area of 8,000 hectares, the project aimed to develop agroforestry with *Acacia auriculiformis* plantations alongside food crop (cassava and maize) rotations in a 12-year cycle. The introduction of nitrogen-fixing acacias aimed to restore soil fertility and produce fertilizer for cassava from potash. While the acacia plantations grow, additional crops are planted. On maturation, the acacias can be harvested to provide sustainably sourced charcoal to sell in nearby Kinshasa. By developing a market for the Mampu secondary tree products in Kinshasa, project entrepreneurs were able to generate revenue which could be used to invest in the restoration of agricultural lands and natural areas.

### Deforestation caused by subsistence activities in DRC



## 5.9 Operationalising the SADC GWW strategy

In October 2019, SADC Ministers in charge of Environment, Natural Resources and Tourism endorsed the SADC Great Green Wall (GGW) strategy paving the way for its design and eventual implementation. This SADC Secretariat has begun to develop a costed action plan for the implementation of Sub Regional Action Programme (SRAP) and other initiatives, including the GGW SADC in collaboration with the UNCCD secretariat and other partners.

The aim of SADC GGW is largely to promote synergies and effective coordination between the activities of various national and sub-regional bodies working to combat land degradation and desertification, biodiversity loss and mitigate the effects of drought. The GGW initiative opens numerous opportunities to advocate for better management of ecosystems and landscapes beginning with a high-level action plan to operationalize and realise the objectives of the strategy represented in **Figure 31**. It is anticipated that the SADC GGW strategy will culminate in a number of outcomes and outputs which will collectively advance LWE nexus gains and progress towards LDN in the region.

**FIGURE 31**  
Process to implement the GGW strategy and expected outcomes and outputs



Source: SADC, 2019

Southern Africa could benefit enormously from a coordination mechanism like the Great Green Wall, because we have seen that such a device has given a huge boost to investment in the Sahel.

**Dr. Dennis Garrity: senior fellow at the World Agroforestry Centre.**

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# Conclusion

The SADC region is witnessing an increase in several unprecedented challenges to land resources, key among which is desertification, land degradation, and drought (DLDD). The COVID-19 pandemic has also contributed to loss of livelihoods and food security. The effects of climate change further exacerbate these challenges. This has knock-on effects for people's livelihoods and the economic development of Southern Africa. Given that the region's LDN and NDC responses are still evolving, considerable effort will be required to produce a harmonised approach. Such coordination must consider not only large-scale regional LDN projects and programmes, but also align the standard of assessment target setting, implementation, data collection and reporting. Strategically, these actions will inform important policy and management decisions on aspects, such as land governance, planning and skills development, to accelerate the implementation of LDN initiatives to generate multiple benefits as regards the LWE nexus.

Having unpacked the key challenges and constraints to land use and management in the region, this report presented multi-sectoral case studies from across the region that highlight efforts to reverse the negative trends in land degradation and desertification. These case studies emphasise the importance of viewing country commitments, strategies and implementation from a holistic, systemic and integrated perspective. They also highlight, in a practical manner, the multi-dimensional linkages within the LWE nexus. Full understanding and appreciation of these linkages is an emerging science and success stories will continue to inform the design, planning and implementation of LDN initiatives.

The goal, as set out by the UNCCD, is to assist countries with the “rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions”. Achieving this goal necessitates tactical thinking to effect regional change. Such transformation will assist SADC member states in realising their LDN and NDC commitments – whether these relate directly to LWE management or land governance as part of their development priorities.

Realizing LWE nexus gains can only be achieved through concerted and coordinated efforts to integrate LDN objectives with land-use planning and the sustainable management land, water and energy resources. A set of strategic pathways and associated action mechanisms provide flexible options for advancing LWE nexus gains across Southern Africa. Although these pathways offer a broad roadmap, their evolution and ultimate implementation must be tailored to meet the needs of the region's diverse governance, biophysical and socio-economic contexts and be supported by the necessary political will and impetus.

Looking forward, the GGW strategy for the SADC region, informed by the GGW initiative in the Sahara and Sahel, offers an opportunity to develop a regional coordination mechanism to leverage LDN planning, resourcing and implementation in Southern Africa.

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# Abbreviations

<b>AFOLU</b>	Agriculture, Forestry and Other Land Use
<b>AFR100</b>	African Forest Landscape Restoration Initiative
<b>AU</b>	African Union
<b>CBD</b>	Convention on Biological Diversity
<b>CBNRM</b>	Community-based natural resource management
<b>CPP</b>	Country Partnerships Programs
<b>DLDD</b>	Desertification, Land Degradation and Drought
<b>DS-SLM</b>	Decision Support for Sustainable Land Management
<b>ESG</b>	Environmental, social and governance
<b>ETG</b>	Energy Thematic Group
<b>FAO</b>	Food and Agricultural Organization of the United Nations
<b>FLR</b>	Forest Landscape Restoration
<b>GGW</b>	Great Green Wall Initiative
<b>GHG</b>	Greenhouse gas
<b>GIS</b>	Geographical Information System
<b>GLO</b>	Global Land Outlook
<b>HDI</b>	Human development index
<b>IWRM</b>	Integrated water resource management
<b>KAZA</b>	Kavango-Zambezi Transfrontier Conservation Area
<b>LAPCAS</b>	Land Administration Processes, Capacity and Systems
<b>LDN</b>	Land degradation neutrality
<b>LUP</b>	Land Use Planning
<b>LWE</b>	Land, water and energy
<b>M&amp;E</b>	Monitoring and evaluation
<b>NAP</b>	National Action Plan
<b>NBSAP</b>	National Biodiversity Strategy and Action Plan
<b>NDC</b>	Nationally determined contribution
<b>NELGA</b>	Network of Land Governance in Africa
<b>NGO</b>	Non-governmental organisation
<b>PPF</b>	Peace Parks Foundation
<b>PV</b>	Photovoltaic
<b>RBO</b>	River basin organisation
<b>RERA</b>	Renewable Electricity Regulators Association
<b>RISDP</b>	Regional Indicative Strategic Development Plan

<b>SACREEE</b>	Southern African Centre for Renewable Energy and Energy Efficiency
<b>SADC</b>	Southern African Development Community
<b>SADC-GMI</b>	Groundwater Management Institute
<b>SAPP</b>	Southern African Power Pool
<b>SDG</b>	Sustainable Development Goals
<b>SGM</b>	Sustainable Groundwater Management
<b>SIDS</b>	Small Island Developing States
<b>SLM</b>	Sustainable land management
<b>SLWM</b>	Sustainable land water management
<b>SRAP</b>	Sub-Regional Action Programme
<b>TBA</b>	Transboundary aquifers
<b>TFCA</b>	Transfrontier Conservation Area
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environmental Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VGGT</b>	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security





# GLOBAL LAND OUTLOOK

The United Nations Convention to Combat Desertification (UNCCD) recognizes that addressing and reversing land degradation is one of the key sustainable development priorities for many countries, particularly in the developing world. In response, the UNCCD secretariat and its partners created a strategic communications publication and platform, entitled the Global Land Outlook (GLO), to facilitate insights, debate and discourse on a transformative vision for land management policy, planning and practice at various scales.

The aim of the GLO is to communicate and raise awareness of evidence-based, policy-relevant information and trends to a variety of stakeholders, including national governments formulating their responses to commitments to better manage and restore land resources, including the SDGs and associated targets, such as Land Degradation Neutrality (LDN). The evidence presented in the Global Land Outlook thematic regional reports demonstrates that informed and responsible decision-making can if more widely adopted help to reverse the current worrying trends in the state of our land resources.



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