



Demonstrating the Value of SADC Transfrontier Conservation Areas (TFCAs) and Understanding the Funding Modalities for Investment

FINAL TECHNICAL REPORT

August 2022



Kyle Harris, Jackie Crafford, Kevan Zunckel, Paul Bewsher, Karen Vickers, Marco Vieira & Joseph Mulders

k.harris@primeafrica.net

EXECUTIVE SUMMARY

Context & Aims

The Southern African Development Community's (SADC) eighteen Transfrontier Conservation Areas (TFCAs), represent a unique, non-substitutable ecological asset spanning approximately 1 000 000km² and covering both terrestrial and marine environments. Additionally, they incorporate over half of the declared conservation estate in the region. The overarching SADC mission statement for TFCAs as per the adopted SADC TFCA Programme (2013), is as follows: *To develop SADC into a functional and integrated network of TFCAs where shared natural resources are sustainably co-managed and conserved to foster socioeconomic development, and regional integration for the benefit of those living within and around TFCAs and mankind at large (SADC, 2013).*

Despite the potential role of TFCAs in sustainable, economic, and social development in SADC, it has been difficult to quantify and communicate the tangible benefits generated by these areas to beneficiaries at local, regional, and global scales. In addition, the financial sustainability of the TFCAs has been questioned as their funding remains largely dependent on support from International Cooperating Partners (ICPs), as well as contributions from the Member States. The advent of the COVID-19 pandemic has further exacerbated the precarious funding situation faced by many TFCAs and their constituent protected areas and has highlighted their dependence on the tourism income stream. As a result, there is an urgent need to diversify income streams and improve financial sustainability and resilience.

With this context in mind, the overarching objective of the assignment was to demonstrate the value that TFCAs provide to a multitude of beneficiaries. This is achieved by utilising an ecosystem service assessment (ESA) framework which identifies the linkages between the ecological asset (the TFCA estate), the subsequent delivery of ecosystem services and the benefits provided to society. Furthermore, the assignment aimed to identify barriers to investment in TFCAs, how risk factors can be overcome and options for diversifying investment streams through innovative financing mechanisms.

The Value of TFCAs

To demonstrate the value of TFCAs, an ESA methodology was utilised based on the framework proposed by The Economics of Ecosystems and Biodiversity (TEEB, 2010) and the United Nations Statistics Division's (UNSD) System of Environmental Economic Accounting (SEEA). The approach was underpinned by the relationship between ecological assets (in this case the TFCAs themselves) and their delivery of ecosystem services to society and the subsequent benefits that they provide. The ecosystem services delivered by the TFCAs were identified, prioritised, and valued using a literature survey of relevant case studies. A summary of selected ecosystem service values for the TFCA estate is given in the table below.

Table 0-1. Selected ecosystem services values for TFCAs

Category	Ecosystem Service	Case Study	Value
	TEEB (2010)		
Provisioning	Food	Greater Limpopo TFCA	Mean annual direct-use value of US \$627 (adjusted for 2021) per household (Twine et al. 2003).
	Wood & fibre		
	Biochemical & pharmaceutical products	Across all TFCAs	Expressed as a land value, the value of these types of provisioning services can be as high as US \$7 000/ha in the most productive biomes (derived from Maua et al. 2019).
	Grazing	Across all TFCAs	The grazing value of land, expressed as an asset value, across SADC, is approximately US \$2 800/ha (Prime Africa, 2022).
Cultural	Nature-based Tourism	<ul style="list-style-type: none"> • GLTFCA • Malawi-Zambia TFCA (MZTFCA) • Kavango-Zambezi TFCA (KAZA) • Lubombo TFCA • Zimbabwe-Mozambique-Zambia Transfrontier Park (ZIMOZA) • Greater Mapungubwe Transfrontier Conservation Area (GMTFCA) 	<p>There are an estimated 284 000 – 473 000 tourist visits a year and the annual revenue from accommodation bookings is as much as US \$790 million a year. The approximate number of jobs created within the TFCAs is 34 000 – 38 000. (PPF, 2019).</p> <p>When expressed as a per hectare value, nature-based tourism can contribute on average US \$6 000/ha to the TFCA estate (PPF, 2019).</p>
	Recreational hunting	SADC Countries.	Average annual revenue for recreational hunting across SADC countries was in the region of US \$260 million (Snyman et al. 2021).
	Cultural diversity	<ul style="list-style-type: none"> • Greater Mapungubwe TFCA (GMTFCA) • Kgalagadi Transfrontier Park (KTP) 	<p>The Mapungubwe Cultural Landscape (MCL) was proclaimed a UNESCO World Heritage Site in 2003 and together with the TFCA makes a significant cultural historical contribution to Southern Africa.</p> <p>The KTP is an important cultural heritage area for the #Khomani San People and incorporates the #Khomani Cultural Landscape which was established as a world heritage site by UNESCO in 2017.</p>
Regulating	Water regulation	Maloti Drakensberg Transfrontier Park (MDTP)	<p>The MDTP has been shown to have Unit Reference Values (URV) of 0,31 and 0,48 (MDTP, 2007).</p> <p>URV is a term used by SA water resource planners as an expression of the relationship between the costs associated with obtaining water services and the value of the benefits.</p>

Category	Ecosystem Service	Case Study	Value
TEEB (2010)			
	Climate regulation	Across all TFCAs	The carbon capture value of biomes across TFCAs can vary between US \$900 - \$2 700/ha, expressed as a land value (UNEP, 2017).
Habitat	Habitat and biodiversity	Across all TFCAs	Expressed in terms of an equivalent land value, this value may vary between US \$6 000 - \$21 000ha for TFCAs (Crafford et al. 2022).

Broadly, the case studies identified three sets of TFCA beneficiaries who derive value from the TFCA natural assets:

1. Local communities that have a direct livelihood dependence linked to the TFCAs – these communities benefit primarily through provisioning services, such as food, fodder, fibre, fuel wood and job creation through eco-tourism activities. Some of these services have specific benefits for women. These benefits provided by TFCAs can be expressed through various measures of household income and well-being, as well as Sustainable Development Goal (SDG) measures.
2. Country citizens who have direct and indirect welfare dependence on the TFCAs – these people benefit through the regulating services provided to the national economy, the national economic impacts of tourism and the opportunity to enjoy a range of cultural services. These benefits can be expressed as contributions to macro-economic indicators such as contribution to GDP, as well as other welfare or prosperity indicators not captured by GDP.
3. Citizens from other countries derive direct and indirect benefits from the TFCAs – these people benefit through a range of provisioning, cultural and regulating services. These benefits are often measured through a country's GDP through eco-tourism activities, but there exists also a willingness to pay variable, which is difficult to measure, and which relates to the unique and scarce features of TFCAs. A critically important example of a regulating service of international significance is the carbon sequestration and storage service provided by the TFCAs.

In summary, the study clearly shows that TFCAs provide real value in the form of ecosystem services and are therefore an irreplaceable ecological asset for the entire SADC region and the global community. While the study did not work with TFCA operating budgets, the values are likely to far exceed these and show a highly positive cost: benefit ratio.

Increasing Investment in TFCAs

The benefits that TFCAs provide are at risk from a range of hazards including land-use change, pollution, direct exploitation of species, climate change, and invasion of alien species and disease. Mitigation of these risks requires additional sources of investment from either the Member States, ICPs or new investment sources. Additionally, investment in TFCAs is also crucial to safeguard the capacity of the TFCAs to sustain the current flow of benefits as well as to potentially enhance any future flows.

While the legislative and institutional frameworks may not be ready for all the Member States, new, innovative financing investment types including the following should be investigated for possible implementation:

1. Debt for Nature Swaps;
2. Carbon Trading;
3. Biodiversity Offsets and Bio-banking;
4. Wildlife Conservation Bonds;
5. Payment for Water Catchment Services; and
6. Direct Investment.

These innovative financing mechanisms coupled with support from the Member States and ICPs, could go a long way toward securing the ecological assets that are the TFCAs, as well as safeguarding the current and future flows of benefits to society.

ACRONYMS

A	Annum/annually
AP	African Parks
CA	Conjoint Analysis
CBA	Cost Benefit Analysis
CESVI	Cooperazione e Sviluppo (Italian NGO)
CICES	Common International Classification of Ecosystem Services
CIRAD	Centre de Coopération internationale en recherche agronomique pour le développement
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CO ₂	Carbon Dioxide
COFACE	Compagnie Française d'Assurance pour le Commerce Extérieur
COMACO	Community Markets for Conservation
COVID	Coronavirus Disease
CPIC	Coalition for Private Investment in Conservation
CVM	Contingent Valuation Method
DEFRA	Department for Environment, Food and Rural Affairs
DOPA	Digital Observatory for Protected Area
ESA	Ecosystem Service Assessment
ESARO	Eastern and Southern Africa Regional Office of the IUCN
ES	Ecosystem Services
ESA	Ecosystem Service Assessment
ESG	Environmental, Social and Governance
EU	European Union
FAO	Food and Agriculture Organisation
FANR	Food Agriculture and Natural Resources
FDI	Foreign Direct Investment
FZS	Frankfurt Zoological Society
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GIZ	Gesellschaft für Internationale Zusammenarbeit
GLTFCA	Great Limpopo Transfrontier Conservation Area
GLTP	Greater Limpopo Transfrontier Park
GMTFCA	Greater Mapungubwe Transfrontier Conservation Area
GTZ	Gesellschaft für Technische Zusammenarbeit
ha	hectare
H4H	Herding for Health

HVM	Hedonic Valuation Method
ICP	International Cooperating Partner
IDRC	International Development Research Centre
IPBES	International Panel on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
KAZA	Kavango Zambezi
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
KNP	Kruger National Park
KZN	KwaZulu-Natal
LIMCOM	Limpopo Watercourse Commission
m ³	cubic metres
MCL	Mapungubwe Cultural Landscape
M&E	Monitoring and Evaluation
MDTP	Maloti Drakensberg Transfrontier Project
MEA	Millennium Ecosystem Assessment
METT	Management Effectiveness Tracking Tool
MoU	Memorandum of Understanding
MZTFCA	Malawi Zambia Transfrontier Conservation Area
NBT	Nature-based Tourism
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PA	Protected Area
PES	Payments for Ecosystem Services
PPF	Peace Parks Foundation
SADC	Southern African Development Community
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SDG	Sustainable Development Goals
SECAD	Selous Ecosystem Conservation and Development
SEEA	System of Environmental Economic Accounting
TCM	Travel Cost Method
TEEB	The Economics of Ecosystems and Biodiversity
TFCA	Transfrontier Conservation Area
TFP	Transfrontier Park
TNC	The Nature Conservancy
TUPNR	Transboundary Use and Protection of Natural Resources

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNSD	United Nations Statistics Division
URV	Unit Reference Value
USAID	United States Agency for International Development
USD	United States Dollar
WBG	World Bank Group
WildCRU	Wildlife Conservation Research Unit
WTTC	World Travel and Tourism Council
WWF	Worldwide Fund for Nature
yr	year
ZIMOZA	Zimbabwe-Mozambique-Zambia

TABLE OF CONTENTS

EXECUTIVE SUMMARY	II
ACRONYMS	VII
1 INTRODUCTION	1
1.1 THE TFCA CONCEPT	1
1.2 SADC'S MISSION STATEMENT FOR TFCAS.....	2
1.3 AIMS OF THE STUDY.....	3
1.4 STRUCTURE OF THE DOCUMENT.....	3
2 THE CURRENT STATE OF TFCAS	4
2.1 OVERVIEW.....	4
2.2 THE SOUTH AFRICAN AND ZIMBABWEAN EXPERIENCE.....	4
2.3 CURRENT FUNDING OF TFCAS	5
2.4 SUMMARY	7
3 DEMONSTRATING THE VALUE OF TFCAS THROUGH ECOSYSTEM SERVICES.....	8
3.1 DEFINITION OF ECOSYSTEM SERVICES.....	8
3.2 METHODOLOGY FOR DEMONSTRATING THE VALUE OF TFCAS	10
3.3 PROVISIONING SERVICES	12
3.3.1 <i>Direct Benefits to Communities</i>	12
3.3.2 <i>Rangeland Grazing</i>	15
3.3.3 <i>Cautionary Note</i>	18
3.4 CULTURAL SERVICES.....	18
3.4.1 <i>Nature-based Tourism</i>	18
3.4.2 <i>Recreational Hunting</i>	20
3.4.3 <i>Cultural Diversity</i>	22
3.5 REGULATING SERVICES	22
3.5.1 <i>Water Related Provisioning and Regulatory Services</i>	22
3.5.2 <i>Ecological Connectivity</i>	27
3.5.3 <i>Climate Regulation</i>	28
3.6 HABITAT SERVICES.....	30
3.6.1 <i>Habitat and Biodiversity</i>	30
4 RISK FACTORS AND DIVERSIFYING FUNDING OPTIONS IN TFCAS.....	31
4.1 IDENTIFYING BARRIERS TO INVESTMENT IN TFCAS	31
4.2 STABILITY AND RISK IN COUNTRIES HOSTING TFCAS.....	32
4.3 OVERCOMING RISK FACTORS	33
4.4 DIVERSIFYING FUNDING OPTIONS	34
4.5 ADDRESSING INVESTMENT RISKS.....	36
5 POSSIBLE INVESTMENT SOURCES FOR TFCAS.....	37
5.1 INVESTMENT TYPES.....	37
5.1.1 <i>Debt for Nature Swaps</i>	37
5.1.2 <i>Carbon Trading</i>	37
5.1.3 <i>Biodiversity Offsets and Biobanking</i>	38
5.1.4 <i>Wildlife Conservation Bonds</i>	38
5.1.5 <i>Payment for Water Catchment Services</i>	38
5.1.6 <i>Direct Investment</i>	39

5.2	RELATIONSHIP BETWEEN FUNDING TYPE, FINANCIAL RETURNS AND POSITIVE IMPACT.....	39
6	CONCLUSION	41
6.1	THE VALUE OF TFCAs AND NON-SUBSTITUTABILITY	41
6.2	TFCAs PROVIDE BENEFITS TO SOCIETY.....	41
6.3	INCREASING INVESTMENT IN TFCAs	42
6.4	WAY FORWARD	42
7	REFERENCES	44
8	APPENDIX 1: TFCA STATUS QUO	49
9	APPENDIX 2: TFCA SYSTEMS DESCRIPTION	55
9.1	/AI /AIS-RICHTERSVELD TRANSFRONTIER CONSERVATION AREA.....	55
9.2	CHIMANIMANI TRANSFRONTIER CONSERVATION AREA.....	57
9.3	GREAT LIMPOPO TRANSFRONTIER PARK	58
9.4	GREATER MAPUNGUBWE TRANSFRONTIER CONSERVATION AREA.....	60
9.5	IONA SKELETON COAST TRANSFRONTIER PARK	62
9.6	KAGERA TRANSFRONTIER CONSERVATION AREA	64
9.7	KAVANGO ZAMBEZI TRANSFRONTIER CONSERVATION AREA	66
9.8	KGALAGADI TRANSFRONTIER PARK	68
9.9	LIUWA PLAINS-MUSSUMA TRANSFRONTIER CONSERVATION AREA	69
9.10	LOWER ZAMBEZI-MANA POOLS TRANSFRONTIER CONSERVATION AREA.....	72
9.11	LUBOMBO TRANSFRONTIER CONSERVATION AND RESOURCE AREA	73
9.12	MALAWI-ZAMBIA TRANSFRONTIER CONSERVATION AREA.....	75
9.13	MALOTI-DRAKENSBERG TRANSFRONTIER CONSERVATION AND DEVELOPMENT AREA	77
9.14	MAYOMBE FOREST TRANSFRONTIER CONSERVATION AREA	79
9.15	MNAZI BAY-QUIRIMBAS TRANSFRONTIER MARINE CONSERVATION AREA	81
9.16	NIASSA-SELOUS TRANSFRONTIER CONSERVATION AREA	83
9.17	WESTERN INDIAN OCEAN TRANSFRONTIER MARINE PARK	85
9.18	ZIMBABWE MOZAMBIQUE ZAMBIA TRANSFRONTIER CONSERVATION AND RESOURCE AREA	87
10	APPENDIX 3: VALUATION METHODOLOGY	90
10.1	OVERVIEW.....	90
10.2	LINKING ECOSYSTEM ASSETS TO ECOSYSTEM SERVICES.....	91
10.3	TFCAs SECURE NATURAL CAPITAL, WHICH DELIVERS ECOSYSTEM SERVICES.....	92
10.4	VALUING NATURAL CAPITAL	93
10.5	A PERSPECTIVE ON ECOSYSTEM SERVICES VALUES OF TCFAs.....	93
10.6	METHODS USED FOR NATURAL CAPITAL VALUATION AND ECOSYSTEM SERVICES VALUATION.....	94
10.7	THE PROCESS TO BE FOLLOWED TO CONDUCT VALUATION	94

1 INTRODUCTION

1.1 The TFCA Concept

The loss of biodiversity is a cause for concern in maintaining healthy ecological functions in ecosystems (FAO, 2019). The five major changes driving an unprecedented increase in biodiversity loss over the last fifty years are: changes in how humans exploit land and sea, pollution, direct exploitation of species, climate change, and invasion of alien species and disease (IPBES, 2019; WWF, 2020) as illustrated in Figure 1-1.

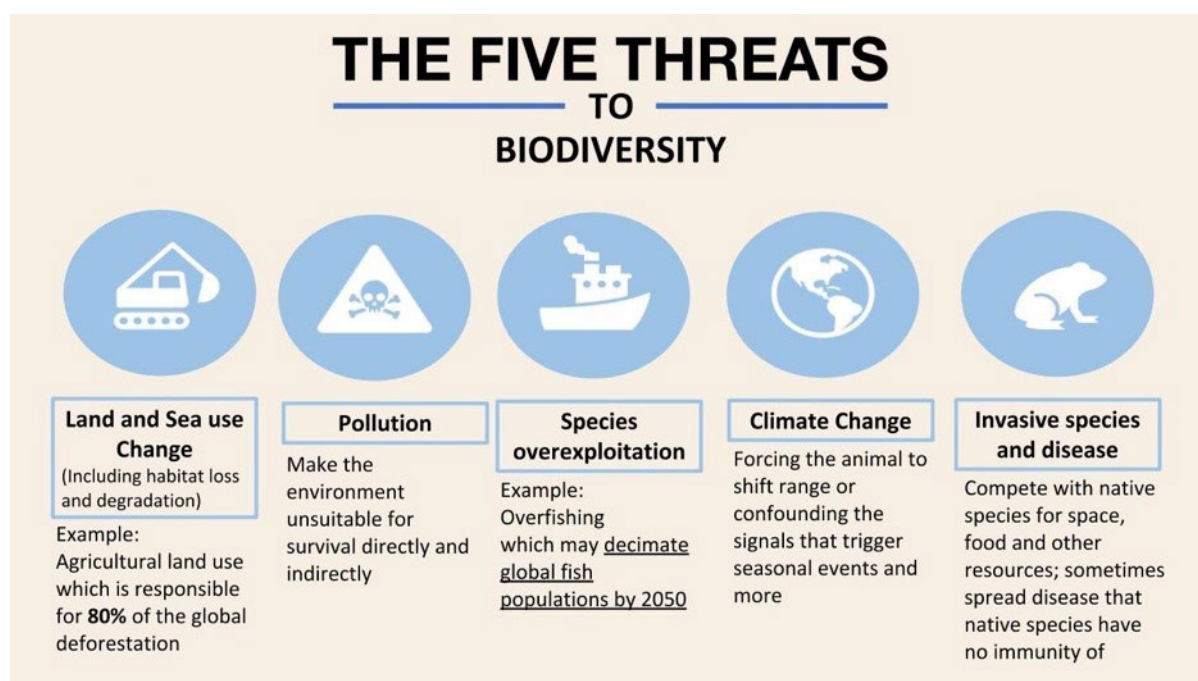


Figure 1-1. Largest threats to biodiversity as defined by the WWF (image sourced from Earth.org)

These changes exacerbate existing biodiversity-related challenges that weaken and reduce provisioning, supporting, regulating and cultural services. A few important examples of this include reduced capacity for water provisioning and diminished water quality, reduced climate regulation capacity, negative perturbations to food webs (including those to pollinators important for food production), and impoverishment of soil resources (WWF, 2020).

To meet the aspirational targets set in the Post-2020 Global Biodiversity Framework (CBD, 2021), purposeful multilateral action must be taken. The framework targets the conservation of 30% of global land and sea areas using robust spatial planning in an integrated, biodiversity-inclusive approach. This requires that nations understand regional dynamics in biodiversity and ecosystem function and look to conserve ecosystems in their entirety. The development of Transfrontier Conservation Areas (TFCAs) has been informed by this approach and has proven to be an effective tool for multi-national collaborative management and conservation of shared natural and cultural resources.

As a regional approach to landscape-level conservation, the Southern African Development Community (SADC) has adopted the concept of TFCAs. This is defined in the Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement (1999) as a component of a large ecological region that straddles the boundaries of two or more countries encompassing one or more protected areas and multiple resource use areas. In the SADC region, there are 18 existing or

potential TFCAs across both terrestrial and marine environments covering approximately 1 000 000km² (Figure 1-2). Southern Africa's TFCAs incorporate over half of the declared conservation estate in the region. TFCAs have been grouped into three categories based on their level of development:

1. Category A (TFCAs with a Treaty or other form of legally binding and mutually recognised agreement);
2. Category B (TFCA with a Memorandum of Understanding – MoU); and
3. Category C (TFCAs at a conceptual stage).

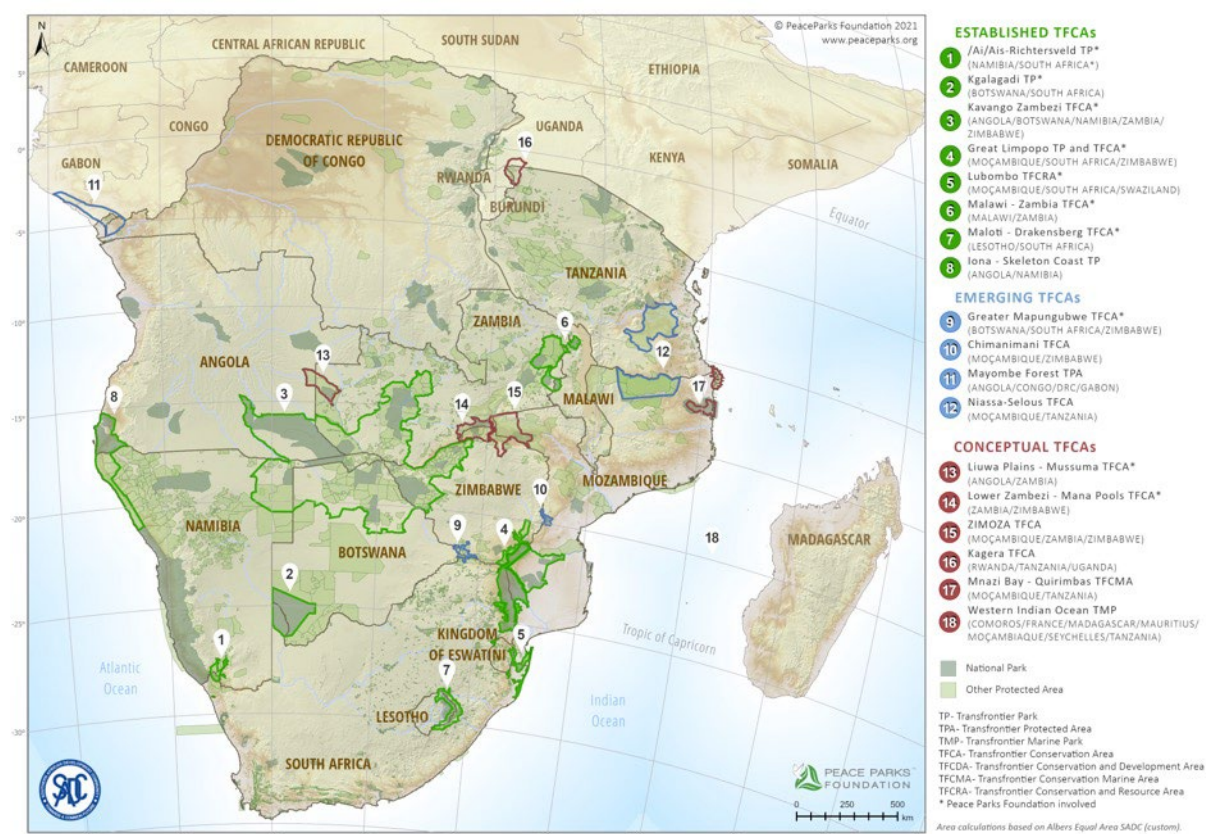


Figure 1-2. Location of SADC's transfrontier conservation areas (TFCAs) (Source: PPF, 2021)

1.2 SADC's Mission Statement for TFCAs

The SADC mission statement for TFCAs is to develop a functional and integrated TFCA network where shared natural resources are sustainably co-managed and conserved to foster socio-economic development, and regional integration for the benefit of people living within and around TFCAs, the SADC region, and the world (SADC, 2013).

Furthermore, SADC views TFCAs as a means of creating an enabling environment for communities to participate in local decision-making processes and provide increased opportunities for investment in income-generating activities. These actions will improve local economies, which will lead to poverty reduction and greater levels of prosperity and resilience.

The positive ecological effects of well-managed TFCAs further enhance the functionality of ecosystems and their capacity to provide the necessary goods and services required to support the socio-economic prosperity of the region through a unique level of regional cooperation amongst participating countries.

1.3 Aims of the Study

The overarching objective of the assignment was to demonstrate the value that TFCAs provide to societies and economies. This was achieved by utilising an ecosystem service assessment (ESA) framework which identifies the linkages between the ecological asset (the TFCA estate), the subsequent delivery of ecosystem services and the benefits provided. Overall, the approach is a broad view of the value proposition for all SADC TFCAs, drawing on case studies which provide a holistic view of the different values present.

The final output provides the SADC Member States with a value proposition for the TFCA estate which can be used to leverage additional and sustained support from International Cooperating Partners (ICPs) as well as the Member States themselves.

The intended audiences of the report are the Member States, TFCA staff, politicians, decision-makers and investors with incentives and mandates for making sustainable long-term investments in TFCAs. Together with this technical report, a concise, user-friendly summary document is available.

1.4 Structure of the Document

The technical document is structured as follows:

- Section 1: A definition and overview of TFCAs and the aims of the document.
- Section 2: The status quo of TFCAs, the current funding modalities and a partial summary of the projects funded by International Cooperating Partners (ICPs).
- Section 3: A selection of case studies at different TFCAs demonstrating their value using an ecosystem service assessment (ESA) framework.
- Section 4: Identifies barriers to investment, overcoming risk factors and options for diversifying investment streams.
- Section 5: Provides details on different innovative financial mechanisms for potentially increasing the funding of TFCAs.
- Section 6: Provides a summary as well as the way forward for funding.

2 THE CURRENT STATE OF TFCAS

2.1 Overview

While TFCAs are potential engines of sustainable, economic, and social development in SADC, the sustainability of the TFCAs in themselves has been questioned. Member States do provide a portion of the budget required for the effective management of their protected areas, but besides these core contributions, the collaborative management of TFCAs remains largely dependent on support from International Cooperating Partners (ICPs) which includes donors and large international non-governmental organisations (NGOs).

To date, it has been difficult to quantify the benefits generated by these areas and the advent of the COVID-19 pandemic has illustrated the vulnerability of their dependence on the tourism income stream. Resilience needs to be built into the conservation models underlying TFCAs and this should ideally be motivated by the full value that TFCAs have within the region with funding supporting initiatives linked to this. It is therefore important to unveil more of the benefits and values to stakeholders at all scales; as well as to attract sustainable support from governments, donors, and private sector stakeholders; specifically, investors. Updated information on the state of TFCAs in terms of their current financing streams, governance structures and other salient features is provided in Appendix 1: TFCA STATUS QUO.

Across the region, the impact of TFCAs has been characterised by ebbs and flows, largely dependent on donor funding and support. Support from the SADC member states has been significant, with the TFCA office in the SADC Directorate of Food Agriculture and Natural Resources (FANR) leading the way internationally regarding the formalization of TFCA initiatives, as well as, setting up regional, national, and in-country structures to guide the implementation of conservation, community, and business development opportunities.

2.2 The South African and Zimbabwean Experience

The value of TFCAs is deeply embedded within individual partner states as evidenced by South Africa and Zimbabwe. Within South Africa, the Department of Forestry, Fisheries, and the Environment (DFFE), has been effectively implementing the SADC Transfrontier Conservation Areas Programme, working in collaboration with her partner countries. Since the birth of the SADC TFCA Programme, the Department ensured that a dedicated TFCA Unit was established with the mandate of focusing on the implementation of the SADC TFCA Programme. The establishment of the dedicated unit has proven to be beneficial in ensuring that the country effectively coordinates and facilitates all activities related to the six TFCAs that South Africa is a party to (A. Seepersadh, Personal Communication, May 20, 2022).

Similarly, Zimbabwe has placed the TFCA programme at the forefront of its conservation toolbox due to several reasons, including but not limited to:

- Zimbabwe's unique situation as a country with the second-largest population of elephants in the world, a species that requires huge home ranges beyond protected area boundaries.
- The TFCA initiative, apart from the elephant habitat requirements, also secures Zimbabwe's growing population of wide-ranging species of large carnivores such as wild dog, lions, and cheetah.

- The institutional structures and mechanisms that come with the establishment of TFCAs at the national level have become important fora for multi-stakeholder collaboration for conservation; even in areas where the CAMPFIRE institutions have weakened over years due to various factors.
- Financing the TFCA agenda has increasingly become a convening factor bringing key players together for conservation and tourism development. The socio-economic challenges and limited options for financing conservation and community developmental initiatives that Zimbabwe has faced for decades, have also catalysed innovation in the TFCA space as the various cross-border tourism products incubated, despite being executed at low frequency, bring so much hope and possibilities in a world with scarcity. (P. Gandiwa, Personal Communication, May 20, 2022).

Gandiwa (2022) states further that *“For Zimbabwe, the conservation agenda is always pursued beyond boundaries and TFCAs have been embraced as the most appropriate and innovative special purpose vehicle to achieve several sustainable development goals and national obligations under various bilateral/multilateral environmental agreements.”*

2.3 Current Funding of TFCAs

At the SADC level, structures for regional collaboration and cooperation have been established, aimed at optimising the impact of initiatives at a transboundary scale, including climate change adaptation and mitigation, law enforcement and anti-poaching, regional tourism promotion, community development and joint funding opportunities. Regular discussions, meetings and publications characterise this approach while at the field level, specific initiatives are being implemented such as joint law enforcement patrols and information and intelligence sharing.

As a result, SADC has been able to mobilise substantial ICP funding over the past two decades, some for regional initiatives and programmes, while others were dedicated to specific TFCAs or protected area components within TFCAs. In a recent attempt to create a database of all ongoing and planned development initiatives in SADC TFCAs, the SADC/GIZ Transboundary Use and Protection of Natural Resources (TUPNR) Project conducted a mapping exercise that found a total of 190 initiatives in TFCAs with a total budget exceeding EUR 600 million (GIZ, 2021). The German Federal Ministry for Economic Cooperation and Development (BMZ) through the Kreditanstalt für Wiederaufbau (KfW) and Gesellschaft für Internationale Zusammenarbeit (GIZ) has contributed and will continue to contribute approximately EUR 202 million to the SADC TFCA programme over the period 2003 – 2025 (GIZ and KfW, 2022).

The Malawi Zambia TFCA has leveraged substantial funding for conservation projects, such as from the World Bank Group (WBG), KfW and GIZ for each of the partner states; as well as specific funding for areas such as Nyika National Park, Vwaza Marsh, the Chama Block and North Luangwa National Park through the Frankfurt Zoological Society (FZS) and Peace Parks Foundation (PPF).

The Great Limpopo TFCA has leveraged significant support for project components, such as protected area development and support from PPF for Limpopo, Banhine and Zinave National Parks in Mozambique; and FZS for park operational support and species reintroduction in Gonarezhou National Park in Zimbabwe; and rhino protection and protected area integrity support in the Kruger National Park (KNP) in South Africa.

A (full-size) Global Environment Facility (GEF) project was initiated in 2019 to build skills in integrated transboundary river basin management in the Limpopo River Basin. With funding from USAID through the Resilient Waters Programme, projects have been coordinated by the Limpopo Watercourse Commission (LIMCOM) and include robust stakeholder engagement during the development of the Integrated Water Resources Management (IWRM) Plan to ensure that the plan is sustainable and speaks to the needs of all stakeholders. Further to this, the on-going stakeholder engagement plan is anticipated to cover livelihood strategies for stakeholders in the catchment.

Within the Kavango Zambezi (KAZA) TFCA, funding has been leveraged from several ICPs for institutional, protected area and community engagement support: such as KfW, United Kingdom's Department for Environment, Food and Rural Affairs (DEFRA), the European Union (EU) and United States Agency for International Development (USAID). Support has also been leveraged from NGOs such as National Geographic, World Wide Fund for Nature (WWF); PPF; African Parks (AP); The Nature Conservancy (TNC); Panthera; and Wildlife Conservation Research Unit (WildCRU) for various support initiatives between and within TFCA partner states (See Box 2-1 for more information on the funding modality of KAZA).

No direct funds have been received for the Niassa-Selous TFCA at this juncture. However, during the last quarter of 2021 indirect support for the TFCA was forthcoming. This was from two main sources; KfW provided funds for WWF via Selous Ecosystem Conservation and Development (SECAD), and funding for specialist consultants was mobilised by the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and United Nations Environment Programme (UNEP).

Other TFCAs have been mainly supported through ad-hoc technical support from various donors including WWF, PPF, GIZ, EU, WBG, and Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD).

In support of these landscape level conservation initiatives, two regional funding opportunities have been established, the first being the KfW supported SADC TFCA Financing Facility aimed at supporting transboundary conservation initiatives. The second is the Legacy Landscape Fund launched by the British Government through DEFRA. USAID has focussed on ensuring resilience within the Limpopo, Okavango, and Zambezi River basins through the Resilient Waters programme, covering several TFCAs in their support initiatives. In addition, USAID is supporting anti-poaching and law enforcement activities in KAZA, Great Limpopo and Malawi-Zambia TFCA, as well as the North-West region of Namibia which includes part of the Iona-Skeleton Coast TFCA.

Box 2-1. The KAZA Fund: Funding Modality for the Kavango Zambezi (KAZA) TFCA

Within the context of KAZA, the partner states drew from the KAZA Treaty to establish the KAZA Fund as a mechanism to focus and channel the support from the various partner states toward coordinated cooperation and integration of efforts within the entire TFCA. The KAZA TFCA Fund is a creation of the KAZA Treaty and therefore part of the institutional arrangements for the development of KAZA. The fund comprises contributions from the Partner States and receipts from other sources, including the private sector, civil society, and NGOs. Partner States have developed a KAZA Fund Constitution to outline the rules and procedures for the management of the Fund and have further committed to annual contributions towards supporting the operations of the KAZA Secretariat - the TFCA's coordination and facilitation hub. Partner States' annual contributions are key to financing operational costs of the Secretariat such as salaries of the core staff (i.e., non-project-based staff), professional fees incurred, Secretariat workshops and meetings, travel, accommodation, office running and marketing costs as well as capital costs that are not tied to and thus funded by donors, international cooperating partners, and implementing partners. In this way, Partner State contributions augment funds by international cooperating partners by ensuring that such investments go towards programmatic needs and priorities as opposed to operations. (N. Nyambe, Personal Communication, May 20, 2022).

2.4 Summary

In summary, SADC TFCAs remain largely dependent on external funding through ICPs as well as support from the Member States. Although they have been mooted as being a great opportunity for tourism development and associated benefits to neighbouring communities, few have been able to track the extent to which these benefits have materialised. Considering that transfrontier collaboration comes at an additional cost to that of national conservation efforts and that the latter are significantly underfunded (IUCN ESARO, 2020), it is understandable that the SADC TFCAs have a long way to go to generate their own income and become less financially dependent on ICP support.

3 DEMONSTRATING THE VALUE OF TFCAS THROUGH ECOSYSTEM SERVICES

3.1 Definition of Ecosystem Services

Ecosystem services are the many and varied benefits that humans obtain from the natural environment and from properly functioning ecosystems - for free (TEEB, 2010). The present concept of ecosystem services was first defined and described in detail by the United Nations' "Millennium Ecosystem Assessment" (MEA 2005). Since the inception of the MEA, there have been several ecosystem service assessment (ESA) frameworks which further disaggregate and classify the benefits people derive from ecosystem services, to allow for a thorough assessment of their economic value. The most utilised of these ESA frameworks include:

- The Economics of Ecosystems and Biodiversity (TEEB, 2010);
- Common International Classification of Ecosystem Services (CICES) (Haines-Young & Potschin, 2018); and
- The International Panel on Biodiversity and Ecosystem Services (IPBES, 2019).

From these ESA frameworks, a comprehensive list of ecosystem services based on the MEA and TEEB frameworks has been developed (Table 3-1) and is used as the basis for the identification of ecosystem services delivered by the TFCA conservation estate and the subsequent valuation thereof.

Table 3-1. The categories of ecosystem services (ES) (adapted from MEA & TEEB)

Category of ecosystem services	Types of services in the category	Description
Habitat	Maintenance of genetic services	Natural habitats allowing natural selection processes to maintain the vitality of the gene pool.
Regulating	Air quality regulation	Ecosystems both contribute and extract chemicals from the atmosphere that influence many aspects of air quality.
	Climate regulation	Ecosystems influence climate both locally and globally. At a local scale, changes in land cover can affect both temperature and precipitation. At a global scale, ecosystems play an important role in the carbon cycle by either sequestering or emitting greenhouse gases.
	Water regulation	The timing and magnitude of runoff and flooding can be strongly influenced by changes in land cover, including alterations that change the water storage potential of the system such as the conversion of wetlands or the replacement of natural land cover with croplands or with urban areas. Water regulation is also relevant to groundwater, including baseflow, near-surface water flows, recharge of aquifers and salinisation of groundwater.
	Erosion regulation / sediment movement	Sediment movement is an important ecological process which can be disrupted either by excessive (more than natural) erosion or obstruction of sediment movement pathways.
	Water purification and waste treatment	Ecosystems can be a source of impurities in freshwater but also can help to filter out and decompose organic wastes introduced into inland waters and coastal and marine ecosystems.

Category of ecosystem services	Types of services in the category	Description
	Disease regulation	Changes in ecosystems can directly change the abundance of human pathogens such as cholera and can alter the abundance of disease vectors such as mosquitoes.
	Pest regulation/Biological control	Ecosystem changes affect the prevalence of crop and livestock pests and diseases.
	Pollination	Ecosystems that support pollinators are important to the success of economies and genetic diversity. Refers to animal-assisted pollination, done by bees, rather than wind pollination.
	Detoxification	Biological processes are involved in the sequestration or detoxification of various chemical wastes introduced into the environment.
	Natural hazard regulation	Such as storm protection, the presence of coastal ecosystems such as mangroves and coral reefs can dramatically reduce the damage caused by hurricanes or large waves.
Provisioning	Food	Provision of food from crops, livestock, marine and freshwater capture fisheries, aquaculture or wild plant and animal food products.
	Fresh water	Ecosystems provide storage and retention of water for domestic, industrial, and agricultural use, especially in the absence of water treatment infrastructure.
	Wood and fibre	Direct benefits from wood for timber and pulp, biomass energy (fuelwood and charcoal consumption) and from the production of agricultural fibres such as cotton, silk, and hemp.
	Biochemical and pharmaceutical products	Ecosystems provide natural products that have been used for biochemicals and pharmaceuticals and other natural products (such as cosmetics, personal care, bioremediation, biomonitoring, and ecological restoration.
	Genetic resources	The exploration of biodiversity for new products and industries, such as medicine, genes for plant pathogen resistance or ornamentals. Conserving genetic diversity maintains the potential to yield larger future benefits and ensures options for adapting to changing environments.
Cultural	Cultural diversity	The diversity of ecosystems is one factor influencing the diversity of cultures and the identity of specific cultures.
	Spiritual and religious values	Many religions attach spiritual and religious values to ecosystems or their components.
	Knowledge systems (traditional and formal)	Ecosystems influence the types of knowledge systems developed by different cultures.
	Educational values	Ecosystems and their components and processes provide the basis for both formal and informal education in many societies.
	Inspiration	Ecosystems provide a rich source of inspiration for such activities as art, folklore, national symbols, architecture, and advertising.

Category of ecosystem services	Types of services in the category	Description
	Aesthetic values	Many people find beauty or aesthetic value in various aspects of ecosystems, as reflected in the support for parks, 'scenic drives and the selection of housing locations.
	Social relations	Ecosystems influence the types of social relations that are established cultures. Fishing societies, for example, differ in many respects in their social relations from nomadic herding or agricultural societies.
	Sense of place	Many people value the 'sense of place' that is associated with recognized features of their environment, including aspects of the ecosystem.
	Cultural heritage values	Many societies place high value on the maintenance of either historically important landscapes ("cultural landscapes") or culturally significant species that serve to remind us of our historic roots.
	Recreation and ecotourism	People often choose the location for spending their leisure time based in part on the characteristics of the natural or cultivated landscapes in a particular area.

3.2 Methodology for Demonstrating the Value of TFCAs

Assessing the values of TFCAs can be a complex task, considering the range of values and their perceived importance by different stakeholders. This complexity is amplified by the large number of countries involved, the difference in underlying legislative conditions and diverse land and resource uses. Developing a methodology which takes cognisance of these differences, is difficult and is compounded by the numerous methodologies available. In the interest of simplicity and repeatability, the authors have employed an Ecosystem Service Assessment (ESA) approach based on the MEA, TEEB, and the United Nations Statistics Division's (UNSD) System of Environmental Economic Accounting (SEEA) (Please see Appendix 3 for further explanation). The approach is underpinned by the relationship between ecological assets (in this case the TFCAs themselves) and their delivery of ecosystem services to society and the subsequent social and economic benefits they provide.

In summary, the methodology contains the following steps:

- 1. Systems Description:** The purpose of the systems description is to understand the key features of each of the 18 existing TFCAs. The information was used to build a profile of the entire SADC TFCA estate and to understand at a high-level, how each of the TFCAs contributes to human well-being through the identification of ecosystem services (APPENDIX 2: TFCA Systems Description).
- 2. Ecosystem Service Prioritisation:** The identified ecosystem services across the individual TFCAs were then aggregated into a single prioritised list representative of all TFCAs. This list of prioritised ecosystem services was then presented at the SADC Consultative Workshop with the Working Group Members on the 3rd of March 2022. On the advice of the Working Group, additional ecosystem services were added. The list of prioritised ecosystem services is given in Figure 3-1 below.

3. **Demonstration of the Value of TFCAs:** Using the list of prioritised ecosystem services, a literature survey was conducted, and case studies were identified which demonstrate the value of ecosystem services in TFCAs. The case studies were sourced from available literature and presented at the SADC Consultative Workshop on the 3rd of March 2022. Additional case studies were then incorporated into the draft documents. The results of the valuation discussion are given in Sections 3.3 - 3.6 below.

Figure 3-1 below shows the method used for the assignment. In summary, the asset, in this case, the TFCAs themselves, are comprised of several smaller ecological assets such as woodlands, wetlands, grasslands, river systems etc. These ecological assets provide a suite of ecosystem services, which in turn provide benefits to society through various economic sectors. The list of ecosystem services is shown below and is based on the prioritisation exercise (Step 2). The arrows represent the flow of benefits as well as the complexity and linkages that the entire complex socio-ecological system provides to society.

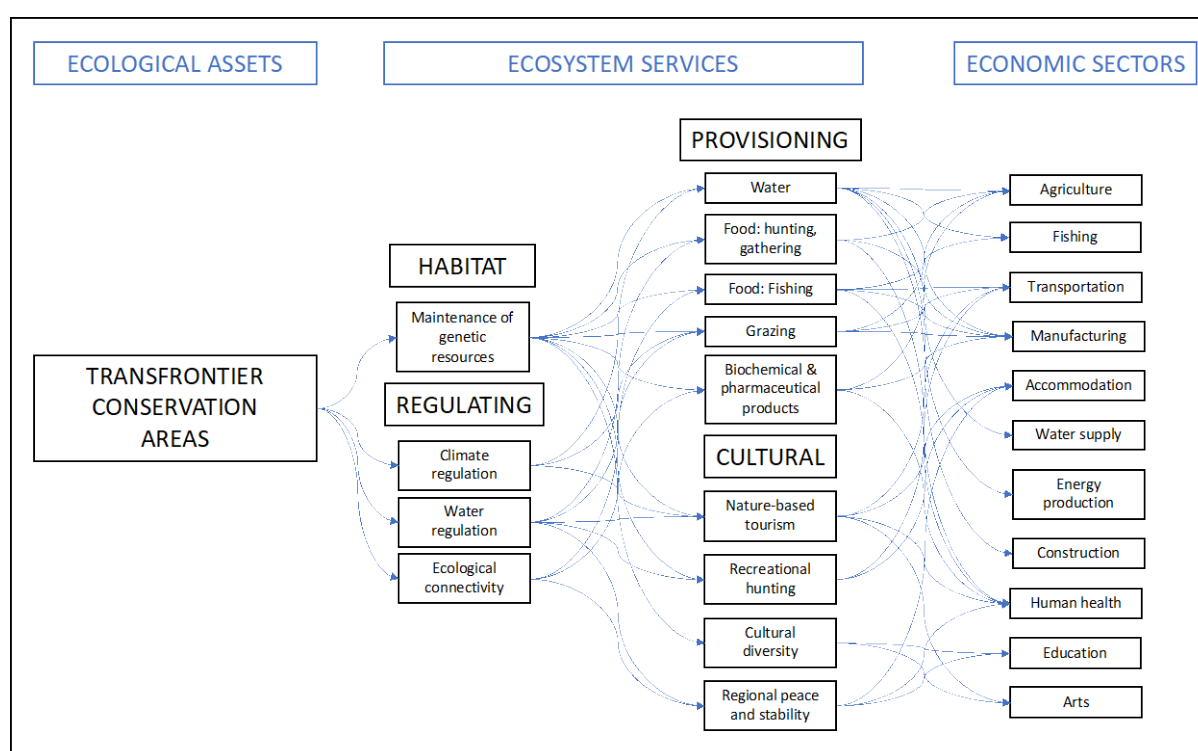


Figure 3-1. The ecosystem service assessment model shows the relationship between the ecological assets (TFCAs), the delivery of ecosystem services and the benefits that accrue to society through different economic sectors. The main components of the ESA model are underpinned by the Millennium Ecosystem Assessment (MEA, 2005), The Economics of Ecosystems and Biodiversity (TEEB, 2010) and the United Nations Statistics Division's (UNSD) System of Environmental Economic Accounting (SEEA)

3.3 Provisioning Services

Provisioning Services are those ecosystem goods that humans extract, and directly benefit from nature and include clean water, food (wild edible fruits, leaves, seeds, and roots), medicine, materials for building, fodder for livestock and genetic materials that ecosystems provide. Generally, provisioning services are related to the material benefits of ecological assets, whereas the other types of ecosystem services are related to the non-material benefits of environmental assets.

3.3.1 Direct Benefits to Communities

3.3.1.1 Underlying Assets

The underlying asset of this service is the plethora of biodiversity that exists on Earth. Numerous species have known uses and market values, but those that do not, have option value for future discovery and use. Currently, the assets most valued include those floral and faunal species that make up crops, marine and freshwater species caught for subsistence or small and large-scale fisheries (See Box 3-1), aquaculture, wild plant and animal food products including wild game and bush meat. Beyond those goods consumed as food, many humans benefit by harvesting wood for timber and pulp, biomass energy (fuelwood and charcoal), fibres such as cotton, silk and hemp, and minerals such as oil, coal, iron, diamonds, and other materials harvested from underground. Most, if not all, biochemicals and pharmaceuticals (Box 3-2), including cosmetics, come from biological goods or did at one time, including the many medicinal plants that are still harvested from the wild today. Lastly, the earth's remaining biodiversity allows for exploration for new products and industries such as medicines, genes for plant pathogen resistance or ornamentals. Conserving genetic diversity maintains the potential to yield larger future benefits and ensure options for adapting to changing environments. It is important to recognise that in addition to this, most supporting and regulating services play a crucial role in maintaining this vast diversity of plants and animals that humans currently utilise.

Box 3-1. Freshwater and marine fishing in TFCAs

Within Africa, the value added by the fisheries sector in 2011 was estimated at more than US \$24 billion, or 1.26 percent of the GDP of all African countries. Detailed figures by subsector highlight the relevance of marine artisanal fisheries and related processing, and of inland fisheries, which contribute one third of the total catches in African countries. Aquaculture is still developing in Africa and is mostly concentrated in a few countries, but it already produces an estimated value of almost US \$3 billion per year (de Graaf & Garibaldi, 2014). Extrapolating this information to the TFCA level is difficult and although it is known that both freshwater and marine fishing occurs in TFCAs, there are limited available studies on these activities. For freshwater and marine fishing activities in TFCAs, most fishers would most likely fall in the artisanal fishing categories which is defined by the FAO (2018) as 'traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amounts of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption'. Freshwater fishing in KAZA (Okavango Delta), Lubombo (iSimangaliso Wetland Park) and several other TFCAs would most likely be for subsistence and small-scale commercial activities. Near-shore marine fishing activities are likely to occur in Lubombo, Iona-Skeleton, Mnazi Bay – Quirimbas, while deep sea, commercial fishing is likely to occur in the Western Indian Ocean Transfrontier Marine Park (TFMP).

3.3.1.2 Beneficiaries

In Africa, despite being heterogeneous in their spatial distribution, provisioning services play an exceptionally important role across the continent as a high proportion of the African population lives in

rural areas within and surrounded by nature, and thus accrue the benefits of harvesting nature's goods directly (i.e., independent of any formal market trade or industry). Through the harvesting and collection of ecosystem goods, individuals may contribute to their livelihoods and well-being all while having very little impact on the health of and continued provisioning by such ecosystems.

TFCAs, where most of the land has largely not been altered from its natural state, provide a multitude of benefits to communities both within and beyond their borders. Studies from across Southern Africa indicate that provisioning services can account for a third of household income on average but can range from 10% to over 50% (Twine et al. 2003, Shackleton et al. 2008). The safety net function - where nature's goods provide subsistence in times of shock or disturbance such as drought, floods, disease, or family deaths (which many rural African households are more susceptible to) is further evidence that provisioning services have values far beyond those our traditional markets account for (Twine et al. 2003, Guerbois and Fritz 2017). One study (Lynam et al. 2003) demonstrated that a village consisting of between 45-100 households could rely on an area up to 300 km² to obtain natural provisions, highlighting the value of healthy natural landscapes for provisioning services.

While it is often assumed that the harvesting of natural resources and conservation of biodiversity and ecosystems result in competing and thus conflicting land-use objectives, there are numerous examples where ecosystem provisioning can support communities while conservation objectives are being met (Lynam et al. 2003) – this is an important proviso for protected area managers and for TFCAs in particular, which often do not just span political boundaries but also span the boundaries between formal protected areas and community conservancies or communal lands and villages.

Box 3-2. The potential of the bioprospecting sector in TFCAs

*Bioprospecting is the systematic search for biochemical and genetic information in nature to develop commercially valuable products for pharmaceutical, agricultural, cosmetic, and other applications. Bioprospecting activities must comply with the definition of utilization of genetic resources of the Nagoya Protocol or as stated in the national law or policy. The Nagoya Protocol applies to the utilization of genetic resources and their derivatives (UNDP, 2016). Within several countries in SADC, bioprospecting is seen as a driver for community livelihood development as well as safeguarding national resources from external exploitation. A successful example is the benefit sharing agreement signed between the Rooibos industry and the Khoi and San indigenous communities in South Africa. The monetary benefit involves an annual levy of 1,5% on the farm gate price, which accrues to the Khoi and San communities (Schroeder et al. 2019). This case study shows how the benefits could accrue to communities in TFCAs and how the mechanism could be structured. TFCAs, provide a vast repository of market ready genetic materials e.g., baobab (*Adonsonia digitata*), Devil's Claw (*Harpagophytum procumbens*) and marula (*Sclerocarya birrea*), as well as many other species which could have potential. In particular, the market for baobab products such as powder and oil has shown considerable growth in the European market.*

3.3.1.3 The Value of Provisioning Services

Various case studies have been conducted to estimate such contributions to household wellbeing, and the relative contribution of these provisioning services to household wellbeing is significant (Box 3-3). In forest biomes, the value of provisioning services can be up to 2.8 times that of the grazing value (Maua et al. 2019). In savanna biomes, the value of provisioning services can be up to 2.0 times that of the household cash income (Moynihan et al. 2022). It is to be noted that these multiplier effects would vary spatially across the TFCA estate, depending on rainfall, soil types, vegetation cover and biome type.

Expressed as a land value, the value of these types of provisioning services can be as high as US\$7 000/ha in the most productive biomes (derived from Maua et al. 2019).

Box 3-3. Value of Provisioning Services in the Greater Limpopo TFCA

Twine et al. (2003) calculated a mean annual direct-use value of US \$627 (adjusted for 2021) per household across three villages in Limpopo, South Africa, which in many instances is almost as great as the total household income per annum from other income sources (Table 3-2). In this case study, data were collected using household surveys from 110 households, participatory rural appraisals and key informant interviews and responses were compared to socio-economic status and other household indicators to better understand if natural resource use was due to reliance or was a household choice. Measuring consumption of all goods harvested from nature per household and using informant and appraisal information on the value of goods per unit, allowed for the calculation of a Total Direct Use Value of natural resources per household. One important finding from this study was that households with the lowest incomes were not necessarily those that used the most resources, and many households chose to use fuelwood even when electricity was available and they could afford it, indicating that ecosystem provisioning is not just valuable for those living in poverty, but can be a selected strategy or cultural choice for a household. It should be noted that the Twine et al. (2003) study was conducted in the Greater Kruger Region, an area that is considered peri-urban with high population densities and as such, valuations in more rural or naturally vegetated areas with lower population densities may yield even higher economic values.

Table 3-2. Percentage of 110 households using each natural resource represented as a mean across three villages located in Limpopo Province, South Africa; as well as the total direct use value of each resource type per household (Adapted from Twine et al. 2003)

Resource	Mean Percentage of Households	Direct Use Value (Dollars) 2021
Wooden utensils	100	4,6
Grass hand brooms	100	3,9
Twig hand brooms	100	2,9
Fuelwood	97	93,1
Wild herbs	97	244,8
Wild fruit	95	162,7
Edible insects	93	89,6
Fencing poles	83	7,5
Weaving reeds	82	11,1
Fish	60	
Bushmeat	56	5,6
Housing poles	54	0,6
Medicinal plants	52	
Thatching grass	47	1,4

3.3.2 Rangeland Grazing

3.3.2.1 Overview of Grazing in Africa

Africa's rangelands cover 43% of the continent (13.2 million km² sq.) and support an estimated 50 million pastoralists. Regrettably, 90% of these rangelands are degraded, destroying water catchment functions, and driving poverty traps for livestock farmers throughout Africa. Africa currently has over 700 million hectares of degraded lands, which serve as a challenge for the climate and food security of the continent..." Additionally "... rangeland and associated river systems essential for food security will be more susceptible to devastating impacts of climate change. There are several demonstrated successes across Africa, where cooperative planned grazing results in improved livestock condition, more land available for crop production, as well as healthier livestock for red meat markets. This can fundamentally shift the resilience of rural communities and alleviate poverty for households working across the value chain. There are also emerging studies that show that managed grazing can reduce the risk of wildlife-livestock conflict, augment carbon sequestration, increase biodiversity, and improve water system functioning (S. Frazee, personal communication, March 22, 2022).

3.3.2.2 The Herding 4 Health Model

Using primarily principles of the One Health concept the Herding 4 Health (H4H) model was developed through the Faculty of Veterinary Science of the University of Pretoria (UP) to address the complex of challenges faced by the wildlife-livestock interface in TFCAs in an integrated and practical way. The model was tested as a pro-poor, rural development project which aims to respond to these and other pressing challenges. In 2017 PPF and CI initiated the Herding 4 Health Programme as a vehicle to scale the H4H model as a support programme to partners wanting to implement the model. Herd monitors and ecorangers with knowledge of primary animal health, livestock, and environmental management; work with scientists, local government departments, and communities to improve livestock production, while restoring degrading rangelands.

In addition, the H4H partners also support local farming cooperatives to take advantage of economic opportunities and improve their livelihoods. This was built on a decade's worth of experience in studying, developing, and implementing integrated rangeland management, restoration, and stewardship approaches at the landscape level within three southern African biomes and biodiversity hotspots - succulent karoo, mesic grassland, and semi-arid savannahs. These sites were the testing ground for the implementation of rangeland management strategies in partnership with communal livestock farmers in some of the most rural, impoverished yet biodiverse environments of the region; with the successes pivoting on the conservation agreements mechanism developed by Conservation International, which provides economic and other incentives or benefits to communities to improve management of their natural resources (Southern African Development Community, 2022), (University of Pretoria, 2022).

The broad AfD and Conservation International funded project, named *the Pro-nature Enterprises for the People of Southern Africa*, will provide a range of incentives and support to rural communities envisaged to be rolled out over a six-year period in parts of the Great Limpopo and Kavango-Zambezi TFCAs to adopt sustainable practices that regenerate grass and water, reduce costly losses of wildlife and livestock, and bring down high poverty rates. As such the project seeks to address the challenges that rural communities living in and around wildlife areas face in building viable livelihoods out of their livestock, land, and other resources (Conservation International, 2022). The Herding for Health

Programme aims to improve the *“functioning, resilience, and livelihoods for people, livestock, wildlife and land, though better holistic understanding and management of rangelands and livestock on those lands.”* Through discussions and community workshops revolving around “Doctors of the Land” the need to offer skills development training and career paths was determined by Conservation International and Peace Parks Foundation. Professional Herder and Ecoranger training courses were developed and piloted by the Herding Academy, associated with the SA College of Tourism, and the Southern Africa Wildlife College (Southern African Development Community, 2022). The Herding Academy is positioned to play a leading role in instilling knowledge and skills regarding the principles underlying the restoring of livelihoods and landscapes within rangelands through various training and awareness programmes regarding regenerative and restorative land management practices it facilitates throughout the region.

The aim of the implementation of the Herding for Health concept is that through negotiated conservation and stewardship agreements, *“rural communities will voluntarily commit to implement planned grazing of their livestock to minimize overgrazing, remove invasive vegetation that hamper grass growth and water availability, adopt human-wildlife conflict mitigation practices, and adopt sustainable fisheries practices among other measures identified in consultations with local actors. In turn, they will receive support to improve quality of their livestock, reduce animal losses from wildlife predators, and access facilitated livestock markets...”* Moreover, these projects support communities to initiate investable community-based, “nature-friendly” rural enterprises that can deliver environmental and social outcomes. This will include strengthening partnerships with private sector and impact investors (Conservation International, 2022).

The professional herders or Ecorangers that are trained and skilled through the programme are taught a variety of skills such as humane livestock handling and management, planning and recording keeping, tracking of wildlife that could be harmful to livestock, understanding climate change, and much more. This allows Ecorangers to fulfil a key role in conservation landscapes, ensuring rangeland regeneration, meeting the needs of livestock and wildlife, and improving the livelihoods and resilience of rural communities within multi-functional landscapes as tangible working social-ecological systems. For example, in rural villages multiple landscape functions typically overlap and co-exist, such as residence, cultivation, free-range pastoral livestock production, cultural and religious activities, tourism, and trading, while also providing ecological goods and services like water, grazing, grass-cover enabling rainfall absorption (‘water factories’), biodiversity, and water and carbon cycles. Management of these landscapes requires a delicate balance between ecological and social priorities and actions of multiple, diverse actors all aimed at collaborative solutions that bring long-term ecological function and social justice (Peace Parks Foundation, 2022).

The model facilitates and integrates four pillars - healthy rangelands; healthy animals; thriving livelihoods; and the development of policies that incentivize the adoption of sustainable, climate-smart, and wildlife-friendly livestock management practices. As such the Herding for Health Programme is a model that has been developed and tested and revolves around skills development and deployment, farmer-driven participation, sustainable rangeland management practices, disease risk and food safety control as well as community-led rural development principles. Through the Herding for Health Programme, communal farmers, both men and women, directly benefit from learning new skills, increased income, and greater livestock and rangeland health. In addition to promoting gender equality, the project builds community governance capacity that improves interactions between

communities and conservation entities and resolves barriers that stand in the way of transfrontier conservation area development (Peace Parks Foundation, 2022).

Key within the process to unlock the potential of rangelands is the initiatives undertaken by Meat Naturally (Pty) Ltd., constituted under South African legislation as a commercial business held by the Meat Naturally Shareholders Trust, where the shareholding interests are a majority (60%) owned by communal farmers who sell through it. The Trust currently represents over 3 000 communal farmers from South African communal lands. All farmers who receive market access support are automatically included in the business shareholding via the Trust. The remaining 40% shareholding resides with Conservation South Africa, the local affiliate of Conservation International. This structure ensures that the longevity of the conservation commitments is supported by a sustainable business vehicle while helping local farmers gain shareholding in the formal livestock sector. In 2019, Meat Naturally registered in Botswana and is in the process of establishing a similar co-operative structure for farmers creating the land-use change that sustains the value-chain associated with livestock, grazing and meat production.

Meat Naturally (Pty) Ltd. provides livestock production and mobile market access incentives that enable farmer-driven improvements in water and food availability, as well as climate mitigation and adaptation for Africa *“through active and passive growth models, aiming to deliver the following impact through this innovative model:*

- *restore adaptive capacity of 1 000 000 hectares of degraded rangeland through regenerative grazing in priority areas*
- *empower 15 000 farmers adjacent to Transfrontier Conservation Areas to comply with conservation agreements and improve their livestock management to meet the new international standards*
- *contribute to sustainability for natural red meat value-chains to enable passive replication and sustainability of initial donor-based funding through capitalising on the growing demand for meat and the potential for low-carbon livestock production in Africa.”*

Through facilitating and activating market demand for socially and environmentally responsible red meat, Meat Naturally has been able to reward livestock management practices that generate productive, resilient rangeland ecosystems. Since 2016, Meat Naturally has helped communal farmers engaged in conservation agreements earn approximately US \$4.5 million from livestock sales and has supported regenerative grazing management on more than 320 000 ha of natural rangelands. Through a collaboration with the Herding Academy, Meat Naturally envisages the training and support for almost 500 Ecorangers over the next five years, aimed at restoring approximately 2 000 000 ha of degraded rangeland through regenerative land management practices. (S Frazee, personal communication, March 22, 2022).

Grazing might seem a small and insignificant component of the regional economy yet has potential to significantly address poverty if implemented in a socially acceptable and equitable manner based on regenerative principles. The benefits to the conservation sector, especially TFCA's are immense. According to J. van Rooyen (personal communication, May 19, 2022) *“models such as H4H are demonstrating to governments that natural capital in the form of carbon sequestration through rangeland restoration and improved livestock management can contribute significantly to Nationally Determined Contributions (NDC) of the Paris Climate Accord. Hence, through green job creation multiple*

outcomes can be reached in rangeland landscapes and even generate income at national level whilst meeting national development goals. In Botswana, through the Green Climate Fund funding the implementation of H4H, Botswana will reach over 50% of their NDCs just through rangelands restoration and improved livestock management."

Additionally, van Rooyen states that "restored rangelands can sequester on average one ton of carbon per ha per year and can be as much as three tons. Collectively, if healthy and thriving, the rangelands of Africa can sequester as much carbon annually as the Amazon Forest. But rangelands are complex systems supporting multiple land-uses and livelihood strategies, hence rangeland management strategies need to accommodate this. TFCAs provide an exceptional platform to facilitate the implementation of models such as H4H to have multiple impacts in rangelands of protected areas and in communities living in and around protected areas. It accounts for the complexity by focusing on a basic model of harnessing and combining Indigenous knowledge with good agricultural practices all seated in a basic model of skilled herders facilitating strategic herding and kraaling practices at scale. These are developed by the community to be community-driven and is based on H4H principles."

3.3.2.3 The Value of Rangeland Grazing

The grazing value of land is a key ecosystem service value that is commonly reflected in economic decision-making across the natural rangelands of SADC. The commercial value of most rangeland in SADC is based on the grazing carrying capacity of the land, and thus land prices or rent (depending on land tenure systems) are strongly linked to grazing services. For the SADC rangeland area, typical of where TFCAs are situated, these values can be estimated from FAO data. Analyses of FAO data reveals that the grazing value of land, expressed as an asset value, across SADC, is approximately US \$2 800/ha (using a conservative discount rate of 2%) (Prime Africa, 2022). A significant variation exists around this number, and the variation is determined by the grazing carrying capacity of the land.

3.3.3 Cautionary Note

The values related to the consumptive utilisation of provisioning services (ecosystem goods) assume that beneficiaries have access to these resources. Certain protected area designations may exclude access for consumptive use and therefore lose the use of these values and their associated socio-economic benefits. Caution, therefore, needs to be exercised in the use of these values to build a value proposition for areas where access is not allowed otherwise it may be construed as 'false advertising'.

3.4 Cultural Services

The cultural ecosystem services are broadly defined as the non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience (MEA, 2005).

3.4.1 Nature-based Tourism

Nature-based tourism (NBT) can be defined as tourism that uses natural resources in a wild or undeveloped form, either consumptively and/or non-consumptively. Nature-based tourism is travel for the purpose of enjoying undeveloped natural areas or wildlife and includes ecotourism activities such as hiking, birding, cycling, recreational hunting (which is covered separately in Section 3.4.2 below) and related activities such as accommodation and transport.

Within protected areas, nature-based tourism plays an essential role in contributing to financial sustainability as well as providing a positive impact to numerous stakeholders. A recent study by the

World Bank (2020) showed that nature-based tourism in protected areas generates significant income multipliers, benefits households involved in the tourism sector directly and indirectly, and creates significant job opportunities. Recently however, this potential has been eroded due to the COVID-19 pandemic. An online survey of African tourism operators conducted by Spenceley (2021), showed a steep decline in clients in March 2020 compared to the same month in 2019 (63% less) coupled with a substantial drop in future booking requests (72% lower). In addition, many local employees have had wages reduced (59%) and nearly half have been made redundant (Spenceley, 2021).

3.4.1.1 The Underlying Assets

The unique biodiversity of southern Africa is the key underlying asset to this service. This asset includes the unique species, both fauna and flora, and the charismatic landscapes which comprise their habitat. It also includes unique natural features such as charismatic waterfalls, lakes, wetlands, swamps, and mountains. Other enabling assets, associated with well-managed TFCAs, include physical infrastructure that allow safe and easy access to and unique experience of the biodiversity assets. This includes airstrips, roads, accommodation, and other infrastructure. The human capital that governs these assets and provide important tourism services to visitors are also key.

3.4.1.2 The Beneficiaries

The beneficiaries of nature-based tourism are varied. A range of international tourists from other continents pay premium prices for the privilege of experiencing the rich wildlife resources of Africa. Domestic tourists from SADC countries also enjoy the benefits of this form of tourism, as a means of relaxation and experiencing nature.

Local communities benefit from nature-based tourism through a concession fee, job opportunities, and small business opportunities associated with supplying goods and services to tourism operators.

Tourism operators benefit from varied investment opportunities ranging from accommodation provision, offering of nature-based activity services (e.g., guided tours) and the provision of transport and other services.

Box 3-4. Value of Nature-based Tourism in TFCAs

An analysis of the high-value ecotourism market in several TFCAs (including Great Limpopo TFCA (GLTFCA), Malawi-Zambia TFCA (MZTFCA), Kavango-Zambezi TFCA (KAZA), Lubombo TFCA, Zimbabwe-Mozambique-Zambia Transfrontier Park (ZIMOZA) and Greater Mapungubwe Transfrontier Conservation Area (GMTFCA) showed that there is an estimated 284 000 – 473 000 tourist visits a year and the annual revenue from accommodation bookings is as much as US \$790 million a year (Table 3-3). The approximate number of jobs created within the TFCAs is 34 000 – 38 000. The highest number of high-end beds is found in the GLTFCA with most of these beds located in the central and southern KNP and the private concessions and reserves adjacent to this part of KNP (PPF, 2019).

When expressed as a per hectare value, nature-based tourism can contribute on average US \$6 000/ha to the TFCA estate (PPF, 2019) It is to be noted that a large variation can exist around this average number, based on the productivity and characteristics of the landscape, the accessibility for tourism and the level of investment in tourist infrastructure. It is important to note that this is likely to be an undervaluation of the total NBT value for TFCAs. The high-value ecotourism segment is overall a small proportion of the total NBT market and does not include mid-range and budget facilities. Additionally, the study does not consider the value add that would become apparent through a full value chain study.

Table 3-3. Total revenue from accommodation for selected TFCAs (Source: PPF, 2019)

TFCA	Number of beds	Average Rack Rate per bed night (US \$)	No. of Visitors per annum	Total revenue for accommodation (Million US \$)	Jobs created
Total: All TFCAs	4 787	838	284 000 – 473 000	714.4 – 793.7	34 000 – 38 000
GLTFCA	2 070	878	142 000 – 237 000	374.8 – 416.5	18 000 – 20 000
KAZA	1 556	863	102 000 – 170 000	267.1 – 296.7	13 000 – 14 000
MZTFCA	172	574	11 000 – 18 000	18.3 – 20.3	880 - 980
Lubombo	636	432	40 600 – 67 700	52.6 – 58.3	2 500 – 2 800
ZIMOZA	238	756	16 000 – 26 000	35.5 – 39.4	1 700 – 1 900
GMTFCA	92	316	4 500 – 7 600	4.3 – 4.8	210 - 230

3.4.2 Recreational Hunting

Across Africa, there are several different hunting practices which contribute differently to the socioeconomics at local and regional scales. Different hunting practices include: 1) Poaching, 2) Hunting for bushmeat, 3) Traditional or subsistence hunting 4) Wildlife cropping, 5) Recreational hunting and 6) Sport or tourism hunting (Snyman et al., 2021). In general, the better regulated the hunting activities, the greater the positive impacts in terms of conservation, socio-economic benefits, and value-adding multiplier effects. Conversely, illegal, and unregulated hunting activities place increasing burdens on wildlife administrators in terms of law enforcement costs and loss of large numbers of animals (Snyman et al. 2021).

Recreational hunting involves the payment of a fee for a hunting experience, usually supervised, for one or more animals with specific desired characteristics (such as large body size or horns). The part of the animal, such as the horns or head, are usually kept by the hunter and taken home. This supports the taxidermy industry. Meat of hunted animals is usually used for food by local communities and/or the hunter. It may be a distinct activity from, or overlap with, hunting for recreation or meat (IUCN, 2016).

3.4.2.1 The Underlying Assets

The unique biodiversity of southern Africa is the key underlying asset to this service. This asset includes the unique species, particularly the fauna, and the charismatic landscapes which comprise their habitat. Other enabling assets, associated with well-managed TFCAs, include physical infrastructure that allow safe and easy access to and unique experience of the biodiversity assets. This includes airstrips, roads, accommodation, and other infrastructure. The human capital that governs these assets and provide important tourism services to visitors are also key.

3.4.2.2 The Beneficiaries

Legal, well-regulated trophy hunting plays an important role in delivering benefits for both wildlife conservation and for the livelihoods and wellbeing of indigenous and local communities living with wildlife (IUCN, 2016). Trophy hunting generates significant income streams, creates jobs, and contributes to the economy through several multiplier effects i.e., airlines, hotels, taxidermy, etc. The beneficiaries of trophy hunting are varied. Trophy hunters pay premium prices to hunt in the wilderness of Africa. Local communities benefit from trophy hunting through a concession fee, job opportunities and/or small business opportunities associated with supplying goods and services to trophy hunting outfitters. Trophy hunting outfitters benefit from varied investment opportunities ranging from accommodation provision, to offering related nature-based activity services (e.g., guided tours) and transport services.

3.4.2.3 Value of Recreational Hunting in TFCAs

Recreational hunting contributes strongly to the conservation enterprise in sub-Saharan Africa, where large areas support important terrestrial biodiversity that is allocated to trophy hunting use (De Minin et al. 2016). The study further estimated that the trophy hunting annual revenue to national economies in sub-Saharan countries to be more than US \$217 million, mostly from the charismatic Big Five species (De Minin et al. 2016). A more recent meta-analysis showed that the average annual revenue for trophy hunting across SADC countries was in the region of US \$260 million (Snyman et al. 2021). However, that value is most likely an underestimation of total revenue, as a study conducted in 2018 showed that trophy hunting in South Africa annually contributes more than US \$214 million to the South African economy and that it supports more than 17 000 employment opportunities (Saayman et al. 2018). Revenue from trophy hunting has been shown to benefit conservation agencies through contributing to PA management costs as well as direct financial benefits to communities (Lindsey et al. 2020). In Namibia, trophy hunting supports the budgets of 82 conservancies covering 20% of the country (162 000km²) and encompassing approximately 189 000 community members which is equivalent to 9% of the total population (Naidoo et al. 2016). Analysis of the PA area budget of Tanzania by Lindsey et al. (2016) indicated that 68% of the PA budget required is dependent on revenue from trophy hunting.

3.4.3 Cultural Diversity

The diversity of ecosystems is one factor influencing the diversity of cultures and the identity of specific cultures. In addition, many religions attach spiritual and religious values to ecosystems or their components. TFCAs provide a multitude of cultural, spiritual, and inspirational services to several beneficiaries. The physical, emotional, and mental benefits produced by these ecosystems are often subtle in nature and the value assigned to them is based on the individual and cultural assessments of their contribution to well-being (Scullion et al. 2011). One agreed-upon characteristic of cultural services is their intangibility, which often makes an appraisal of these services difficult (Milcu et al. 2013).

Box 3-5. Cultural Diversity in the GMTFCA and KTP

While cultural diversity and their associated values are present in all TFCAs, two were selected for further discussion, the Greater Mapungubwe TFCA (GMTFCA) and the Kgalagadi Transfrontier Park (KTP). The Mapungubwe Cultural Landscape (MCL) was proclaimed a UNESCO World Heritage Site in 2003 and together with the TFCA makes a significant cultural historical contribution to Southern Africa. Artefacts discovered in the area attest to complex societies dating back 1 000 years ago as well as numerous San rock paintings and engravings (petroglyphs) of more than 10 000 years (PPF, 2022). The MCL demonstrates the rise and fall of the first indigenous kingdom, The Mapungubwe Kingdom, in Southern Africa between 900 and 1 300 AD (UNESCO, 2022). Until its demise at the end of the 13th century AD, the Mapungubwe Kingdom was the most important inland settlement in the African subcontinent and the cultural landscape contains a wealth of information in archaeological sites that record its development (UNESCO, 2022). The KTP is an important cultural heritage area for the #Khomani San People and incorporates the #Khomani Cultural Landscape which was established as a world heritage site by UNESCO in 2017. The Landscape includes landmarks of the history, migration, livelihoods, memory, and resources of the #Khomani and related San people. The #Khomani Cultural Landscape meets the two following cultural criteria for eligibility as a World Heritage site:

1. **Criterion (v):** *The Landscape is uniquely expressive of the hunting and gathering way of life practised by the ancestors of all modern human beings; so are the simple, yet highly sophisticated technologies which they use to exploit scarce resources such as water, find plant foods in an extremely hostile environment and deal with natural phenomena such as drought and predators*
2. **Criterion (vi):** *The Landscape reflects and is associated with an ethnobotanical knowledge and memories embedded in the !U!-Taa languages are still spoken by a few people in the #Khomani community, illustrating a virtually extinct way of life and beliefs.*

3.5 Regulating Services

3.5.1 Water Related Provisioning and Regulatory Services

3.5.1.1 The Theory of Catchment Services

As this is a very broad component of the suite of ecosystem services offered by the natural assets of the SADC TFCAs, it is not possible to provide a definition, but rather a brief discussion on the important interface between a catchment and the precipitation it receives, and how this works to deliver both the provisioning and regulatory services related to water.

To understand water catchments and their capacity to deliver both provisioning and regulatory services related to water, it is important to understand basic catchment hydrology and the relationship between

precipitation, vegetation cover, soil and geological properties and catchment topography, which all play a role in determining what happens to precipitation within the boundaries of a catchment.

It is an elementary and fundamental fact that precipitation falls primarily over the terrestrial component of a catchment area. The quantity and quality of the water in the watercourses is firstly determined by the condition of the terrestrial component and therefore in managing to enhance catchment services, it is essential that the entire terrestrial component of the catchment is managed to ensure that it retains as much of its pristine condition as possible. Where natural land cover must give way or has already given way to forms of development, either agricultural and/or settlement, it is critical that natural catchment features are integrated into these transformed areas to buffer their negative impacts and the loss of catchment services.

Once the importance of the terrestrial land cover is understood, it is important to understand further that terrestrial land cover that is managed to maintain close to pristine or benchmark conditions, will retain the optimal capacity to receive any form of precipitation (snow, hail and/or rainfall), thus being able to absorb the energy of the precipitation and protect the soil from weathering and erosion. In this way infiltration of water into the soil is optimised allowing for soil water recharge to the benefit of both surface and groundwater resources. While this speaks to the provisioning aspect of catchment services, it also contributes to the regulatory aspect through the provision of flood attenuation services. It must be noted though that this service has thresholds that may be exceeded in times of extreme events and caution must be exercised in the 'selling' of this service.

Catchments with good quality natural land cover will ensure that precipitation runoff carries limited sediment loads and thus sustains the quality of the water in the watercourses from the perspective of suspended solids, i.e., reducing the turbidity of the water. Where good quality natural land cover is integrated into transformed areas of a catchment, this has the capacity to mitigate non-point-source pollution from working sections of the catchment, such as settlement areas and agricultural lands. The absorption of pollutants by natural land cover thus contributes to sustaining good quality water.

The enhanced capacity for infiltration and groundwater recharge referred to earlier ensures that a catchment retains the optimum ability to sustain the delivery of water into the watercourses during the dry season and times of drought. This ensures that the dry season base-flow of the watercourses is maintained at an optimal level, providing both the provisioning service of direct access to the water for human and animal consumption at both the subsistence and commercial scales. Where catchments include dams designed to capture surface water for the managed or engineered provisioning of water through a network of water treatment and reticulation infrastructure, the importance of the natural provisioning service is thus substantially increased. This value is demonstrated in the case studies discussed in Section 0 where it is shown that catchments in optimal condition deliver sustained volumes of high-quality water.

Enhanced dry season base-flow also ensures that catchments have the capacity to contribute to enhanced water quality through providing dilution services, i.e., the greater the volume of water in the watercourse, the greater its ability to dilute any impurities that might enter it. This is particularly relevant where catchments encompass large proportions of transformed landscapes that have lost their capacity to deliver catchment services and deliver dis-services through the loss of absorption/infiltration capacity, causing accelerated runoff and increased flood risk. Also, where there is an accumulation of impurities on hardened and working surfaces that cause non-point-source pollution and reduced water quality during precipitation events, increased base flow will help to reduce

the impact of this pollution on water quality. This in turn will help to reduce the occurrence of water-borne diseases and related health threats which can lead to significant costs to society.

Wetlands of various forms are inevitable components of the hydrology of catchments, and they have an exaggerated capacity to deliver regulatory services, particularly as this relates to enhancing water quality and sustaining base-flows. The capacity of wetlands to slow down the velocity of flow in a catchment and its watercourses allows for sediments and impurities to be deposited and/or absorbed by the wetland plants. The greater surface roughness that wetlands present within a hydrological system also increases a catchment's capacity to attenuate floods.

3.5.1.2 *The Underlying Assets*

The underlying assets within the SADC TFCA are their large tracts of relatively pristine natural land cover. One could argue that this would apply across the entire region, irrespective of the uneven distribution of the long-term annual average precipitation. However, it makes sense that key assets in the region are those areas recognized as water towers or the mountains that are important sources of freshwater for the adjacent lowlands (Viviroli et al, 2007) (Figure 3-2). The value of these river catchments is further bolstered by their being some of the few in South Africa where long-term annual precipitation levels are greater than the losses experienced by evaporation (Zunckel 2003).

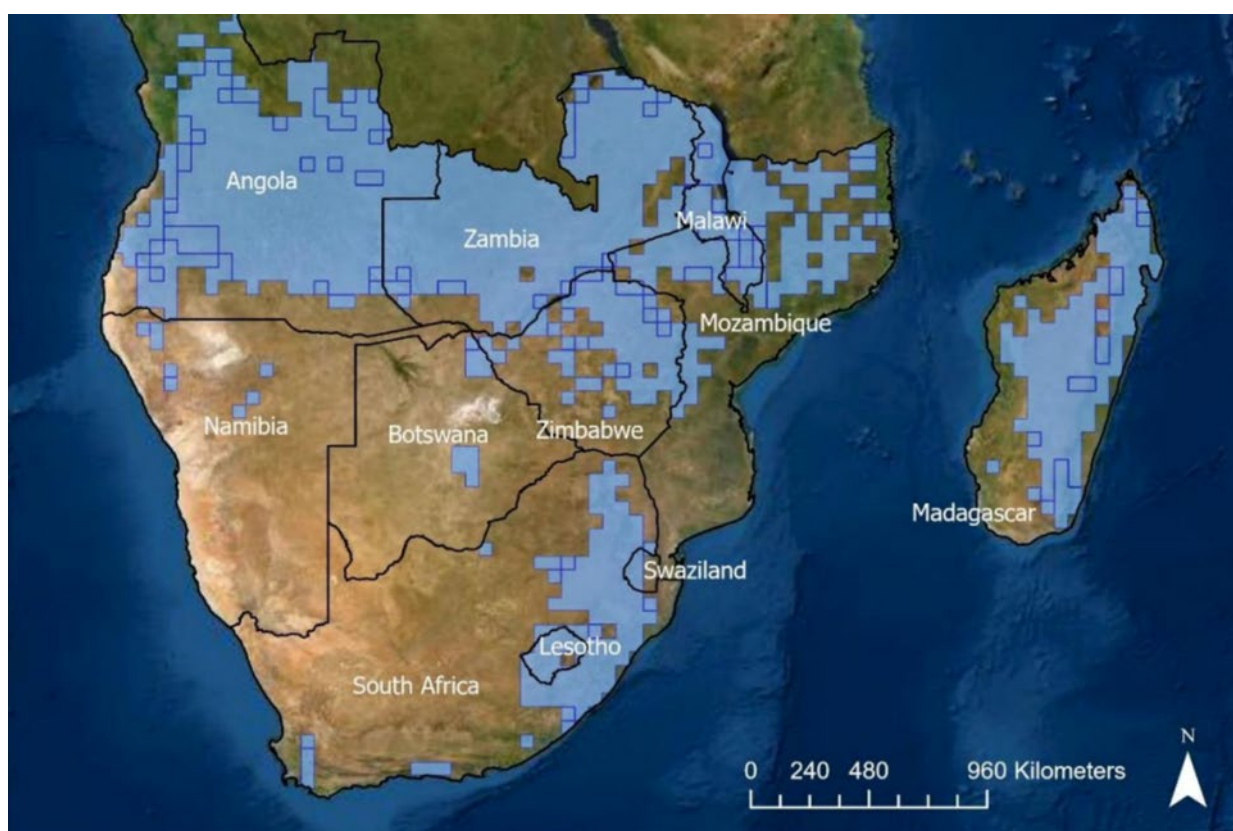


Figure 3-2. Rough boundaries for water towers in Southern Africa (Source - Viviroli et al, 2007)

3.5.1.3 *The Beneficiaries*

The scale at which water related provisioning and regulatory services provide benefits is both local and regional. At the local scale there are many communities within and adjacent to TFCA who are dependent on being able to abstract water directly from the water courses for both human and domestic livestock consumption, as well as for the irrigation of their croplands. Direct abstraction by

commercial farmers is also a critically important benefit which has a multitude of knock-on benefits such as job creation and food production.

At the regional scale many of the river systems within the SADC region have been impounded to capture and store runoff so that it can be treated for reticulated supply to formal settlements of various scales from towns to cities, to provide an assurance of supply for downstream commercial agriculture and industry, and/or to generate hydro-electric power, which is then distributed widely across the region.

Box 3-6. Value of Water Related Provisioning & Regulatory Services in the Maloti Drakensberg

A series of important studies emanated and evolved from the first five-year implementation phase of the Maloti Drakensberg Transfrontier Project (MDTP) (2003 – 2008) ranging from the modalities of payment for ecosystem services (MDTP, 2004; MDTP, 2007; SANBI 2012) to the assessment of ecological infrastructure (SANBI, 2013a; SANBI, 2013b & Jewitt et al, 2015). Not all the studies provided values, but they provide valuable insights into approaches that can be taken, and the lessons learned along the way when packaging the value of a catchment for the beneficiaries, decision-makers, and potential investors. Indicative values from these studies have been extracted and collated in Table 3-4 below. The relevance and meaning of the variables in the table are provided below and must be read in the context of avoided degradation:

- *Total additional yield (m^3/yr) – the additional volume of water that the catchment delivers because of it being in a relatively pristine condition or under conservation management.*
- *Total additional base flow (m^3/yr) – base flow is that portion of water in the watercourse that is sustained from the slow release of water stored in the catchment in the absence of runoff. Well managed/conserved catchments will deliver greater volumes of base flow.*
- *Total avoided sediments (m^3/yr) – unnatural sediment loads in a watercourse impact on water quality as well as aquatic habitat, but they also reduce the water holder capacity of dams thus reducing their longevity.*
- *Water yield Unit Reference Value (total cost: yield over 50 years) - this is a term used by South African water resource planners as an expression of the relationship between the costs associated with obtaining water services and the value of the benefits. A value of less than 1 reflects a cost-effective outcome, while values greater than one show that costs exceed the value of the benefits. It must be noted that URVs listed below only reflect the value of the water-related ecosystem services and therefore exclude the host of other ecosystem service values that will be relevant to well-managed catchment areas.*

Table 3-4. Indicative values for various catchment services extracted from studies related to the MDTFCA

Study	Catchment	Total additional yield (m^3/yr)	Total additional base flow (m^3/yr)	Total avoided sediments (m^3/yr)	Water yield URV (total cost: yield over 50 years)
MDTP (2007)	uThukela		12 869 204	1 256 252	0.31
	Umzimvubu		3 936 842	4 920 958	0.48
Jewitt et al (2015)	uMngeni	359 356 960	82 659 438	50 465 045	2.52

It must be emphasized that the figures captured in the table above are indicative and that the significant differences between them are a factor of differences between the catchments, both on the supply and demand side. The fact that the figures from the Jewitt et al. (2015) study are an order of magnitude greater than the MDTP (2007) study is possibly due to a more refined and sophisticated method that was applied, as well as access to more accurate data.

3.5.2 Ecological Connectivity

3.5.2.1 The Value of Large-Scale Conservation Areas

To protect biodiversity and promote sustainable development, TFCAs aim to enhance wildlife flows across national borders more effectively. The movement of ecological actors across a landscape is a prerequisite for many ecological processes and functions. Movement may be hindered or supported by natural landscape features or man-made infrastructure such as park and border fences as well as road infrastructure. Given the impact of country borders that were established within the region during colonial times, often using rivers as the borders, ecosystems are often shared between two or more countries, necessitating collaboration and cooperation by the TFCA partner states if ecosystem functionality and ecological connectivity is to be maintained, or restored where this has been fragmented. The approach to TFCA development creates an environment that is conducive to landscape level conservation, optimises impact at large landscape scale, and enables wildlife movement across these manmade boundaries.

Enhanced connectivity is one of the strongest motivation factors for the TFCA concept, given the impact of maintaining ecological connectivity and the ease with which this can be done, as opposed to striving to restore or rewild areas that have been severely impacted by human interventions and developments. The region has numerous connected landscapes that host significant percentages of the world's remaining wildlife populations such as rhino, elephant, lion, wild dog, cheetah, and leopard, as well as avifauna.

Box 3-7. Ecological Connectivity in KAZA TFCA

One of the intentions of the KAZA TFCA is for elephants in densely populated northern Botswana to move north through Namibia and eventually occupy more sparsely populated areas in southern Angola, where densities may be 30 times lower (Schlossberg et al., 2018). The African savanna elephant is the TFCAs flagship species and is seen as a key indicator species for landscape connectivity (Naidoo et al. 2022). However, a study conducted in the TFCA showed that fences along the border of Namibia and Botswana constrain the movement of elephants across the landscape (Naidoo et al. 2022). These fences were initially erected to keep wildlife and livestock (particularly cattle) separated, to limit disease transmission. The findings showed the implications for the stated connectivity aims of the KAZA TFCA and suggested that potential decommissioning or realignment of fences could address these issues (Naidoo et al. 2022). Fence realignment or removal poses considerable challenges to member states including wildlife-cattle disease transmission) and security concerns. The challenge is therefore, for member states of KAZA to develop approaches that alleviate their concerns while unlocking the wildlife movement potential upon which KAZA's vision of a connected social-ecological system and world-class tourism destination is based (Naidoo et al. 2022).

3.5.3 Climate Regulation

3.5.3.1 Local climate regulating services

Local climate regulation is very important in maintaining habitat heterogeneity, and a healthy environment for all species inhabiting an area (including humans). For example, trees provide shade, while evapotranspiration from healthy forests (and other biomes to a lesser extent) influences rainfall and water availability while also reducing erosion and flooding. Healthy and heterogenous vegetation cover also creates niche climatic conditions, which provides a diversity of temperature niches for biota to exploit (TEEB, 2010).

Ecosystems and the biota that inhabit them moderate the effects of extreme climate events (TEEB, 2010). Some are better at this than others; for example, healthy mangroves and coral reefs are instrumental in reducing the damages associated with storm surges. This protects humans and infrastructure as well as other ecosystems and the services they maintain. Forests are also capable of reducing the negative effects associated with extreme climate events, but this is contingent upon eliminating or at least reducing deforestation rates.

Certain ecosystem components (such as wetland) are extremely important in terms of water storage, reducing evaporation rates and purification of water contaminated with pathogens and/or pollutants from anthropogenic activities.

The maintenance of food systems is also highly dependent on ecosystem function and climate. Intact ecosystems with the full assemblages of fauna and flora safeguard animal pollinators which in turn assist plant species (including economically important species) in the retention of the genetic diversity of the species. Directly, species requiring wind pollination are reliant on climatic conditions which could be disrupted under climate change conditions.

3.5.3.2 Carbon Capture Regulating Services

The value of longer-term climate regulation services is directly related to the ability of the ecosystem to sequester and store carbon dioxide (CO₂), thereby reducing the volume of this greenhouse gas in the atmosphere. While all types of ecosystems sequester CO₂, the volume is directly related to the ecosystem type, vegetation type, and the health of the ecosystem (Kruid et al. 2021). Higher density biomass is associated with higher levels of carbon sequestration, i.e., woody forests, peatlands, etc. In ecosystems where fire or other disturbances are a regular driver of change (e.g., savannas such as Lower Zambezi Mana Pools), above-ground carbon sequestration is more variable than in ecosystems that do not experience such disturbances (e.g., forests such as Chimanimani, as well as arid and desert systems like those in the Iona Skeleton Coast), but carbon storage remains relevant.

In all ecosystems, landscapes can become carbon sources instead of sinks if they are damaged beyond their capacity to draw down carbon and begin releasing their stored carbon instead (Buotte et al. 2020). Therefore, the climate regulation value of an ecosystem is a function of ecosystem health, carbon stock and the rate of carbon sequestration. The corollary (and opportunity for carbon investors) is that avoided degradation in pristine landscapes and remediation of degraded landscapes and ecosystems holds the greatest potential for carbon drawdown, and consequently carbon credit sales. However, this is contingent upon a defined strategy for avoided degradation and remediation and accrual of carbon stocks (Valach et al. 2021). This approach must be complemented by sound management of existing carbon stocks in ecosystems with lower variability in carbon storage potential (e.g., forests and deserts) to stabilise carbon stocks and avoid unplanned or unnecessary emissions caused by sudden large infrequent disturbances such as fire and deforestation.

Ecosystems with a greater proportion of soil organic carbon and below ground carbon (e.g., wetlands, grasslands) are more stable (Borjesson et al. 2018) and therefore “higher quality” when compared with ecosystems dominated by above-ground carbon (e.g., forests). Soil organic carbon includes the detritus from expired animals and fallen leaves, as well as plant root materials. Below ground carbon is the inorganic fraction of mineralised carbon present below ground. Soil organic carbon and below ground carbon are more stable than above-ground carbon (see Figure 3-3). It is important to understand the

carbon storage potential of each ecosystem present in the TFCAs, as this will enable an accurate calculation of the carbon stored and potentially the amount of carbon that could still be sequestered post-remediation (where this is needed).

Figure 3-3 highlights the different proportions of where ecosystems store carbon, across three ecosystems: the forests of Chimanimani, the desert of the Iona-Skeleton Coast, and the savanna of Mana Pools. While forests store more carbon than do deserts, it is important to acknowledge that the carbon stored in deserts is more stable than those of the savanna or forest because desert ecosystems are far less prone to large disturbances than either forests or savannas.

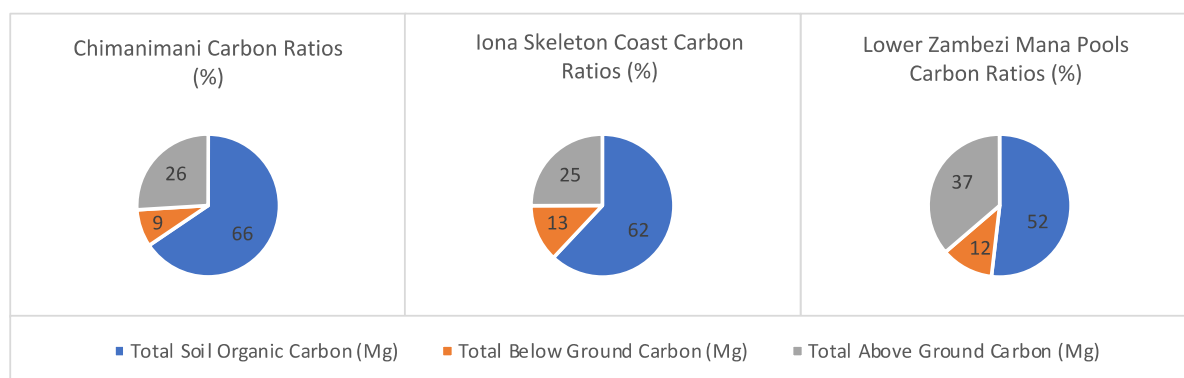


Figure 3-3. Carbon storage proportions for three TFCAs including forest, savanna, and desert ecosystems

3.5.3.3 The Value of Carbon Storage

The TCFA estate encompasses more than 1 000 000 km² of landscapes containing 16 types of biomes with woody and forest landcover. These landscapes play an important role as a carbon sink. The carbon capture value of these landscapes can vary between US \$900 - \$2 700/ha, expressed as a land value (derived from UNEP, 2017).

Other studies by UNEP (2012) have demonstrated significant relationships between the carbon sink service of protected areas, and a range of other ecosystem services such as water purification, erosions control, fisheries productivity, water availability, hydropower generation, human health, and other services. By applying these multiplier effects to the carbon value stated above, it is possible to expect multiplier effects equivalent to between US \$1 800/ha - \$5 400/ha, when expressed as a land value.

3.6 Habitat Services

3.6.1 Habitat and Biodiversity

The valuation of a specific habitat within a unique and large landscape is complex. The complexity arises from the fact that such landscape-habitat permutations are non-substitutable and so unique that accurate valuation is redundant with respect to informing policy or development decisions. TFCAs typically display such characteristics. There is nevertheless a method that demonstrates society's willingness to pay for conserving such landscapes. For example, the size of a long-term investment grant into the maintenance or protection of a unique natural system may serve as a proxy for the value of such a system. It is noted that this is not a perfect method as grants are often below requirements, however, provides a snapshot of the potential quantification of such intrinsic value.

One such investor is the Global Environmental Facility (GEF). The GEF functions to assist with the protection of the environment and to promote environmentally sustainable development. More specifically the GEF provides grants which transform environmental projects with national benefits to projects with global environmental benefits. The projects and funding provided are an expert-based reflection of priority areas which need attention. Mining of GEF databases, and valuation using revealed preference methods, provides strong evidence of society's willingness to pay for scarce habitats and landscapes.

Such analyses (Crafford et al. 2022) reveal that willingness to pay for conservation is affected most significantly by species diversity, combined with the unique characteristics of the landscape, and to a lesser extent by the actual area size of the protected area. Expressed in terms of an equivalent land value, this value may vary between US \$6 000 - \$21 000/ha for SADC TFCAs.

4 RISK FACTORS AND DIVERSIFYING FUNDING OPTIONS IN TFCAS

As seen in Section 2, TFCAs remain largely dependent on funding from ICPs and Member States. As a result, TFCAs are generally underfunded and are not currently meeting their stated socio-economic objectives such as fostering socio-economic development, and regional integration for the benefit of people living within and around TFCAs. As demonstrated in Section 3, TFCAs provide a diverse set of benefits to local communities as well as further afield to national, regional, and global economies. Taking this inherent value into consideration, further investment into the TFCA conservation estate is necessary and is likely to enhance the flow of benefits to beneficiaries. However, understanding the current barriers to investment and identifying the risk profile of TFCAs is key to any potential investor. The purpose of this section is therefore to provide an overview of the associated risk to investment.

4.1 Identifying Barriers to Investment in TFCAs

The World Bank Group (2020) survey on Global Investment Competitiveness surveyed 14 000 companies making foreign direct investment (FDI) in almost 28 000 greenfield and expansion projects in middle-income countries (Figure 4-1). For practicality, in this section, we will consider the top three most common risk factors affecting investment decisions in this report, namely political stability, macro-economic and legal and regulatory environments per country hosting or intending to host TFCAs.

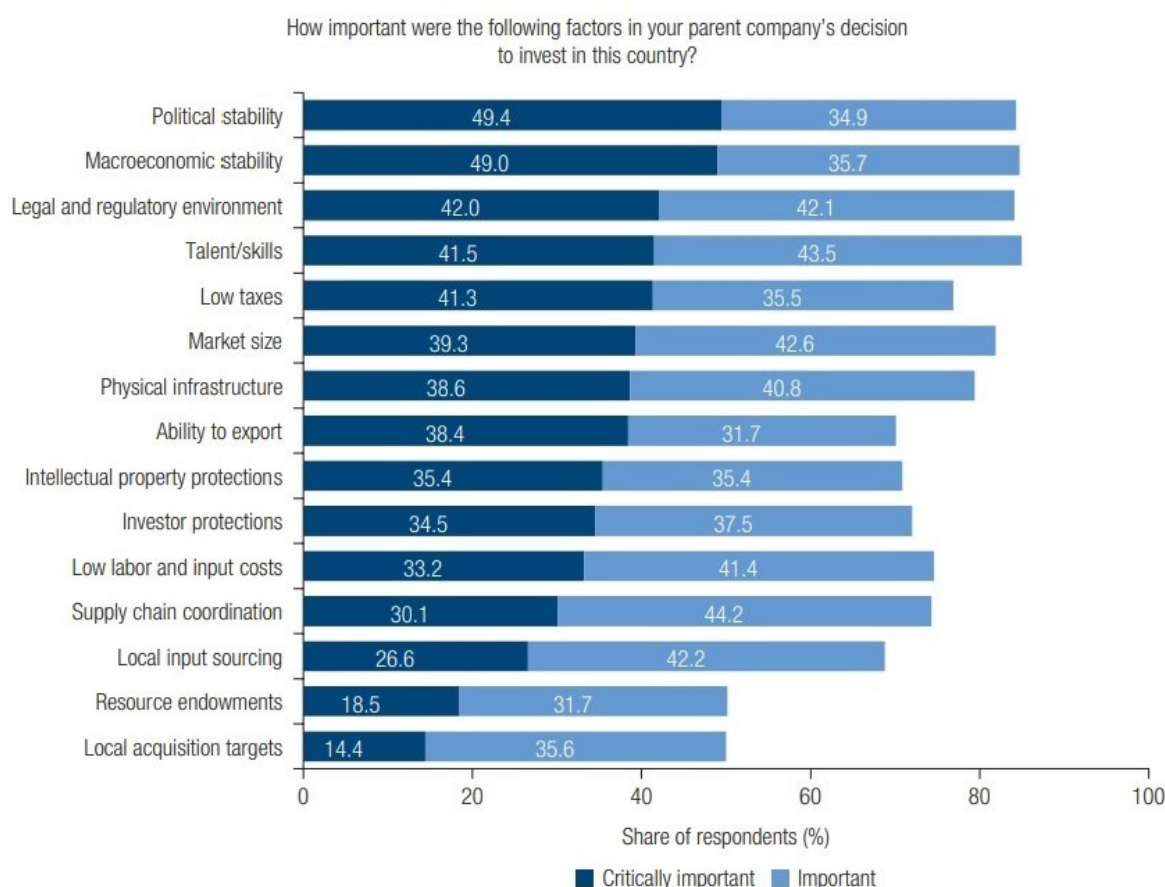


Figure 4-1. Top factors affecting flows of FDI in 2019 (the most recent survey data) – WBG

Different investor types will perceive risks in different ways and possess different risk appetites for investment in conservation and supporting industries. For example, philanthropic funders may not be concerned about investing in markets with robust regulations and taxes on capital export, as they are

not seeking to extract capital and/or profits. This scenario will however limit the likelihood of private direct investment, as such investors would seek market-related returns and may wish to freely extract their returns and/or capital to make further investments elsewhere.

It is important to note that the relatively nascent concept¹ of TFCAs means that often, cross-border legislative and regulatory frameworks are not yet mature enough to govern such elements as foreign investment and capital movement within TFCAs, as even conservation-related laws could yet benefit from further clarity in many instances (Lubbe, 2015). The corollary is however that this can create enabling environments for investors in TFCAs, wherein more secure legislative jurisdictions/countries may prove bankable in a manner that creates TFCA-wide benefit (e.g., an investment in the more stable Botswana or Namibian portion of the KAZA TFCA may accrue benefit to the entire TFCA, especially when located to foster strategic/geographic development and sharing benefits from entry and/or trade into Angola and Zambia).

The three top-ranked risks listed in Figure 4-1 are considered below and are based on and adapted from the 2020 COFACE Country and Sector Risks Handbook². The COFACE rating system was chosen as other ratings agencies maintain a narrow focus on financial risk, while COFACE considers a broader range of potential risks that investors must assess and overcome to find an investment appealing, namely country/political risk, macro-economic and business risk, and regulatory risks.

4.2 Stability and Risk in Countries Hosting TFCAs

It is important to point out that a fundamental aspect of TFCAs is to promote trans-national cooperation amongst nations in the management of ecosystems and biodiversity. A consequent benefit of this is that peace and security, stable trading regimes (e.g., Southern African Customs Union) and regional policy harmonisation will result in improving risk profiles over time in most or all TFCA host countries.

Nevertheless, the investor community, especially private investors are aware of the levels of political, macro-economic and regulatory risk that will affect their potential or planned investments in all countries (Table 4-1). The COFACE ratings scale spans eight classes for each parameter, spanning A1 – E classes, explained in Table 4-1 below.

Table 4-1. Description of political, macro-economic and regulatory risks - COFACE

Key to risk definitions:	
Country/Political Risks:	
A1	Stable political context.
A2	Generally stable political context.
A3	Political context is/remains stable.
A4	Political context could suffer from tension.
B	Political context could suffer strong tensions.
C	Political context could be unstable.
D	Very unstable political context.
E	Extremely unstable political context.

¹ This is true in terms of private investors potentially investing in TFCAs.

² COFACE is the Compagnie Française d'Assurance pour le Commerce Extérieur, a credit insurer established in France in 1946. COFACE publishes quarterly credit and economic risk reports for 162 countries comprising the larger economies of the world.

Macro-economics, Business and Regulatory Risks:	
A1	Very good macroeconomic and financial outlook. Good quality business climate. Effective debt collection. High quality institutions. Domestic market is almost perfectly open. Very satisfactory business climate.
A2	Good macroeconomic and financial outlook. Overall good healthy business climate. Debt collection works reasonably well. Institutions generally perform well. Domestic market is widely open. Business climate relatively stable but could be improved.
A3	Less favourable and/or volatile macroeconomic and financial outlook. Institutions generally perform well, but with some shortcomings. Business climate may have some shortcomings.
A4	Economic and financial outlook could be marked by some weaknesses. Business climate may present significant deficiencies, with unreliable recourse via regulatory frameworks.
B	Uncertain economic and financial outlook. Business climate may present substantial deficiencies. Debt collection is often difficult. Inherent institutional weaknesses. Domestic market is not very accessible. Business climate is unstable and underperforms.
C	Very uncertain economic and financial outlook. Business climate has substantial deficiencies. Debt collection is somewhat random. Institutions display numerous weaknesses. Difficult access to domestic market. Difficult business climate.
D	Highly uncertain economic and financial outlook. Very difficult institutional and business climate. Debt collection is random. Institutions display significant weaknesses. Very difficult access to domestic market.
E	Extremely uncertain economic and financial outlook. Extremely difficult institutional and business climate. The legal system makes debt recovery extremely uncertain. Critical institutional weaknesses. Nearly inaccessible domestic market.

4.3 Overcoming Risk Factors

As alluded to above, the current likely best option to overcome the risk factors detailed above would be to invest in TFCA's from within the jurisdictions with lowest risks for financial and other (e.g., physical assets) investments. While this is not entirely within the spirit of TFCAs, such investments could provide a springboard for investments in jurisdictions that currently present higher risks to investor assets and capital, but at a later stage once the value proposition has been established for both the investor and regulators. Additionally, a benefit and profit-sharing agreement can be reached amongst all countries in the TFCA wherein all countries reach consensus for an equitable share of benefits and profits irrespective of the location of the investment. Such arrangements must ensure that local communities are considered as material stakeholders, for multiple reasons. The two most important are that these communities, as stewards of the lands (and seas) of the TFCA should benefit (either directly financially, and/or via ecosystem services), and to stabilise local relationships and therefore local economies to ensure sustainable financial value creation going forward. Table 4-2 below shows the best-case political, macro-economic and regulatory risk scenarios for each current and planned TFCA, amongst the member states comprising each TFCA. Capital investment into member state jurisdictions with the most stable risk profile at the present time is likely to yield benefit to entire TFCAs, member states and investors while remaining within the acceptable risk domain of a broad range of investor types.

Table 4-2. Best case risk scenarios for each TFCA, and the country in which these conditions are present

TFCA Name:	Highest Country Income Level:	Best Case Risk Profile:		
		Political Risks:	Macro-Economic Risks	Regulatory Risks:
/Ai/Ais Richtersveld	Upper Middle	B	A4	A4
Kgalagadi	Upper Middle	A4	A4	A4
KAZA	Upper Middle	A4	A4	A4
Great Limpopo	Upper Middle	B	A4	A4
Lubombo	Upper Middle	B	A4	A4

Malawi-Zambia	Lower Middle	D	C	C
Maloti-Drakensberg	Upper Middle	B	A4	A4
Iona-Skeleton Coast	Upper Middle	B	A4	A4
Greater Mapungubwe	Upper Middle	A4	A4	A4
Chimanimani	Lower Middle	D	D	D
Mayombe Forest	Lower Middle	C	D	D
Niassa-Selous	Lower Middle	C	C	C
Liuwa Plains-Mussumu	Lower Middle	D	C	C
Lower Zambezi-Mana Pools	Lower Middle	D	C	C
ZIMOZA	Lower Middle	D	C	C
Kagera	Low Income	A4	A4	A4
Mnazi Bay-Quirimbas	Lower Middle	C	C	C
Western Indian Ocean	Upper Middle	A4	A3	A3

4.4 Diversifying Funding Options

Donor funding channels are expected to be well-known and appropriately exploited by TFCAs at this juncture, for the most part. A similar situation is likely to be evident regarding fiscal sources of funding directed to TFCAs. To a lesser extent, blended funding may not yet be fully exploited by the TFCAs and their partners. Blended funding/finance draws on a combination of national, multilateral, and private funding sources AND expertise to tailor investment that enables emergent positive impact, development and financial benefit that is greater than the sum of the individual investments. For example, a multilateral funder may require a guaranteed mechanism drawn from the fiscus to demonstrate a country's financial commitment to conservation.

To illustrate this example, the World Bank may decide to fund the human resources and hospitality infrastructure for a national park, conditional upon fiscal funding first being committed to erecting fences and guaranteeing security and anti-poaching services in the national park. This would form a "Condition Precedent" in an Investment Agreement between the parties, meaning that release of funding tranches would only occur once fences are erected, and employment contracts or service agreements signed for anti-poaching personnel and services.

Lesser exploited sources of funding are those that are typically more likely to be undesirably impacted by negative political, macro-economic and regulatory factors. These include private investments sourced from a wide variety of funding types spanning a range of institutional investors such as insurance companies, public and private pension funds, private equity and Sustainability and Impact funds.

A 2016 report compiled by TNC, and NatureVest for Ecosystem Marketplace indicated a trend of increasing private capital entry into conservation in the preceding decade, based upon a survey of 98 participating organizations making conservation investments, although the COVID-19 pandemic likely reversed this trend over the last two years (Figure 4-2). It is however notable that most of these capital

flows are derived and deployed in developed economies, albeit with a growing proportion flowing to developing nations according to the report.

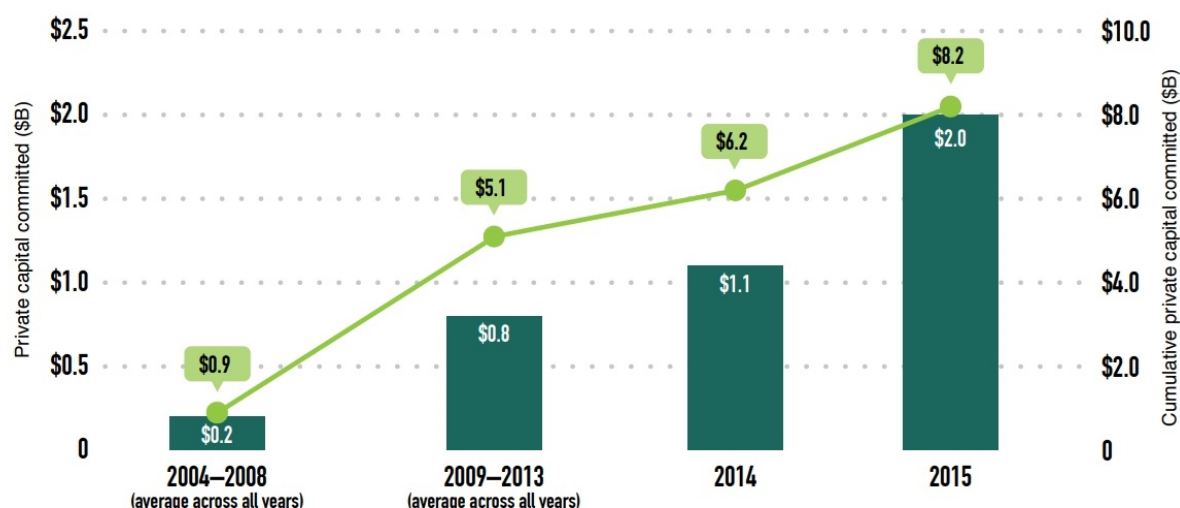


Figure 4-2. Private capital committed across all tracked years, 2004 - 2015 - Ecosystem Marketplace

For the expansion of private investment into TFCAs, it is imperative that member states hosting TFCAs should endeavour to continue improving political stability and enhancing the macro-economic conditions in their respective countries. Regulatory frameworks would also benefit from improved clarity both within countries as well as in the way supra-national governance is managed by TFCA nations. Regulators and legislators acknowledge that the success of TFCAs will not rely solely on improved conservation regulations. Better national and supra-national financial regulations may prove to be even more important in ensuring positive outcomes for conservation and biodiversity, as these can improve capital inflows and security.

Beyond these well-established challenges facing regulators and politicians, it is also of utmost importance that employees of the TFCAs learn to articulate to private investors the business case for investing in TFCAs and auxiliary businesses, through building an understanding of the investment types presented in Section 5. Many of these auxiliary businesses can be owned and managed by local communities, meaning direct financial benefits can accrue at the local level. Through building an understanding of what appeals to different investor types, TFCA employees tasked with fundraising can match capital to specific requirements for capital-starved projects within the TFCA using a diverse suite of investment types (Section 5), and in a manner that investors find appealing. Understanding the needs of investors is key to attracting more diverse, stable, and sustainable funding sources which in turn will create more resilient TFCAs. This capacity needs to be built within the agencies managing TFCAs.

Simultaneously, investors are seeing more mainstream value in the conservation of natural resources, biodiversity, and ecosystems (CPIC, 2021 quoting CreditSuisse). As a result, TFCAs are primed for private investment provided that TFCA employees can assist investors in understanding risks and opportunities, as well as monitor key performance measures that are important to a diverse suite of investor types.

Typically, an investment prospectus is the means to convey pertinent information advertising the opportunities that any investment provides. The prospectus should contain general information about the TFCA, including highlights on unique value propositions, financial metrics as well as indicators for biodiversity and ecosystem services; many of these have been outlined in this document. Pertinent information in the management agreement, the management team and how the team interfaces with

national authorities and TFCA employees is also important. This should be followed by a description of each of the types of investment available, and a proposed/desired deal/investment structure³ and broadly, the risks that any investor might face. The subject material should also provide information for investors on how TFCA management and national authorities can facilitate investment and manage TFCA assets in a way that benefits ecosystems, and the people that use them both directly and indirectly.

4.5 Addressing Investment Risks

In terms of a way forward to enhance investment, challenges need to be addressed at two main levels. Firstly, at the political level, political risks and uncertainty, macro-economic conditions and regulatory environments should be actively addressed and improved in order to attract capital inflows from investors. This pattern should be universally observed by politicians irrespective of current conditions, as tending towards improvement is beneficial in all contexts. Capital may be sourced within country or from international investors, as improving investment stability is beneficial to all investor types.

Secondly, finer scale challenges (i.e., at park/TFCA-level) need to be addressed within all TFCAs. Across the TFCA estate in Africa, the most apparent challenges appear to be issues of accessibility for guests and the safety of guests and travellers (from bandits and poachers, as well as tropical diseases such as malaria). It is also important to acknowledge that the TFCAs are often situated in areas experiencing high levels of poverty and marginalisation of the rural poor. Robust programmes of consultation with local and peripheral residents are an absolute necessity, and should from the outset give due consideration to inclusiveness and beneficiation for these residents as integral to the management of the TFCAs. When people have a vested interest in the success of the TFCA venture, stability and peace improve and the sustainability of the TFCA also progresses. This is particularly relevant in the post-COVID economies of countries that host TFCAs and can be used to improve the lives of many rural poor. Improving stability and sustainability of the TFCA estate will doubtless attract investment; KAZA and GLTFCA are good examples of this process in action.

³ Deal/investment structure descriptions quickly allow potential investors to see capital outlay requirements as well as evaluate the returns on investment. By having a diversified investment product offering, the TFCA's improves their ability to attract investment from a diversified client base (as described in Figure 5-2).

5 POSSIBLE INVESTMENT SOURCES FOR TFCAS

5.1 Investment Types

Existing capital flows into TFCAs whether at the TFCA level or via the Member States are described in Section 2, and are comprised primarily of ICP and Member State support. Below follows a concise description of potential sources of capital and/or revenue for TFCAs that have to date remained under/unexploited. Where possible, case study examples are provided to contextualise the opportunities discussed below.

5.1.1 Debt for Nature Swaps

Debt for nature swaps are transactions wherein some financial debts of a nation are written off in exchange for investments in local conservation measures and biodiversity protection interventions. According to UNDP (2015), these transactions may occur between/amongst a variety of parties but are usually between a debtor country, and a creditor and/or donor from the public or private sector (donor country Finance Minister, export credit agency, bank, investment firm, company, or even private individual). No TFCA level debt for nature swaps is known to have taken place at this juncture, but there is no conceivable reason that such a mechanism could not be integrated into TFCA agreements.

Creditors and donors should consider debt for nature swaps that would contribute to improvement in natural resources and ecosystem services that are directly related to their operations in the debtor country. For example, a creditor/donor country with large foreign direct investments (FDI's) in a debtor nation's agriculture sector may wish to design a debt for nature swap that enhances the ecosystem health of water tower areas. Superior candidate nation-states for this include member states of KAZA, and the Maloti-Drakensberg TFCA (especially those involved in the World Banks Debt Service Suspension Initiative⁴).

5.1.2 Carbon Trading

Trading of carbon stock within TFCAs will require the calculation of the carbon stock present and under the control of the TFCA. The carbon can then be traded in established markets. Restoration interventions can also be funded with proceeds to further enhance carbon stocks.

Specific candidate TFCAs for which carbon trading would be most suitable are those that host the forest biome. These include Mayombe Forest, and some of the conceptual stages (see Figure 1-2) TFCAs such as Mnazi Bay-Quirimbas and Kagera. This is because the forest biome presents a larger carbon stock than savannas and desert areas. The carbon stock in marine TFCAs is also very important. For example, seagrass beds are known to store vast amounts of oceanic carbon (UNEP, 2020), and may be an important sector within carbon trading in the future.

The carbon trading markets in savannas and marine environments are far less developed than those created for forests (e.g., the UN's REDD programme), but there is substantial value to be unlocked in extending carbon markets to include non-forest biomes.

⁴ <https://www.worldbank.org/en/topic/debt/brief/debt-service-suspension-initiative-gas>

5.1.3 Biodiversity Offsets and Biobanking

In instances where negative impacts to biodiversity cannot be avoided, those responsible for the negative impacts can seek out biodiversity offsets from TFCAs, which can be undertaken directly by the TFCAs or specialist organisations. The purpose of the offset is to ensure that there is no net loss of biodiversity, by conserving biodiversity in one area when the loss of biodiversity in another is unavoidable.

With respect to biobanking, the principles are the same as those for offsets, except those offset interventions are undertaken *a priori*. Both options require that detailed natural capital valuations be undertaken for each TFCA.

The application of biobanking should be aimed at interested, large private enterprises operating in member countries that also host TFCAs, although biobank/offsets may be drawn from a wider investor pool where this is allowed by legislative frameworks governing such transactions. The nature of such transactions means that they are more likely in countries with larger economies and supportive environmental legislation, and/or countries wherein large multinational corporations operate, and cause biodiversity losses during their business operations.

5.1.4 Wildlife Conservation Bonds

Recently, the World Bank has been involved in issuing wildlife bonds. The instruments are like national bonds issued by countries, with the exception that instead of interest payments accruing to investors, the interest is diverted towards the management and protection of wildlife over the bond term. A current example is the rhino bond which recently entered the market during March of 2022. The bond is based on the successful increase in rhino population numbers. The rhino bonds were sold to investors at lower than face value to guarantee a minimum return to investors. Depending on the successful increase in rhino numbers over the 5-year maturation period, a performance incentive fee of up to US \$14 million has been guaranteed by GEF, which will be shared amongst investors.

Although the wildlife bond market is new, it is envisaged that TFCAs may be able to apply to receive interest from these bonds for conservation related operational expenditure. Another angle that could be exploited in this regard would be for TFCAs to become candidate protected areas for specific species covered under a wildlife conservation bond, provided those species occur or are translocated to the TFCA.

5.1.5 Payment for Water Catchment Services

Many TFCAs contain water catchment areas, wherein water is generated and used lower down the catchment by various user types and industries. Where the regulatory environment supports the development of payments for guarantees to maintain the integrity of the upper catchment, TFCAs should give serious consideration to developing this investment and/or revenue source, as conservation of water source areas often requires transboundary cooperation, much the same as management of TFCAs.

As discussed in Section 5.1.1, TFCAs that should look to exploit this revenue stream are limited to those that host watershed areas. Thus, lowland, and coastal TFCAs are unlikely to be able to secure capital/funding via this potential source. However, lowland areas below water source areas may be the most likely source of capital inflow, as these areas rely on water generated higher in these catchment areas.

5.1.6 Direct Investment

Where legislative allowance has been made for private investors to partake in the development of TFCAs, private enterprise may make direct equity and non-equity investments into TFCAs. This could include infrastructure and hospitality services, through to management of bookings, hunting trips etc. Investment may also take the form of infrastructure supporting tourism development in TFCAs, for example, building and operating roads to and in TFCAs.

Direct investment is a capital and revenue stream that can take a multitude of forms and opportunities and is thus a prospect in all TFCAs. Regulators and managers of the TFCAs and in the member states of TFCAs are duty-bound to ensure fiscal, political, and business conditions (see Section 4.2), as well as the capacity and competency of TFCA employees and management, contribute positively to attracting such funding.

5.2 Relationship Between Funding Type, Financial Returns and Positive Impact

The investment options described above span a variety of funding resources which could be pursued for financing TFCA activities. Diversifying the types of finance that TFCAs could draw upon enables a more stable and sustainable means by which to meet total budgetary requirements in each TFCA and can be deployed at both TFCA and member state levels, as illustrated in Sections 2 and 5.1.

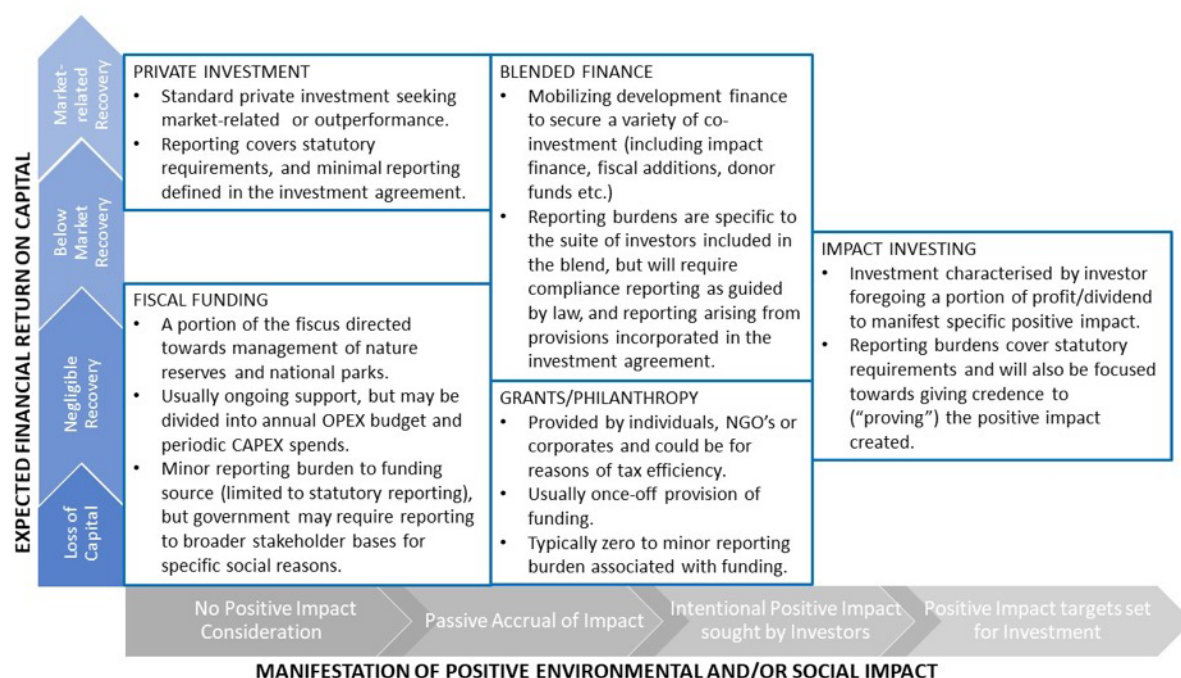


Figure 5-1. The relationship amongst funding types, financial returns, and positive impact

Each type of funding source will have reporting requirements defined by the goals and objectives of the capital partners, whether in the form of grants or direct investment with the expectation of capital returns. Management of the TFCAs understand their specific context and regulatory framework, and this should inform the types of funding they seek out. For example, where a TFCA is low on human capital capable of monitoring environmental and social data parameters and compiling reports relevant to impact investors, the focus should be on seeking out and securing fiscal funding, private funding or philanthropic funds which are usually associated with lower data monitoring and reporting requirements than impact funding. A different TFCA with a larger pool of human resources may favour

impact funding over fiscal funds in countries where fiscal conservation funding is subject to austerity measures and/or other cutbacks, for example, those related to the COVID-19 pandemic (Waldron et al., 2013; OECD, 2020).

6 CONCLUSION

6.1 The Value of TFCAs and Non-Substitutability

Transfrontier Conservation Areas provide a multitude of benefits to communities living in proximity to the protected areas as well as those further afield. Using available literature, the study clearly shows that TFCAs provide real value in the form of ecosystem services and are therefore an irreplaceable ecological asset for the entire SADC region and the global community.

SADC emphasizes that, at the core of the TFCA value proposition, lies the re-establishing, renewing, and preserving of large functional ecosystems where natural resources and cultural heritage can be protected and regenerated. Given that TFCAs exist in a mosaic of different land-uses, this effort needs to be extended to many different stakeholders and to take cognisance of different points of view. The ultimate purpose of this is to supply the range of ecosystem services that are valuable to humans, ranging from the array of livelihood services provided to resource-dependent communities, to the utility humans gain from knowing that these systems are managed ethically and preserved for the future generations.

TFCAs thus comprise multi-land use areas that are unique and non-substitutable. The attributes that make SADC TFCAs unique are:

- Southern African biomes that provide habitats for globally unique biodiversity
- Specific charismatic natural features that are globally unique and famous
- Specific ecosystems that preserve unique and keystone ecological processes
- An extensive scale, both in terms of landscape and the benefits that are provided to humans
- A trans-frontier management approach that fosters regional cooperation and stability for the benefit of local communities and countries.

In the discipline of economics, when an asset is non-substitutable, conducting a natural capital valuation for pricing the asset only, is not required. This is because the asset is not for sale and should be conserved. However, in the normal course of TFCA management, many complex management decisions must be made that directly or indirectly impact the TFCA or natural assets within the system. To provide information to decision-makers, valuation becomes a powerful management tool. The sheer scale and complexity associated with TFCA ecosystems, its management and the use of its resources imply that anthropogenic activities and associated hazards, pose risks to the natural assets of TFCAs. These risks need to be mitigated if the benefits provided by the TFCAs are to be maintained and improved. Valuation enables analyses of these risks and can underpin the planning and financing of mitigation interventions.

6.2 TFCAs Provide Benefits to Society

Broadly, the case studies described in Section 3 identified three sets of TFCA beneficiaries that derive value from the TFCA natural assets:

1. Local communities that have a direct livelihood dependence linked to the TFCAs – these communities benefit primarily through provisioning services, such as food, fodder, fibre, fuel wood and job creation through eco-tourism activities. Some of these services have specific benefits for women. These benefits provided by TFCAs can be expressed through various

measures of household income and well-being, as well as Sustainable Development Goal (SDG) measures.

2. Country citizens who have direct and indirect welfare dependence on the TFCAs – these people benefit through the regulating services provided to the national economy, the national economic impacts of tourism and the opportunity to enjoy a range of cultural services. These benefits can be expressed as contributions to macro-economic indicators such as contribution to GDP, as well as other welfare indicators not captured by GDP.
3. Citizens from other countries derive direct and indirect benefits from the TFCAs – these people benefit through a range of provisioning, cultural and regulating services. These benefits are often measured through a country's GDP through eco-tourism activities, but there exists also a willingness to pay variable, which is difficult to measure, and which relates to the unique and scarce features of TFCAs.

6.3 Increasing Investment in TFCAs

The benefits that TFCAs provide are at risk from a range of hazards including land-use change, pollution, direct exploitation of species, climate change, and invasion of alien species and disease. Mitigation of these risks requires additional sources of investment from either the Member States, ICPs or new investment sources. Additionally, investment in TFCAs is also crucial to safeguard the current flow of benefits as well as to potentially enhance any future flows.

While the legislative and institutional frameworks may not be ready for all the Member States, new, innovative financing investment types including the following should be investigated for implementation:

1. Debt for Nature Swaps;
2. Carbon Trading;
3. Biodiversity Offsets and Biobanking;
4. Wildlife Conservation Bonds;
5. Payment for Water Catchment Services; and
6. Direct Investment.

These new, innovative financing mechanisms coupled with support from the Member States and ICPs, could go a long way toward securing the ecological assets that are the TFCAs as well as safeguarding the current and future flows of benefits to society.

6.4 Way Forward

It must be acknowledged that the capacity for SADC TFCAs to produce and deliver benefits through ecosystem services is being compromised because of numerous anthropogenic threats and dynamics. Additional sources of investment from the Member States, ICPs and/or new investment sources are required for:

- Mitigation of threats and the securing of the resource base;
- Safeguarding current benefit flows; and

- Enhancing current and future benefit flows.

Solutions for increased investment lie in:

- Overcoming political instability;
- Securing macro-economic stability;
- Facilitating an investor friendly political and regulatory enabling environment; and
- Positioning conservation as a legitimate land-use that supports socio-economic resilience.

Only then, can TFCAs access new, innovative financing mechanisms, although it may be possible to secure investments based on proof of restoration and avoided degradation. In addition to the above TFCA practitioners need to:

- Embrace the need to better understand and represent the value of their TFCAs to decision-makers, funders, and potential investors.
- Identify opportunities to secure investments to improve the management effectiveness of their TFCAs.
- Embrace the need to play the role of broker and/or facilitate brokerage processes necessary to secure a diversity of financial and socio-economic agreements - an investment prospectus.
- Establish and implement robust M&E processes aimed at measuring the production and flow of ecosystem services and their benefits and use every opportunity available to report on these.
- Use the findings of this study as a point of departure to build on and refine the value proposition for their TFCAs.

7 REFERENCES

- Borjesson, G., Bolinder, M.A., Kirchmann, H. and Katterer, T. 2018. Organic carbon stocks in topsoil and subsoil in long-term ley and cereal monoculture rotations. *Biology and Fertility of Soils*, 54, 549 – 558.
- Buotte, P.C., Law, B.E., Ripple, W.J. and Berner, L.T. 2020. Carbon sequestration and biodiversity co-benefits of preserving forests in the western United States. *Ecological Applications*, 30(2).
- CBD Working Group, (2021). First Draft of the Post-2020 Global Biodiversity Framework. <https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf>
- CESVI (2003). Sustainable Development and Natural Resource Management in Southern Zimbabwe. CESVI office, Harare, Zimbabwe.
- Coalition for Private Investment in Conservation (CPIC), 2021. Conservation Finance 2021 – An Unfolding Opportunity.
- COFACE (2020). COFACE Country and Sector Risks Handbook 2020.
- Conservation International. (2022). Newsroom. Retrieved from Conservation International: <https://www.conservation.org/press-releases/2021/03/12/afd-and-conservation-international-launch-11.6-million-project-to-restore-degraded-rangelands-in-southern-africa-and-uplift-rural-communities>
- Crafford, J.G.; Moynihan, M.; Harris, K.R.; Mulders, J.A.; Crafford, D. (2022). Willingness to pay for the conservation of unique landscapes – a revealed preference method. Unpublished report. Prime Africa Consult.
- de Graaf, G. & Garibaldi, I. (2014). The value of African fisheries. *FAO Fisheries and Aquaculture*. No. 1903. Rome, FAO.
- De Minin, E., Leader-Williams, N. & Bradshaw, C.J.A. (2016). Banning Trophy Hunting Will Exacerbate Biodiversity Loss. *Trends in Ecology and the Evolution*. 31(2): 99-102.
- Environmental Incentives, LLC. (2021). Protecting East Africa's Natural Capital. The Cost of Inaction. United States Agency for International Development.
- FAO. (2019). The State of the World's Biodiversity for Food and Agriculture, J. Bélanger & D. Pilling (eds.). FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome.
- GIZ. (2021). Scoping study to identify ongoing development initiatives in the areas of natural resource management, agriculture, climate change; tourism in the SADC member states. Summary Document. Seanama Conservation Consultancy. The results can be accessed online: <https://tfcaportal.org/donor-projects>
- GIZ and KfW. (2022). 20 years of SADC Transfrontier Conservation Areas (TFCA) Investment. German Development Cooperation support to sustainable cross-border management of shared natural resources.
- Guerbois C., and Fritz H. (2017). Patterns and perceived sustainability of provisioning ecosystem services on the edge of a protected area in times of crisis. *Ecosystem Services* 28:196-206.
- Haines-Young, R. and Potschin, M.B. (2018): Common International Classification of Ecosystem Services (CICES) V5.1 and Guidance on the Application of the Revised Structure. Available from www.cices.eu
- IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. IPBES (2019). Report of the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on the work of its seventh session. Paris, 29 April–4 May 2019.
- IUCN. (2016). Informing decisions on trophy hunting. Briefing Paper.

- IUCN (2020). Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: IUCN. ISBN: 978-2-8317-2058-6.
- IUCN ESARO (2020). The state of protected and conserved areas in Eastern and Southern Africa. State of Protected and Conserved Areas. Report Series No. 1. Nairobi, Kenya: IUCN ESARO.
- Jewitt, G., Zunckel, K., Dini, J., Hughes, C., de Winnaar, G., Mander, M., Hay, D., Pringle, C., McCosh, J., and Bredin, I. (eds.), (2015), 'Investing in ecological infrastructure to enhance water security in the uMngeni River catchment, Green Economy Research Report No. 1, Green Fund, Development Bank of Southern Africa, Midrand.
- Kruid, S., Macedo M.N., Gorelik, S.R., Walker, W., Moutinho, P., Brando, P.M., Castanho, A., Alencar, A., Baccini, A. and Coe, M.T. 2021. Beyond Deforestation: Carbon Emissions from Land Grabbing and Forest Degradation in the Brazilian Amazon. *Frontiers in Forests and Global Change*, Volume 4, Article 645282, July 2021.
- Lindsey, P. et al. (2020). Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond. *Nature Ecology and Evolution*. 4: 1300-1310.
- Lubbe, W.D. (2015). Straddling borders and legal regimes: A legal framework for transfrontier biodiversity conservation in SADC. PhD Thesis.
- Lynam T., Cunliffe R., Mapaure I., and Bwerinofa I. (2003). Assessment of the value of woodland landscape function to local communities in Gorongosa and Muanza Districts, Sofala Province, Mozambique. Report for the Center for International Forestry Research.
- Maua, J.O., Tsingalia, H.M. & Cheboiwo, J. (2019) Economic value of non-timber forest products utilized by the households adjacent to the South Nandi forest reserve in Kenya, *East African Agricultural and Forestry Journal*, 83:4, 368-391, DOI: [10.1080/00128325.2019.1660037](https://doi.org/10.1080/00128325.2019.1660037)
- Maloti–Drakensberg Transfrontier Project (MDTP), (2004). Payment for Environmental Services Baseline Study. Futureworks. Everton
- Maloti–Drakensberg Transfrontier Project (MDTP), (2007). Payment for ecosystem services: developing an ecosystem services trading model for the Mnweni/ Cathedral Peak and Eastern Cape Drakensberg areas. INR Report IR281. Development Bank of Southern Africa, Department of Water Affairs and Forestry, Department of Environment Affairs and Tourism, Ezemvelo KZN Wildlife, South Africa.
- Milcu, A. I., Hanspach, J., Abson, D., & Fischer, J. (2013). Cultural ecosystem services: a literature review and prospects for future research. *Ecology and Society* 18(3):44.
- Millennium Ecosystem Assessment, (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC
- Moynihan, M., Mulders, J.A.; Crafford, J., Mathebula, V., Eatwell, K., Harris, K.R. 2021. Ecosystem services valuation within NG41 in Botswana. Study undertaken for the Government of Botswana supported by the UNDP (in progress). Pretoria, South Africa.
- Naidoo, R., Weaver, L.C., Diggle, R.W., Matongo, G., Stuart-Hill, G. & Thouless, C. (2016). Complementary benefits of tourism and hunting to communal conservancies in Namibia. *Conservation Biology*. 30(3): 628-638.
- Naidoo, R., Beytell, P, Brennan, A., Killian, W., McCulloch, G., Stronza, A., Taylor, R., Tsholofelo, C., & Songhurst, A. (2022). Challenges to elephant connectivity from border fences in the world's largest Transfrontier Conservation Area. *Frontiers in Conservation Science*. 3:788133.
- Organisation for Economic Cooperation and Development (OECD). (2020). *A Comprehensive Overview of Global Biodiversity Finance – Final Report*.

- PPF. (2019). Feasibility Assessment of Easier Movement of Tourists by Air and Land Within and Between Transfrontier Conservation Areas (TFCA) In the Southern African Development Community (SADC). An investigation conducted for the PPF by Prime Africa Consult.
- PPF. (2021). Retrieved from Peace Parks Foundation: <https://www.peaceparks.org/about/the-dream/>
- PPF. (2022). Hearing 4 Health. Retrieved from Peace Parks Foundation: <https://www.peaceparks.org/h4h/>
- PPF. (2022). Retrieved from Peace Parks Foundation: <https://www.peaceparks.org/tfcas/greater-mapungubwe/>
- Prime Africa. 2022. Grazing value of SADC rangelands – an investigation of FAO data. Unpublished research report.
- Saayman, M., van der Merwe, P. & Saayman, A. (2018). The economic impact of trophy hunting in the South African wildlife industry. *Global Ecology and Conservation*. 16: 1-9.
- Schlossberg, S., Chase, M. J., and Griffin, C. R. (2018). Poaching and human encroachment reverse recovery of African savannah elephants in south-east Angola despite 14 years of peace. *PLoS ONE* 13: e0193469. doi: 10.1371/journal.pone.0193469.
- Schroeder, D., Chennells, R., Louw, C., Snyders, L. & Hodges, T. (2019) The Rooibos Benefit Sharing Agreement—Breaking new ground with respect, honesty, fairness, and care. *Cambridge Quarterly of Healthcare Ethics*. 29(2): 285-301.
- Scullion, J., Thomas, C.W., Vogt, K.A., Pérez-Maqueo, O., & Logsdon, M.G. (2011). Evaluating the environmental impact of payments for ecosystem services in Coatepec (Mexico) using remote sensing and on-site interviews. *Environmental Conservation* 38:426-434.
- Shackleton C., Shackleton S., Gambiza J., Nel E., Rowntree K., and Urquhart P. (2008). Links between Ecosystem Services and Poverty Alleviation: Situation analysis for arid and semi-arid lands in southern Africa. Report submitted to Ecosystem Services and Poverty Reduction Research Programme: DFIF, NERC, ESRC. January 2008.
- Snyman, S., Sumba, D., Vorhies, F., Gitari, E., Enders, C., Ahenkan, A., Pambo, A.F.K., & Bengone, N. (2021). State of the Wildlife Economy in Africa. African Leadership University, School of Wildlife Conservation, Kigali, Rwanda.
- South African National Biodiversity Institute (SANBI) (2012). Supply Chain Management for Payment for Ecosystem Services in the Upper uThukela and Umzimvubu Catchments: PES Brokerage in the Upper uThukela. Report compiled by Kevan Zunckel of Zunckel Ecological + Environmental Services, Hilton, South Africa, May 2012; as part of SANBI's National Grassland Biodiversity Programme.
- South African National Biodiversity Institute (SANBI) (2013a). Assessment of Ecological Infrastructure for Three Potential Dams in the Umzimvubu Catchment Area. Report compiled by Kevan Zunckel of Zunckel Ecological + Environmental Services, Hilton, South Africa, July 2013; as part of SANBI's National Grassland Biodiversity Programme.
- South African National Biodiversity Institute (SANBI) (2013b). Supply Chain Management for Payment for Ecosystem Services in the Upper uThukela and Umzimvubu Catchments: Investments into Ecological Infrastructure in the Greater uMngeni River Catchment. Report compiled by Kevan Zunckel of Zunckel Ecological + Environmental Services, Hilton, South Africa, July 2013; as part of SANBI's National Grassland Biodiversity Programme.
- Southern African Development Community (SADC) (1999). Protocol on Wildlife Conservation and Law Enforcement.
- Southern African Development Community (SADC) (2013). SADC Programme for Transfrontier Conservation Areas. SADC Secretariat, Gaborone, October 2013.

- Southern African Development Community (SADC) (2014). Southern African Development Community Transfrontier Conservation Guidelines: The establishment and development of TFCA initiatives between SADC Member States. Report compiled by Kevan Zunckel for the Secretariat for the SADC Directorate for Food, Agriculture and Natural Resources (FANR), Gaborone, Botswana. January 2014.
- Southern African Development Community (SADC) (2017). Southern African Development Community Transfrontier Conservation Areas Monitoring and Evaluation Framework (SADC TFCAs M&E Framework). Report compiled by Clara Bochino for the SADC Secretariat, Gaborone, Botswana. September 2017
- Southern African Development Community. (2022, March). Herding for Health. Retrieved from SADC Transfrontier Conservation Areas: <https://tfcaportal.org/herding-health-2>
- Spenceley, A., Schägner, J. P., Engels, B., Cullinane Thomas, C., Engelbauer, M., Erkkonen, J., Job, H., Kajala, L., Majewski, L., Mayer, M., Metzler, D., Rylance, A., Scheder, N., Smith-Christensen, C., Souza, T. B. and Woltering, M. (2021). Visitors count! Guidance for protected areas on the economic analysis of visitation. United Nations Educational, Scientific and Cultural Organization, Paris, France and German Federal Agency for Nature Conservation, Bonn, Germany.
- TEEB. (2010). The Economics of Ecosystems and Biodiversity Ecological and Economic Foundations. Edited by Pushpam Kumar. Earthscan: London and Washington
- Twine W., Moshe D., Netshiluvhi T., and Siphugu V. (2003). Consumption and direct-use values of savanna bio-resources used by rural households in Mametja, a semi-arid area of Limpopo province, South Africa. South African Journal of Science. 99: 467-473.
- United Nations. (2021). System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA). White cover publication, pre-edited text subject to official editing. Available at: <https://seea.un.org/ecosystem-accounting>.
- UNEP. (2012). The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy. Project Coordinator: Thierry De Oliveira Authors: Jackie Crafford, Rita Strohmaier, Pablo Muñoz, Thierry De Oliveira, Christian Lambrechts, Melanie Wilkinson, Amelia Burger, and Jan Bosch. https://wedocs.unep.org/bitstream/handle/20.500.11822/8513/Montane_Forests_Kenya.pdf?sequence=3&isAllowed=
- UNEP. (2017). Forestry and Macroeconomic Accounts of Nigeria: The Importance of Linking Ecosystem Services to Macroeconomics. Project Director: Dr Thierry de Oliveira United Nations Environment Program. Prepared by: Dr Jackie Crafford, Mr Joseph Mulders, Mr Nuveshen Naidoo, Ms Dineo Maila, Mr Valmak Mathebula, and Mr Kyle Harris - Prime Africa. <https://wedocs.unep.org/handle/20.500.11822/33378>
- UNESCO. (2022). World Heritage Convention. Retrieved from UNESCO: <https://whc.unesco.org/en/list/1099/>
- University of Pretoria. (2022). Herding for Health. Retrieved from University of Pretoria: https://www.up.ac.za/research-matters/news/post_2989252-herding-for-health
- Valach, A.C., Kasak, K., Hemes, K.S., Anthony, T.L., Dronova, I., Taddeo, S., Silver, W.L., Szutu, D., Verfaillie, J. and Baldocchi, D.D. (2021). Productive wetlands restored for carbon sequestration quickly become net CO₂ sinks with site-level factors driving uptake variability. PLoS One, 16(3).
- Verschuuren B., Mallarach J-M., Bernbaum, E., Spoon J., Brown S., Borde R., Brown J., Calamia M., Mitchell N., Infield M and Lee E. (2021). Cultural and spiritual significance of nature. Guidance for protected and conserved area governance and management. Best Practice Protected Area Guidelines Series No. 32, Gland, Switzerland: IUCN. XVI + 88pp.
- Viviroli, D., H. H. Dürr, B. Messerli, M. Meybeck, and R. Weingartner (2007), Mountains of the world, water towers for humanity: Typology, mapping, and global significance, Water Resour. Res., 43, W07447, doi:10.1029/2006WR005653.

- Waldron, A., Mooers, A.O., Miller, D.C., Nibbelink, Redding, N.D., Kuhn, T.S., Roberts, J.T. and Gittleman, J.L. (2013). Targeting global conservation funding to limit immediate biodiversity declines. Proceedings of the National Academy of Sciences of the U.S.A, July 16, 2013, 110 (29) 12144-12148.
- World Bank Group. (2020). Global Investment Competitiveness Report 2019/2020: Rebuilding Investor Confidence in Times of Uncertainty. Washington, DC: World Bank.
- WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.
- Zunckel K. (2003) Managing and Conserving Southern African Grasslands with High Endemism. Mountain Research and Development 23(2): 113-118.

8 APPENDIX 1: TFCA STATUS QUO

Table 8-1: The status quo of SADC TFCAs based on information gathered from tfcaportal.org and peaceparks.org as of February 2022 (blank cells reflect the unavailability of information at the time of writing).

TFCA	Countries Involved	Type of Agreement	Governance Structures	Pre- and/or Feasibility Assessments	Record of Monitoring & Evaluation (M&E) and or Management Effectiveness Tracking Tool (METT)	Long-Term Viability Plan
/Ai /Ais-Richtersveld Transfrontier Park	South Africa and Namibia	MoU signed in August 2001. Treaty signed in August 2003.	Bi-lateral ministerial and technical committees. 2010 - Joint park management committee, comprising park managers from both countries. 2011 - The /Ai/Ais-Richtersveld joint management board approved the park's integrated development plan and joint operations strategy.	Extensive community consultation.	Joint patrols for monitoring and law enforcement implemented and training provided in the use of geographic information systems (GIS) – enabling the use of monitoring tools needed in conservation and the creation of management maps. No records of M&E and/or METT.	Donor funding.
Chimanimani TFCA	Mozambique and Zimbabwe	MoU signed on 8 June 2001.	Not known at present.	Not known at present.	Not known at present.	Not known at present.
Great Limpopo Transfrontier Conservation Area	Mozambique, South Africa, and Zimbabwe	Tri-lateral agreement signed in 2000 and Joint Operational Plan in place. The Presidents of Mozambique, South Africa, and Zimbabwe signed the international Treaty for the establishment of GLTP in 2002.	Ministerial committee, Joint management board and management committees. April 2014 – bi-lateral MoU between Mozambique and SA for joint law enforcement with a joint park management committee and a joint wildlife-crime	GEF funded studies in 1991 and 1996.	At the SANParks level, but not the TFCA level. The TFCA Unit of the South African Dept. of Forestry Fisheries and Environment used to carry out an assessment of two TFCAs per year using the PPF's Performance Appraisal tool but have not done	Donor funding.

TFCA	Countries Involved	Type of Agreement	Governance Structures	Pre- and/or Feasibility Assessments	Record of Monitoring & Evaluation (M&E) and or Management Effectiveness Tracking Tool (METT)	Long-Term Viability Plan
			strategy established in 2015.		this since the onset of the COVID pandemic. They plan to begin the assessment process again using the SADC TFCA M&E Framework but have not started yet.	
Greater Mapungubwe Transfrontier Conservation Area	Botswana, South Africa, and Zimbabwe	MoU signed in 2006.	Tri-lateral Management Committee. 2011 - The Greater Mapungubwe TFCA resource management committee. 2016 - The trilateral technical committee endorses a joint operations strategy for the TFCA.	CESVI (2003) report on land use and resource management options.	Only in terms of income generated and distributed to beneficiaries.	Donor funding.
Iona-Skeleton Coast TFCA	Angola and Namibia	MoU signed in 2003. Memorandum of Agreement, closer in composition to a Treaty than an MoU, was signed in 2018.	Not known at present.	Not known at present.	Not known at present.	Not known at present.
Kagera Transfrontier Conservation Area	Rwanda, Tanzania, and Uganda	In concept stage.	Not known at present.	Not known at present.	Not known at present.	Not known at present.
Kavango Zambezi (KAZA) Transfrontier Conservation Area	Angola, Botswana, Namibia, Zambia, and Zimbabwe	Multi-national treaty signed in 2011.	7th December 2006 – MoU signed by the partner countries.	There is a pre-feasibility report dated 2006 which is a	The KAZA M&E Tool was developed in 2015 and has been populated to	Donor funding. KAZA Fund.

TFCA	Countries Involved	Type of Agreement	Governance Structures	Pre- and/or Feasibility Assessments	Record of Monitoring & Evaluation (M&E) and or Management Effectiveness Tracking Tool (METT)	Long-Term Viability Plan
			18th of August 2011 - Heads of States of the five governments sign a Treaty. Ministerial Committee. Committee of Senior Officials. Joint Management Committee. Secretariat and implementing agency. National Committees.	subjective strategy to take the initiative forward rather than an objective assessment of feasibility. The fact that it concludes by recommending a 'donor conference' high lights the perpetuation of donor dependency.	some extent, but little evidence of on-going use and related reports emerging.	
Kgalagadi Transfrontier Park	Botswana and South Africa	Bi-lateral agreement signed in 1999.	A Joint Management Board, which meets bi-annually and alternates between the two countries, has been established, but has not functioned since 2017. JUNE 1992 - South African National Parks and the Department of Wildlife and National Parks of Botswana set up a joint management committee.	Formal agreements based on evidence from on-the-ground management collaboration.	At the SANParks level, but not the TFP.	Donor funding.
Liuwa Plains – Mussuma Transfrontier Conservation Area	Angola and Zambia	In process.	None at present.	None.	N/A.	Not known at present.


TFCA	Countries Involved	Type of Agreement	Governance Structures	Pre- and/or Feasibility Assessments	Record of Monitoring & Evaluation (M&E) and or Management Effectiveness Tracking Tool (METT)	Long-Term Viability Plan
Lower Zambezi - Mana Pools Transfrontier Conservation Area	Zambia and Zimbabwe	None at present but the supporting documentation, preparatory work and draft MoU is ready for the Governments of Zambia and Zimbabwe to formalise the TFCA.	None at present.	None.	N/A.	Not known at present.
Lubombo Transfrontier Conservation and Resource Area including the Lubombo Conservancy-Goba TFCA (Mozambique, eSwatini), Ponta do Ouro-Kosi Bay TFCA (Mozambique, South Africa), Nsubane-Pongola TFCA (South Africa, eSwatini), Usuthu-Tembe-Futi TFCA (Mozambique, South Africa) and the Songimvelo-Malolotja TFCA (South Africa, eSwatini)	Mozambique, eSwatini and South Africa.	Tri-lateral General Protocols signed in June 2000.	Ministerial committee, Commission, and task groups.	The Lubombo Strategic Development Initiative is seen as the precursor to the TFCA.	None.	Donor funding.
Malawi-Zambia Transfrontier Conservation Area	Malawi and Zambia	MoU signed in 2004 and a bi-lateral treaty signed in 2015.	Joint integrated management committee established in 2016.	A PPF study preceded government agreement to explore the possibility of the TFCA.	Not known at present.	Donor funding.

TFCA	Countries Involved	Type of Agreement	Governance Structures	Pre- and/or Feasibility Assessments	Record of Monitoring & Evaluation (M&E) and or Management Effectiveness Tracking Tool (METT)	Long-Term Viability Plan
Maloti-Drakensberg Transfrontier Conservation and Development Area	Lesotho and South Africa	Bi-lateral MoU signed in 2000.	Bi-lateral Coordination Committee and bi-lateral working groups. Ezemvelo KZN Wildlife, maintain a small unit dedicated to coordinating the TFCA's activities in South African. In Lesotho, the Department of Environment within the Ministry of Tourism, Environment and Culture, holds this responsibility. A 5-year Joint management plan completed in 2013.	A three-year project was commissioned to prepare the GEF funding application and included in this were numerous studies into the various aspects related to the project.	Population dynamics of the Bearded Vulture and cross-border crime are the only transfrontier elements that are monitored.	The respective governments are continuing to support the governance structures with a small project implementation unit being maintained in South Africa. Donor funding is required to support implementation in Lesotho.
Mayombe Forest Transfrontier Conservation Area	Angola, Congo, Democratic Republic of Congo, and Gabon.	MoU signed in 2009.		Studies have been recommended.	N/A.	
Mnazi Bay-Quirimbas Transfrontier Conservation Marine Area	Mozambique and Tanzania	In concept stage.				
Niassa - Selous TFCA	Mozambique and Tanzania	MoU on cross-border cooperation signed in 2007.	Community based organisations managing Wildlife Management Areas.	Gesellschaft für Technische Zusammenarbeit (GTZ) and GEF projects.	None.	Donor funding.

TFCA	Countries Involved	Type of Agreement	Governance Structures	Pre- and/or Feasibility Assessments	Record of Monitoring & Evaluation (M&E) and or Management Effectiveness Tracking Tool (METT)	Long-Term Viability Plan
Western Indian Ocean Transfrontier Conservation Area	Comoros, France, Madagascar, Mauritius, Mozambique, Seychelles, South Africa, and Tanzania	In concept stage.				
ZIMOZA Transboundary Natural Resource Management Project	Mozambique, Zambia, and Zimbabwe	MoU in concept stage since 2002.				

9 APPENDIX 2: TFCA SYSTEMS DESCRIPTION


9.1 /Ai /Ais-Richtersveld Transfrontier Conservation Area

Name	/Ai/Ais-Richtersveld Transfrontier Park		
Member States	Namibia (75%) South Africa (25%)		
Area	5 920 km ²		
Category	Category A: Treaty Signed		
Timeline	MOU signed in 2001 and Formal Treaty signed on August 1, 2003.		
Ecoregions	Nama Karoo (24%) Namib Desert (5%) Namibian Savanna Woodland (15%) Succulent Karoo (56%)		
Brief Overview and Objective	<p>“The /Ai/Ais-Richtersveld Transfrontier Park (ARTP) measures 5 920 km² and spans some of the most spectacular arid and desert mountain scenery in southern Africa. It includes the /Ai/Ais Hot Springs Game Park in Namibia and the Richtersveld National Park and Richtersveld World Heritage Site in South Africa.” (SADC)</p>		
Joint Operations and TFCA Key Performance Areas	<p>There are Joint Planning and Operations in Place and several Joint training programmes already conducted or underway. However, it is unclear if Joint Management Strategy exists. This TFCA ranks relatively high in term of Key Performance Areas of a TFCA due to its relative financial stability, positive community engagement and joint trainings and operations.</p>		
Carbon Stocks	Sum of above ground, below ground and soil carbon = 5 442 044 Mg (mean = 2 096 Mg) for Richtersveld NP and 13 524 199 Mg (mean 2 522 Mg) for /Ai/Ais Hot Springs Game Reserve.		
Water Resources	<p>This TFCA includes the Orange River mouth which is a wetland of international importance and a designated RAMSAR Wetland Site. In addition:</p> <p>“There are eight river ecosystem types in the park of which 97 % of river length are classified as a “Category AB” (Largely natural). The remaining 3 % are in “Category C” (moderately modified). Eight percent of the rivers and streams are classified as Freshwater Ecosystem Priority Areas (FEPAs) (Nel et al., 2011), furthermore 38 % of the rivers also act as an important fish corridor bordering /inside the park. There are four wetland ecosystem types in the park of which 4 % are in “Good” condition and 96 % are “Moderately Modified”. There are no wetland FEPAs assigned to the park.” (Richtersveld Management Plan)</p>		
Significant Cultural and	<p>- The Nama cultural heritage is central to the park: “The Richtersveld is one of the last regions where the Nama people’s traditional lifestyle, based on nomadic pastoralism,</p>		

<p>Biodiversity Features</p>	<p>has been preserved. It is a way of life particularly well adapted to arid regions. The herders and their flocks move over long distances following the sparse rainfall, thus avoiding the overgrazing that is often associated with a non-nomadic lifestyle. The preservation of the Nama languages is one of the objectives of the Richtersveld National Park. This language has remained better preserved in the Richtersveld than in other part of Namaqualand” (www.peaceparks.org)</p> <ul style="list-style-type: none"> - Limited development in the park, relatively free of pollution, geomorphology, vegetation, climate, uninterrupted landscape. - The TFP is incredibly rich from a geological perspective with the oldest rocks being around 2 000 million years old. - The Park is dominated by the Fish River Canyon – the second largest in the world – that took over 600 million years to evolve. It also contains some hidden treasures such as the little-known Apollo 11 Cave, containing animal images more than 25 000 years old. - This TFP is home to various mega succulents making up 30% of all succulent species found in South Africa with new species being discovered regularly. Several endemic plant species occur in small colonies with about 30% of total floristic composition being endemic to the park. Bastard Quiver Tree (<i>Aloidendron pillansii</i>) and Half-mens (<i>Pachypodium namaquanum</i>). Over 50 species of mammals including mountain Zebra and Oryx, Leopard, Brown Hyena and Cape Clawless Otter; 200 birds’ species a large diversity of lizards, snakes, tortoises, and scorpions. The /Ai/Ais Hot Springs Game Reserve contains the largest free ranging population of Hartmann's Zebra in Namibia. - Parks on both sides are remote, but accessible by road. Road conditions are variable. Not a lot of tourism infrastructure - RNP has one tourist camp with ten huts sleeping 28 people and another five camping areas with a total of 56 campsites. However, there are many Ecotourism activities available including: <ul style="list-style-type: none"> - Hiking: There are many hiking trails available in both the Richtersveld (South African) and /Ai /Ais (Namibian) sections of the park. The Namibian side of the park is best renowned for the 5- day, self-supported Fish River Canyon hike, this is a seasonal hike, please check details before booking. On the Richtersveld side, the following options are available: <ul style="list-style-type: none"> - Vensterval Trail (4 days, 3 nights) - Lelieshoek-Oemsberg Trail (3 days, 2 nights) - Kodaspiek Trail (2 days, 1 night) - Mountain biking: Various mountain biking trails and options are available in the area, with some single track and plenty of gravel roads available for mountain biking enthusiasts. The Desert Knights Mountain Bike tour is a five day, fully catered tour offering the best of ARTP mountain biking. - Kayaking: Inside the park Desert Kayak Tours offer 1,2 and 4 day fully catered and guided kayaking tours down the Orange River through the ARTP. - Camping - Enjoying the Hot springs - Self-drive - Fishing and fly fishing <p>(https://boundless-southernafrica.org/ai-ais-richtersveld/)</p>
<p>Threats & Pressures</p>	<ul style="list-style-type: none"> - Invasive Species, but at a low invasion level - Poaching occurs but also at low levels - Human-Wildlife Conflict exists with local bordering farmers and affects the predation of livestock, but limited information on how extensive a problem it is. - Mining is the largest competing land-use threat to the park with several areas along the river under Exclusive Prospecting Licenses. Diamond mining occurs within the boundaries of the RNP at Ace Plant, Grasdrift, Jakkalsberg, Oena and Sendelingsdrift. - This area is expected to be substantially impacted by climate change as “Dramatic temperature changes have been observed in the Richtersveld area, with significant increases in average minimum and maximum temperatures of 1.1 °C to 1.2 °C in just 20


	years at the Henkries weather station (van Wilgen et al., 2016). The impacts of climate change are already being observed in some places. Quiver trees (<i>Aloe dichotoma</i>) are dying out in areas with increased evapotranspiration (i.e., in places where rising temperatures cause increased water to evaporate off the earth's surface and from plants). But, while the West Coast of South Africa in general is expected to become drier, the Orange River could experience increased rainfall in its catchment area, making the river mouth one of few stable West Coast estuaries and an important refuge for estuarine species." (Richtersveld Management Plan)
Community Indicators	<p>The Richtersveld National Park in the South African component belongs to the community (a contractual agreement resulting from a land claim). Residents have the right to live in the park and graze a total of 6 000 head of livestock. However, the majority choose to live in four settlements adjacent to the park with only livestock herders choosing to live inside the park.</p> <p>It is unclear whether there are communities present in the /Ai/Ais Hot Springs Game reserve and limited information was available on the population densities and community indicators in the other areas of the TFCA's outside of the parks.</p>
Opportunities	With the current Ecotourism activities taking place in this area and high social capital with local communities, this TFCA is well situated to enhance Eco-tourism offerings that contribute to the livelihoods of local beneficiaries. The Park is also a positive case study in contractual/community owned lands designated as a National Park with high levels of community engagement in the management process.
Data Needs & Gaps	No Joint Management Plan sourced, little information available on the Community Indicators and Land-Use and Economic Indicators outside of the Protected areas (Richtersveld NP and /Ai/Ais Hot Springs Game Reserve) as well as Opportunities

9.2 Chimanimani Transfrontier Conservation Area

Name	Chimanimani TFCA	
Member States	Zimbabwe Mozambique	
Area	3 021 km ² (TFCA website) other reports 4091km ²	
Timeline/History	MOU (Category B) signed on June 8 2001	
Ecoregions	Eastern Zimbabwe montane forest-grassland mosaic (4%) Southern Miombo Woodland (96%)	
Brief Overview and Objective	Rugged landscape comprised of Quartzite Mountains and several cascading rivers in pristine condition. It consists of a core TFCA area and buffer zone that spans across the Mozambique-Zimbabwe border. Objective: Conservation of Biodiversity	

Joint Operations and TFCA Key Performance Areas	Management plant only in Chimanimani Nature Reserve (Mozambique). No joint operations plan or KPAs.
Water Resources	The entire area lies within the Buzi River System and there are two major rivers flowing through: the Haroni River meets the Rusitu River in the Southwest corner which then flows east into Mozambique to join the Buzi river.
Significant Cultural and Biodiversity Features	The Chimanimani Mountain range is a large area that is in near pristine condition with no development at all. Considered to be an Important Bird Area (IBA) by Birdlife Zimbabwe, and high numbers of rare and endemic plant species. Animal diversity was high pre-war in the 1970s, but many mammal populations were decimated during the war and are not yet recovered. Some burial sites and sites of historical importance, but Cultural Heritage is limited in comparison to other TFCAs.
Threats & Pressures	The main threats to this area are institutional, as there is no overarching management plan in place while a high level of political instability is associated with the region. Other less pressing threats include ecological integrity and social threats through artisanal mining activities encroaching on the protected area. The lack of infrastructure and tourism development also contribute towards questionable levels of financial sustainability.
Community Indicators	Many people living in the Buffer Zones of Mozambique component but none with the CnNR. High levels of unemployment and poverty outside boundary.
Opportunities	Given the presence of communities living within the boundaries and buffer zones of this TFCA, and the vegetation type, there may be opportunity for CBNRM activities through the exploitation of NTFPs. The high levels of endemism also point to opportunities for research and to expand on the current tourism activities.
Data Needs & Gaps	Very little information can be found online regarding the management of this TFCA and its specific KPAs. It is also likely that this area has significant carbon stocks, although no information can be found in this regard.

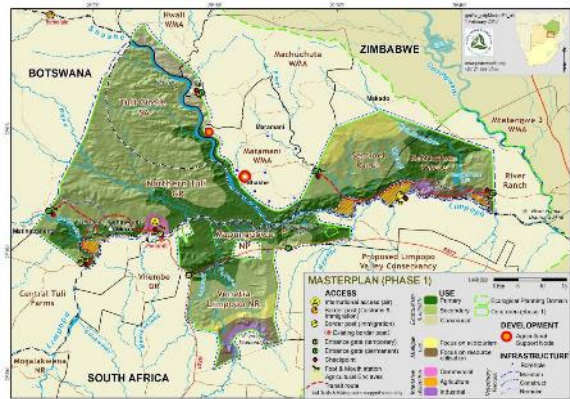
9.3 Great Limpopo Transfrontier Park

Name	Great Limpopo Transfrontier Conservation Area	
Member States	South Africa (43%) Mozambique (43%) Zimbabwe (14%)	
Area	37 572 km ²	
Category	Category A	

Timeline/ History	Kruger National Park declared in 1926. In 1972 Banhine and Zinave in Mozambique are changed from Hunting Areas to National Parks. 1975 Gonarezhou National Park was established. In August 1996 the Transfrontier Conservation Initiative meeting is held in the Kruger National Park and cooperative agreements for transboundary conservation are discussed. The Peace Parks Foundation is then established in February 1997. On the 10th of November 2000 the Skukuza agreement is signed amongst the three nations signalling intent to establish a Transfrontier Park. In 2001 Limpopo National Park is established from the previous hunting concession. A treaty is signed on the 9th of Dec 2002 formally creating the Great Limpopo TFCA
Ecoregions	Drakensburg montane grasslands, woodlands, and forests (1%) Southern African Bushveld (5%) Southern Miombo Woodland (11%) Zambezian and Mopane Woodland (82%) Zambezian halophytics (1%)
Brief Overview and Objective	One of the first established and largest TFCAs in Southern Africa covering extensive Savanna systems, the Great Limpopo TFCA links the Kruger National Park in South Africa to Limpopo National Park in Mozambique and joins Gonarezhou National Park in Zimbabwe through the Sengwe corridor, with the dual objectives of transnational cooperation and ecosystem integrity.
Joint Operations and TFCA Key Performance Areas	SANParks, Mozambique and Peace Parks Foundation are jointly responsible for management operations. Each formally protected area has a management plan, with a joint management plan for the area. The Key Performance Areas of this TFCA rank relatively high with very good joint planning and institutional arrangements, and good policy harmonization and sustainability. Financially, KNP is well positioned, but it is expected that donor funding may be required to make up the shortfall from the Mozambique and Zimbabwean sides. Business development, community engagement, and integrated management strategies are in place.
Water Resources	The TFCA is downstream of six large fully developed catchments and is responsible for water stewardship for further downstream beneficiaries in Mozambique. As such the GLTFCA is implementing the Ecological Reserve principle ensuring the crucial ecosystem service of provisioning healthy water flows for ecosystems and human well-being through engagement with catchment management authorities and influencing water resource management upstream of the area.
Significant Cultural and Biodiversity Features	Significant cultural sites are to be found in this area, particularly in the north, which include Tulamela, with links to Mapungubwe and the Great Zimbabwe Ruins. These cultural ties to the land are reflected in the large number of land claims in the area. Despite the large uninterrupted conservation area this TFCA represents, the area is still functionally quite fragmented in terms of water supply and large herbivores. Nevertheless, the area contains large tracts of undisturbed wilderness, and is host to a wide range of iconic species.
Threats & Pressures	Threats to the ecological integrity and social threats appear to be the highest, with associated threats estimated to be at a medium level. This is largely due to high levels of Rhino and Elephant poaching, some human-wildlife conflict, and the impact of artificial water provisioning. In terms of social pressures, the area has a mix of land tenure systems with

	there being state land in the formally protected areas, private land under conservation and commercial agricultural use, and communal land that is mostly under subsistence agriculture and settlements.
Community Indicators	Some community settlements are present on the Mozambique and Zimbabwe sides of the TFCA, but not in the South African portion. Large settlements exist, however, in the areas directly adjacent to the conservation area in South Africa, with the significant settlements of Bushbuck Ridge, Gazankulu, and KaNgwane directly on the borders of the KNP. There is a strong link between tourism and the communities adjacent the KNP, while some frameworks are in place for sustainable harvesting of natural resources within the GLT by these communities. There remains the challenge of establishing new linkages across to the Mozambique side.
Opportunities	The opportunities on the South African side of the TFCA are arguably being effectively maximized. Structures are also in place here to strengthen the flow of benefits to local communities. Stronger collaboration and training across borders may provide further opportunities to develop tourism and CBNRM activities in the Mozambican and Zimbabwean areas of the TFCA. This potential could also be improved by encouraging the movement of large herbivores into the eastern side of the TFCA.
Data Needs & Gaps	High levels of data are available for the KNP; however, data collection and dissemination could be improved from the other role players in the TFCA.


9.4 Greater Mapungubwe Transfrontier Conservation Area

Name	Greater Mapungubwe Transfrontier Conservation Area		
Member States	South Africa (10%) Zimbabwe (65%) Botswana (25%)		
Area	5 909 km ²		
Category	Category B - MOU signed		
Timeline/ History	The TFCA was established in 2006 when an MOU was signed establishing the intent to develop the area as the Limpopo/Shashe TFCA; later renamed to the Greater Mapungubwe TFCA in 2009 this TFCA then had an official joint operations strategy endorsed in 2016.		
Ecoregions	Zambezian and Mopane Woodlands (94%) Southern Africa bushveld (6%)		
Brief Overview and Objective	The Greater Mapungubwe Transfrontier Conservation Area is located at the confluence of the Limpopo and Shashe rivers and includes conservation lands in three countries namely, South Africa, Botswana, and Zimbabwe. The landscapes in the areas near the Limpopo River are rugged and hilly sandstones while the Tuli circle safari area consists of relatively flat		

	basalts which give way to the Shashe River basin. The altitude of the area ranges from 300-780m ASL.
Joint Operations and TFCA Key Performance Areas	“A trilateral management committee shares intelligence and collaborates on anti-poaching patrols – with marked improvement in the effective protection of the conservation space. Field staff and park rangers also meet regularly to exchange information and develop strategies to overcome their particular challenges.” Although we were unable to source a joint management plan or operational strategy, there seems to be a high level of cross-border collaboration in this TFCA. The TFCA track record and outlook is good owing to management of established protected areas and good tourism infrastructure.
Water Resources	The TFCA is situated at the confluence of the Limpopo and Shashe rivers, two perennial rivers that provide important ecological flows for downstream beneficiaries.
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - Mapungubwe is an area of great cultural and historical importance as it is the home to some Great Zimbabwe Ruins. Evidence has been found to suggest it is the oldest modern capital city in Southern Africa with over 5 000 inhabitants at its peak around 1100 AD, because of this the Mapungubwe Cultural Landscape was listed as a World Heritage Site in 2003. And in 2009 the new Mapungubwe Interpretive centre was named world building of the year at the <u>World Architecture Festival</u>. For more on the important cultural and historical features that make this park an international attraction, see the Cultural/recreational services below. - The TFCA is made up of numerous properties Mapungubwe National Park in South Africa (Northern Tuli Game Reserve in Botswana, and the Tuli Safari Circle in Zimbabwe) each with its own suite of biodiversity. However, some of the notable species protected by this TFCA include Lion, Buffalo, Leopard, Cheetah, spotted hyena and numerous ungulate species including gemsbok, duiker, eland, Sharpe’s grysbok, zebra, blue wildebeest, steenbok, and impala. The area is well-known for its population of over 900 elephant that traverse the Tuli region. - Also, within the Tuli Circle Safari Area lies three botanical reserves: Tolo River (0,44 km²), Pioneer (0,38 km²) and South Camp (0,26 km²). - The Limpopo River acts as a refuge for populations of crocodiles, hippos, and numerous indigenous fish species. - Mapungubwe National Park is home to 26 red data plant species, over 350 bird species and four white rhinos were released into the park in 2004. The De Beer’s Venetia Limpopo Reserve that borders Mapungubwe is also home to released populations of Wild Dog, elephant, roan and tsessebe.
Threats & Pressures	<p>One of the unique aspects of this TFCA is the sheer number of property owners included. The Northern Tuli Game Reserve is an association of private landowners and comprises 36 farms, while the Tuli Circle Safari Area in Zimbabwe is a government owned hunting area, but the Zimbabwe component also include two large private areas namely the Nottingham Estate and Sentinel Ranch as well as Machachuta, Masera and River Ranch Resettlement Areas. Thus, one of the unique pressures for this TFCA is maintaining relationships between numerous landowners and stakeholders.</p> <p>In addition, other threats and management issues include:</p> <ul style="list-style-type: none"> - Climate change predictions combined with increasing water extraction demands predicts reduced water flows and much hotter temperatures in the future - Most households own some animals, and cash is supplemented by sorghum cropping, mopane worm sales, gold panning and remittances from seasonal or migrant work. There has been an increase in the number of people crossing the border to look for work in South Africa or Botswana and border security is an issue. - Livestock diseases are problems that occur periodically. There are constant veterinary concerns arising from movement of livestock and game across these borders. The

	<p>interactions at the interface between animal health, ecosystem services and human health need to be better understood.</p> <ul style="list-style-type: none"> - Land claims are a major factor influencing development and more than a third (36%) of the municipality is subject to land claims. - Mining and quarrying are currently a sector (albeit a declining sector) within the municipality in South Africa. Coal of Africa's Vele colliery has had some setbacks around securing water rights access and Venetia is an active diamond mine near the Mapungubwe National Park - The Transfrontier Conservation Area (TFCA) is the dominant focus of governance but conflicts with the pressures for mining activities. Conflicts over water and ecological functioning between ecotourism and mining will be a dominant feature. (Midgley et al 2013).
Community Indicators	There are communities living inside the boundaries of this TFCA, but little information was available on indicators within these communities on the Zimbabwe and Botswana sides.
Opportunities	This area has some well-established Eco-tourism and hunting operations that provide opportunities for further development.
Data Needs & Gaps	As mentioned above, more information is needed on Community and Economic indicators on the Botswana and Zimbabwe sides. We have sourced the Greater Mapungubwe Transfrontier Conservation Integrated Development Plan of 2010 but could not located management plans or joint strategies for the TFCA or conservation activities on the Botswana and Zimbabwe sides.


9.5 Iona Skeleton Coast Transfrontier Park

Name	Iona Skeleton Coast TFCA	
Member States	Namibia (52%) Angola (48%)	
Area	47 698 km ²	
Category	Category A – MoU signed	
Timeline/ History	<p>The Iona National Park was proclaimed a reserve in 1937 and upgraded to a national park in 1964. The Skeleton Coast National Park was proclaimed in 1971.</p> <p>MOU signed in 2003, MoA signed on May 3, 2018, moving the TFCA from category B to Category A</p>	
Ecoregions	<p>Kaokoveld desert (51%)</p> <p>Namib desert (13%)</p> <p>Namibian savanna woodlands (36%)</p>	

	Seascapes	
Brief Overview and Objective	This TFCA is characterised by dunes, wild plains and cliffy mountains with the Atlantic Ocean forming the Eastern boundary adding an element of rich marine diversity to the conservation area. Natural springs sustain the desert biome while the great Kunene River is an annual river that forms a border between Angola and Namibia. The primary objective is the conservation of species and ecosystems.	
Joint Operations and TFCA Key Performance Areas	“The Namibian and Angolan governments have agreed to work together to develop a transfrontier park.” The exact details of the joint operations plan could not be found.	
Carbon Stocks	Data will be sourced for the next draft.	
Water Resources	<p>“The mouth of the Kunene River is a proposed Ramsar Wetland site. This wetland area of international significance with high numbers of wetland bird species, including Red Data species, are afforded the highest levels of protection that legislation, zonation and management practices can provide.</p> <p>The Kunene River itself is one of only two permanent river estuaries in Namibia.”</p>	
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - “The very rich archaeological and historical heritage of the Namibia’s coast, which presents valuable information about occupation of this area going back 700 000 years, has unique value and should be properly preserved.” - However, no specific heritage sites are designated ecotourism sites, and no information was found on locations and associated values specific to Indigenous peoples of Namibia. - This TFCA contains a wide range of unique and remote landscapes, ranging from desert ecosystems to grassland savanna, and mountainous terrain. The unique ecosystem resulting from the topographical features within the park has created a zone of high endemism, with many species of reptiles, plants and birds occurring only in this region. 	
Threats & Pressures	<ul style="list-style-type: none"> - There are several threats facing this TFCA, with ecological integrity, social, and institutional threats being categorised as medium, and economic threats as high. - The ecological integrity of the site is threatened by the adverse effects of climate change, with more intense droughts being felt particularly hard in this arid landscape. These further puts pressure on the surrounding communities to find grazing for their livestock, which increases human-wildlife conflict and can spur on poaching. - Institutional threats due to political instability on the Angola side persist, while economic threats are highly significant, stemming from the lack of infrastructure throughout the region. There is evidence that the Namibian government is providing support to their counterparts in Angola to improve on this situation. 	
Community Indicators	<ul style="list-style-type: none"> - The Angolan component of the TFCA is “inhabited by Indigenous Peoples and other rural local communities. These are among the most vulnerable people in the country as they have low incomes and are extremely exposed to the impacts of climate change. They are most exposed to climate change impacts that negatively affect agricultural systems, as pastoralism and subsistence agriculture are currently the main livelihoods for people in rural areas. - In Iona National Park, animal husbandry plays a central social and cultural role in communities. Cattle and dairy are fundamental to local diets and the need for cattle enclosures near dwellings has resulted in scattered settlement patterns. Additionally, nomadism and semi-nomadism are practised as adaptations to the harsh climatic 	

	<p>conditions that include low rainfall and periods of drought. Women in these communities cultivate small plots for household consumption, and men typically raise large livestock — an activity that forms an economically important part of the national economy.</p> <ul style="list-style-type: none"> - The SCNP has no human settlements, however included in the Namibian component of the TFCA are two community conservancies.
Opportunities	Tourism activities, particularly based on the cultural significance of the area, have the potential to be expanded. This may also provide a base for educational activities due to the presence of archaeological sites of interest.
Data Needs & Gaps	A fair amount of information is available online for this TFCA; however, details of the management plan and joint operations could not be sourced. Data on community indicators, economic indicators and conservation activities are much needed.


9.6 Kagera Transfrontier Conservation Area

Name	Kagera Transfrontier Conservation Area	
Member States	Tanzania (42%) Uganda (35%) Rwanda (23%)	
Area	2 500 km ²	
Category	Category C - Conceptual	
Timeline/ History	The TFCA is conceptual and thus no official documents have been signed yet. There are difficulties of the three nations working together due all of them being a part of East African Community (EAC) but only Tanzania being a part of SADC. However, Ibanda and Rumanyika are Game Reserves that exist in Tanzania and Akagera is a designated National Park in Rwanda. “This component of the TFCA is managed by the Akagera Management Company under a 20-year joint management agreement which has been signed between the African Parks and the Rwanda Development Board in 2009. Situated directly on a trilateral border, the TFCA also extends into Uganda.” (SADC)	
Ecoregions	Central Zambesian Miombo Woodlands (92%) Victorian basin Forest Savanna Mosaic (8%)	
Brief Overview and Objective	“The proposed Kagera TFCA lies along the Kagera River, which is a natural boundary between Tanzania, Rwanda, and Uganda. This TFCA comprises Ibanda and Rumanyika Game Reserve with a combined area of approximately 1 300 km ² in Tanzania and Rwanda’s Akagera National Park, encompassing 1 200 km ² . The TFCA is located within the East African Community (EAC) with Tanzania being a member of both SADC and EAC and Rwanda and Uganda only of the EAC.”(SADC)	
Joint Operations and TFCA Key	Joint planning is underway, but we have been unable to source any formal documentation outlining any joint operations and TFCA performance indicators.	

Performance Areas	
Water Resources	This TFCA includes the largest protected wetland in Eastern Africa
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - “Due to its variety of habitats the Kagera TFCA has exceptional levels of biodiversity. Akagera National Park in Rwanda is home to many large plain species as well as species restricted to the papyrus swamps such as the sitatunga antelope and the rare and illusive shoe-billed stork. Of the primates, olive baboons, vervet monkeys and the blue monkey can be found there. The Tanzanian Ibanda and Rumanyika Game Reserve also include elephant, lion, eland, waterbuck, and roan. Notably the Ibanda Game Reserve has the largest density of leopard of all game reserves in Tanzania. Lining the string of lakes along the Kagera TFCA are some of the continent’s highest concentrations of water birds, with over 525 species being recorded. - The Ibanda Game Reserve contains rock engravings dated at over 200 000 years ago” (SADC) - “In 2017, 18 eastern black rhinoceros were reintroduced to Akagera, bringing the species back to the park and the country after a 10-year absence. The population was further supplemented by an additional five individuals translocated from European zoos in 2019. - Lions were reintroduced in 2015, and with the addition of two males in 2017 to increase genetic diversity, the population has since quadrupled. - More than 2 000 schoolchildren visit Akagera National Park each year, along with teachers and local leaders, as part of the environmental education programme.” (https://www.africanparks.org/the-parks/akagera)
Threats & Pressures	<p>Information on threats and pressures specific to Kagera TFCA were not readily available however in broad terms the threats are very similar to those of many SADC countries.</p> <p>“In Rwanda, like elsewhere in the world, though rich and diversified, biological diversity is seriously threatened. The destruction of habitats resulting from population pressure, weak institutions, and lack of clarity in the institutional mandates account for much in this. Protected areas, which are the sanctuary of wild plant and animal species, are subjected to reduction. Regulations of access to biological resources in protected areas, wet areas, and aquatic areas, are not respected. Many uncontrolled introductions of wild or domestic plant and animal species result in the disturbance of the native biological heritage which leads to the extinction of some species.</p> <p>In Rwanda, human-induced threats are many and more harmful than natural threats. The main ones are:</p> <ul style="list-style-type: none"> - Population pressure - Population resettlement - Overexploitation of biological resources - Uncontrolled introduction of exotic species. Poaching and pirating - Bush fires - Conflicts and wars” <p>(National Strategy and Action Plan for the conservation of biodiversity in Rwanda)</p>
Community Indicators	We were unable to source information about communities living within and around this TFCA.
Opportunities	In recent years Akagera National Park has been receiving increasing numbers of tourists. In 2011 there were more than 20 000 visitors to the park generating just over US \$400 000 in revenue. There is limited tourism infrastructure, but a luxury lodge exists and there are

	<p>wilderness trails for hiking. This TFCA has good opportunities to build on tourism interest with more eco-tourism activities.</p> <p>“By the close of 2019, Akagera was 90% self-financing, with revenue generated by almost 50 000 tourists, 50% of whom were Rwandan. Even though 2020 saw a 68% reduction in visitors due to COVID-19, Akagera continued to provide for the 300 000 people living on its boundary”. (https://www.africanparks.org/the-parks/akagera)</p>
Data Needs & Gaps	<p>Due to this TFCA being conceptual there is limited accessible information and data readily available. We were unable to find management or strategic plans of any kind for any of the parks and no information about the communities bordering the parks or living within the proposed TFCA area. Data on community indicators, economic indicators and conservation activities are much needed.</p>


9.7 Kavango Zambezi Transfrontier Conservation Area

Name	Kavango Zambezi (KAZA TFCA)	
Member States	Angola (17%) Botswana (30%) Namibia (14%) Zambia (26%) Zimbabwe (14%)	
Area	520 000km ²	
Category	Category A - Treaty Signed	
Timeline/ History	MoU signed in 2006, with subsequent feasibility study facilitated by Peace Parks Foundation. In 2011 a treaty was signed by the presidents of all five countries officially establishing the KAZA TFCA, with eh launch taking place in 2012.	
Ecoregions	Angolan Miombo Woodland (8%) Central Zambian Miombo Woodland (20%) Kalahari Acacia-Baikiaaea woodlands (19%) Southern Africa bushveld (2%) Southern Miombo woodlands (7%) Western Zambeziian grasslands (1%) Zambeziian and Mopane woodlands (30%) Zambeziian Baikiaaea woodlands (8%) Zambeziian Cryptosepalum dry forests (0.1%) Zambeziian flooded grasslands (3.9%) Zambeziian halophytics (1%)	

Brief Overview and Objective	<p>One of the world's largest TFCA consisting of land in five countries, home to more than 2.5 million people, encompassing rich natural and cultural resources and representing a critical landscape for the migration processes of key wildlife species.</p> <p>The primary objective is "To sustainably manage the Kavango Zambezi ecosystem, its heritage and cultural resources based on best conservation and tourism models for the socio-economic wellbeing of the communities and other stakeholders in and around the eco-region through harmonization of policies, strategies and practices."</p>
Joint Operations and TFCA Key Performance Areas	<p>The "KAZA TFCA Master Integrated Development Plan, provides a strategic framework for transboundary initiatives under five key pillars: Integrated Land Use Planning; Management of Shared Natural Resources; Tourism Development; Community Livelihood Development; and Infrastructure Development."</p> <p>Funding for the TFCA has largely been in the form of donations from international organisations and the governments of Germany and the Netherlands.</p> <p>A special visa has been established for tourists travelling across borders within the TFCA to aid in business development.</p>
Water Resources	<p>The Okavango Delta, A world Heritage site is one of the most important inland wetlands in the world supporting one of the greatest wildlife concentrations in Africa.</p> <p>Mosi-oa-Tunya (Victoria Falls) is also a world heritage site.</p>
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - The KAZA TFCA is culturally diverse and includes the site of Tsodilo Hills, a World Heritage site with rock art of more than 4 000 paintings and a human history extending 100 000 years into the past. - The Uniqueness of this TFCA is its sheer size, the amount under protection or wildlife management of some form and the subsequent connectivity, the functional ecosystems and ecosystem processes (like migration) that can be maintained within due to this. - "There are more than 3 000 plant species throughout the park, of which 100 are endemic to the sub-region. The area caters to large-scale migrations of megafauna, including several Red Data List species, of global biological importance; the park contributes to the conservation of threatened species such as African wild dog, wattled crane, Nile crocodile and cheetah. Other mammalian species include buffalo, hippopotamus, lion, lechwe, roan, sable, eland, zebra, wildebeest, waterbuck, puku." - "The area is populated with bushbuck, sitatunga, wild dog and spotted hyena. The Park is also home to the largest contiguous population of African elephant (approx. 250 000). Over 600 bird species have been identified, as well as 128 reptile species, 50 amphibian species and diverse invertebrate species."
Threats & Pressures	<p>Both threats to ecological integrity and social threats appear to be at a medium level. While human-wildlife conflict is a common problem throughout the TFCA, this is concentrated in some areas more than others. Poaching is less of a threat than in some other TFCAs but is a present threat. Unsustainable use of resources and land management by communities living within the boundaries of the TFCA poses some threat to the ecosystems functioning.</p>
Community Indicators	<p>"Most of the 2.67 million people live in the 29% of land that is not protected for wildlife. In the last two decades, population growth has tended to be high in these areas, averaging 2% per annum. This has given rise to human encroachment and increased human-wildlife conflict especially where the unprotected land borders protected land" (MIDP)</p>
Opportunities	<p>The primary opportunities in this TFCA lie in the large number of partners working together to make this TFCA a success. Encompassing such a large swathe of area, and globally</p>

	significant biodiversity and tourism hotspots, there is a wide range of interest in protecting and sustainably utilising this TFCA.
Data Needs & Gaps	There is a significant amount of information available online for this TFCA. This is due to the high levels of international funding it has received.


9.8 Kgalagadi Transfrontier Park

Name	Kgalagadi Transfrontier Park	
Member States	SA (27% Kalahari Gemsbok National Park). Botswana (73% Gemsbok National Park)	
Area	35 551 km ²	
Category	Category A - Treaty Signed	
Timeline/ History	This transfrontier park can date its existence back to 1948, with an informal verbal agreement between the then Protectorate of Bechuanaland and the Union of South Africa. This was formalised in the late 1990's, with the first peace park officially being launched in 2000.	
Ecoregions	Kalahari Xeric Savanna (100%) (WWF Ecoregions) (Includes: Savanna, Open Woodland, River, Pans)	
Brief Overview and Objective	Arid to semi-arid southern Kalahari region; Divided into four key ecological units including: Dunes, sandy plains, rivers, and pans.	
Joint Operations and TFCA Key Performance Areas	<p>In 1999 a bilateral agreement between the Botswana and South African governments was signed which sets out the management objectives and implementation for this transfrontier park. It further established the formation of the Kgalagadi Transfrontier Park Foundation. It is unclear when this agreement was adopted, and the extent to which it is being implemented.</p> <p>“Staff from the Botswana Police, the departments of Wildlife and National Parks and of Immigration conduct joint patrols with staff from South African National Parks and the South African Police Service.” (PPF)</p>	

Water Resources	The region is very dry, with the main water resources represented by the Nossob, Auob, Molopo, and Kuruman Rivers. "These rivers are predominantly dry, only flowing for short periods after abnormally high rainfall." (SANParks)
Significant Cultural and Biodiversity Features	<p>The Kgalagadi Transfrontier Park is one of the largest contiguous conservation areas in the world that allows for a fully functioning open large predator-prey system. It is also host to a wide range of iconic species with rich biodiversity, despite its dry, semi-arid environment, boasting 625 plant species (0 endemic), 300 bird species (significant raptor populations), 46 reptile species, 67 mammal species. Big Five present. Five cat species, three hyena species, three canid species.</p> <p>Further, it holds significant cultural value with land ownership of the Khomani San and Mier communities and symbolic rights of the Khomani San being recognised. Contained within the Kalahari Gemsbok NP is the Khomani Cultural Landscape which is a UNESCO World Heritage Site.</p>
Threats & Pressures	No significant threats have been identified. Additional discussion is required with the TFCA park manager.
Community Indicators	No settlements exist within the park, with the above mentioned Mier and Khomani San communities settled outside the boundary of the park. Although these communities are typified as having low infrastructure development, high unemployment, and low levels of education, they possess high and very valuable local and traditional knowledge that allows their survival in this harsh environment. A reported 80% of the park's employees on the South African side are from Mier.
Opportunities	There is already a well establish eco-tourism industry in this TFCA. Improved accessibility may provide opportunity for the expansion on these activities.
Data Needs & Gaps	Information is lacking on the details of joint operations between the entities involved in this TFCA. The review requires inputs and discussions with TFCA management.

9.9 Liuwa Plains-Mussumma Transfrontier Conservation Area


Name	Liuwa Plains Mussumma TFCA	
Member States	Angola (31%) Zambia (69%)	
Area	14 464 km ²	
Category	Category C - Conceptual	

<p>Timeline/ History</p>	<p>In 2003 African Parks entered into an agreement with the Zambia Wildlife Authority and Barotse Royal establishment to manage Liuwa Plains National Park for 20 years. Then in 2009, Peace Parks Foundation prepares the documents motivating for a TFCA which led to the proclamation of Mussumma National Park in Angola. In 2011 an MOU was signed between the two countries signalling the intent to create the TFCA and in 2013 the two countries met to develop the Integrated Development Plan.</p>	
<p>Ecoregions</p>	<p>Angolan Miombo Woodlands (28%) Western Zambezian Grasslands (2%) Zambezian Baikiaea woodlands (64%) Zambezian Cryptosepalum dry forests (1%) Zambezian flooded grasslands (5%)</p>	
<p>Brief Overview and Objective</p>	<p>The Liuwa Plains-Mussumma TFCA protects the second largest wildebeest migration in Africa, as well as a significant portion of the catchment area of the Zambezi River, Africa's fourth largest river system.</p>	
<p>Joint Operations and TFCA Key Performance Areas</p>	<p>Apparently both countries met to plan the Integrated development plan, but we are unable to find published evidence of management plans and/or development plans. No info on business development, except the creation of the upmarket fly-in tented camp built in 2016 to boost tourism potential.</p> <p>This indicator is perhaps not applicable here due to the conceptual phase.</p>	
<p>Water Resources</p>	<p>This TFCA protects the catchment area for the Zambezi River. Liuwa Plain lies within the Barotse Floodplain, and is bounded by the Luambimba River to the north and Luanginga River to the south</p>	

<p>Significant Cultural and Biodiversity Features</p>	<ul style="list-style-type: none"> - Liuwa Plains, its surrounds and Mussuma in Angola are low-density population areas with little infrastructure and few towns. This enables the area to play an important role in the conservation of large mammals and large mammal movement, such as wildebeest and zebra migration. "Liuwa is home to a variety of mammals, including buffalo, common eland, common tsessebe, oribi, red lechwe, reed buck, roan antelope, and migrating blue wildebeest, which gather in the tens of thousands. Liuwa's wildebeest migration is the second-largest in Africa."^{[3][5]} - A survey conducted in 1991 recorded population estimates of 30 000 blue wildebeest, 800 tsessebe, 1 000 zebra, and 10 000 other large mammals, including buffalo, eland, oribi, red lechwe, reed buck, and sitatunga. Subsequent surveys suggested major population declines, with possible eradication of buffalo, eland, Lichtenstein's hartebeest, and roan antelope. However, improved protections since 2003 have stabilized populations. Eland and buffalo have been reintroduced, and the zebra population has increased to over 4 000 individuals. - Predators include the cheetah, leopard, lion, and spotted hyena.^{[1][5][12]} According to the non-profit conservation organization African Parks, all but one of the park's lions were eradicated during the 1990s due to poaching and trophy hunting. Liuwa's lone lioness, known as Lady Liuwa, was first reported to be present in the park in 2002.^[7] The organization has since led the introductions of several additional lions to re-establish a breeding pride in Liuwa, where there are 13 lions, as of July 2020. - Smaller omnivores in Liuwa include the banded mongoose and side-striped jackal.^[12] - 334 bird species, including various species of birds of prey, bustards, cranes (including grey crowned cranes and the endangered wattled crane), pelicans, pratincoles, and storks, have been recorded in Liuwa. Liuwa Plain National Park also provides habitat for various snake species. - High in Liuwa Plains NP as the area falls in the Barotse Royal Establishment. The Barotse people have a long history of living with and respectful practices around resources use and caring for wildlife. This plays a large role in the way this TFCA is managed
<p>Threats & Pressures</p>	<p>The main threats to this area are institutional, as there is no overarching management plan in place while a medium level of political instability is associated with the region. Other less pressing threats include economic threats due to lack of infrastructure and inaccessibility, which makes it difficult to know if this TFCA will be financially viable.</p>
<p>Community Indicators</p>	<p>About 20 000 people live within Liuwa Plains National Park in 430 villages. These communities have a long history of living with wildlife as a part of the Barotse culture. In the early 19th century people practiced agriculture with mixed farming methods while also holding roles of "gamekeepers", i.e., seeing themselves as custodians of the wildlife.</p> <p>"People in the region have developed a sophisticated system of rights of resource use, including fishing and harvesting of natural resources such as thatching grass, building poles and palm fronds.</p> <p>When a centralized management of the Liuwa Plains NP was established in 1972 many of these cultural practices and traditional institutional regulations were abolished. Later Park management realized the values of these practices and began documents them in 2005. Since then, many traditional practices have been re-established. The TFCA enjoys strong community engagement and participation in strategic management."</p>
<p>Opportunities</p>	<p>"Natural heritage sites have great potential for investment. Of late several local and international investors have shown interest in developing these heritage sites in Zambia. There is great potential for Heritage development to be private sector driven for it to contribute significantly to the national and local economy. This also calls for the exploitation of the great potential in Public/Private Partnership in development at heritage sites. "</p>


Data Needs & Gaps	Limited available data and literature on the TFCA has prevented a comprehensive review of the TFCA. The review requires inputs and discussions with TFCA management.
-------------------	--

9.10 Lower Zambezi-Mana Pools Transfrontier Conservation Area

Name	Lower Zambezi Mana Pools TFCA	
Member States	Zambia (40%) Zimbabwe (60%)	
Area	17 745 km ²	
Category	Category C - Conceptual	
Timeline/ History	Peace Parks Foundation has been involved in the preparing all the supporting Documentation and have drafted an MoU ready for the Zambezi and Zimbabwean governments to sign	
Ecoregions	Southern Miombo Woodlands (30%) Zambian and Mopane Woodlands (70%)	
Brief Overview and Objective	<p>The TFCA lies in the Zambezi Valley, below the Kariba Dam and is a thoroughfare for wildlife moving between the escarpment and the Zambezi River. "On the Zambian side the TFCA is composed of the Lower Zambezi National Park and several game management areas. On the Zimbabwean side it encompasses Mana Pools National Park and the Sapi and Hurungwe communal areas, which incorporate Chewore and Marongora safari areas. In Zimbabwe the TFCA also encompasses river frontage, floodplains, islands, sandbanks, and pools. Mana Pools National Park is a UNESCO World Heritage Site, and the pools are designated as a Ramsar Wetland Site." A key objective of the TFCA is conservation of wildlife.</p>	
Joint Operations and TFCA Key Performance Areas	<p>Due to the infancy of the TFCA, classed as a category C, as is expected, the Key Performance Areas are currently not at a high level of development. No data was available to indicate KPA 1 through to 8. From what is available, a management plan for Mana Pools National Park is available as well as anecdotal evidence that community engagement is positive.</p>	
Water Resources	<p>Mana Pools National Park has a large flood plain on the lower Zambezi. During the rainy season the river flows, turning the area into a broad expanse of lake. "Mana means 'four' in the local Shona language and refers to four large pools inland from the Zambezi River. These pools, designated as a Ramsar Wetland of International Importance in 2013, are the remnant ox-bow lakes that the river had carved out thousands of years ago as it changed its course."</p>	

Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - Mana Pools National Park is a World Heritage Site based on its wildness and beauty - Elephant, Buffalo, Hippo, and Impala make up the bulk of the mammal species around Mana Pools and in the TFCA. Other charismatic game includes Lion, Leopard, Cheetah, and wild dog. - The TFCA contains an Important Bird Area with over 400 bird species recorded. - The Zambezi River and its tributaries are host to over 30 species of fish. The most important of these for the sport fishing industry include the Tiger Fish (<i>Hydrocynus vittatus</i>) and the breams belonging to the family Cichlida.
Threats & Pressures	<ul style="list-style-type: none"> - Some riverine invasive fish species - Human-wildlife conflict is present however has not been well described in the literature - Poaching, specifically with snares, is prevalent in the TFCA mostly being concentrated in the escarpment areas. Some poisoning and fish netting. Approximately ten elephants are poached annually. - Various subsistence communities reside within the TFCA boundaries and has been linked to poaching incidences. - As is permitted within Zambia, a large-scale open pit copper mine has been approved within the Zambezi National Park. This threatens the integrity of the Zambezi floodplains and the quality of the water in the basin - Potential political instability is identified as a threat - The lack of a TFCA joint management plan introduces risks.
Community Indicators	Various subsistence communities reside within the TFCA. The Mukwichi Communal Land is located to the south of Mana Pools National Park
Opportunities	The close association with local communities and the TFCA results in opportunities for implementing ecosystem-based approaches to land management. This focussed on the provision of ecosystem services (such as food, water, and other products) to local beneficiaries as well as the development of other services for regional and international beneficiaries (such as ecotourism, climate change and conservation value)
Data Needs & Gaps	Limited available data and literature on the TFCA has prevented a comprehensive review of the TFCA. The review requires inputs and discussions with TFCA management.

9.11 Lubombo Transfrontier Conservation and Resource Area


Name	Lubombo TFCA	
Member States	Mozambique (38%) South Africa (40%) Swaziland (22%) A variety of seascapes	
Area	10 029 km ² (or 11 169 km ² according to SADC TFCA brochure)	
Category	Category A	

Timeline/ History	<p>"On 22 June 2000, the three Governments signed the tri-lateral protocol to establish the Lubombo Transfrontier Conservation Area containing initially four distinct TFCAs: Lubombo Conservancy-Goba TFCA (Mozambique, Swaziland), Ponta do Ouro-Kosi Bay TFCA (Mozambique, South Africa), Nsubane-Pongola TFCA (South Africa, Swaziland) and Usuthu-Tembe-Futi TFCA (Mozambique, South Africa). Inclusion of a fifth component, the Songimvelo-Malolotja TFCA (South Africa, Swaziland) and the incorporation of Swaziland into the Usuthu-Tembe-Futi TFCA were formally approved at a trilateral Ministerial meeting in 2004. In March 2014, the Lubombo Commission decided to merge the Lubombo Conservancy-Goba TFCA with the Usuthu-Tembe-Futi TFCA, linking the Lebombo Mountain Ecosystem with the coastal plains."</p>
Ecoregions	<p>Zambezian and mopane Woodlands (91%)</p> <p>Maputaland Coastal Forest mosaic (6%)</p> <p>Southern Africa Mangroves (1%)</p> <p>Drakensberg montane grasslands, woodlands, and forests (3%)</p>
Brief Overview and Objective	<p>The first TFCA incorporating a Marine protected area, this TFCA links the Lebombo mountain ecosystem with the coastal plains and marine ecosystems of Southern Mozambique and South Africa.</p> <p>The key objectives of the TFCA include:</p> <ul style="list-style-type: none"> - Economic development through appropriate maximum use of opportunities presented by the three countries' natural assets. - Ecological and financially sustainable development, the sustainable use of the natural resource base and the maintenance of ecosystem function through holistic and integrated environmental planning and management. - The development of joint strategies for transfrontier ecological planning and resource management.
Joint Operations and TFCA Key Performance Areas	<p>Although this TFCA is at a well-developed stage, category A, limited data was available that indicated progress towards the TFCA Key Performance Areas (KPA 1 through to 8).</p> <p>Joint planning is variable between the components of the TFCA. E.g., Maputo Special Reserve and Tembe have Joint planning and joint operations, but no indication of joint planning across the entire TFCA.</p> <p>Additional discussions will need to be had with the TFCA manager.</p>
Water Resources	<p>The TFCA includes 5 Ramsar wetland sites including the Ndumo Game Reserve, the Kosi Bay System, Lake Sibaya and Africa's largest estuary Lake St. Lucia and Tongaland (350 km²).</p>
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - TFCA represents marine, coastal, and inland ecosystems. A diverse landscape which is intact in this geomorphical, hydrological, aquatic, terrestrial and ecological functioning. - Several established protected areas, namely, Ndumo Game Reserve, Tembe Elephant Park, Maputo Elephant Reserve and Sileza Nature Reserve. - The area represents a substantial proportion of the core area of the IUCN designated Maputoland Centre of plant endemism. There is an unusually high level of endemism from all high-level taxonomic groupings e.g., aves, amphibians, reptilians. - The region has the potential for reestablishment of the natural movement range for elephant and other species. - The coastline provides critical nesting sites for the endangered leatherback and loggerhead turtles. - Many tropical biota and unique vegetation communities such as sand forests and woody grasslands exist in the area.

	<ul style="list-style-type: none"> - The World Heritage Site, Greater St Lucia Wetlands Park's significant features include: <ul style="list-style-type: none"> - Coral reefs which include soft corals - 800 species of marine fish - Leatherback and loggerhead turtles - Humpback whales pass close to the shore in route to east Africa - Ragged tooth shark aggregations are popular attractions for SCUBA divers - Whale sharks and manta rays are sighted frequently.
Threats & Pressures	<ul style="list-style-type: none"> - Illegal harvesting of fish is widespread between Ponto de Ouro and Inhambane - Unsustainable Tourism Activities such as 4x4 beach driving, harvesting of corals - Potentially unsustainable formal activities such as fishing and hunting as is permitted in some areas - Limited data were available to define additional key threats to the TFCA. Additional discussions with TFCA management are required.
Community Indicators	<p>There are rich sociological, cultural, and historical resources in this TFCA including:</p> <ul style="list-style-type: none"> - Unique forms of traditional fishing and fishery management in the Fonya area - Several Ancestral and Sacred sites - Important cultural associations with certain species of animals - A rich history of past linkages with Arab, Portuguese, and British trade as the TFCA sits on an important historical trade route. - Historical tribal affiliations across boundaries among the three countries - Strong cultural expression through an informal crafting industry that is marketed to visiting tourists <p>"The development of the TFCA reunited the Tembe-Thonga people, who historically ruled over the entire area stretching southwards from Maputo Bay to Lake St. Lucia. The development of the TFCA can go a long way towards strengthening former cross-border social and cultural relations. Cultural manifestations include the famous fish kraals of Kosi Bay, the marula fruit festival, thrust basket (isifonyo) fishing and the extensive palm wine trade, which extends the borders of South Africa and Mozambique. The Tembe-Thonga also have a long history of cooperation and social integration with the Swazi. With Swaziland's rich culture and strong traditions, the component of Lubombo TFCA offers fascinating cultural activities and holds an intrinsic value to the Swazi nation. The TFCA is used as the annual venue for 'butimba' - a traditional hunting event led by the King of Swaziland." (https://tfcaportal.org/node/22)</p>
Opportunities	<p>The close association both currently and historically with local communities residing and utilising the TFCA results in opportunities for implementing ecosystem-based approaches to land management. This focussed on the provision of ecosystem services (such as food, water, and other products) to local beneficiaries as well as the development of other services for regional and international beneficiaries (such as ecotourism, climate change and conservation value)</p>
Data Needs & Gaps	<p>The review presented above requires analysis of institutional progress as well as an understanding of key threats to the TFCA.</p> <p>Additional discussions with TFCA management are required.</p>


9.12 Malawi-Zambia Transfrontier Conservation Area

Name	Malawi Zambia TFCA	
-------------	--------------------	--

Member States	Malawi (10%) Zambia (90%)	
Area	32 278 km ²	
Category	Category A	
Timeline/ History	MOU signed in 2004, Treaty signed in 2015	
Ecoregions	Central Zambezan Miombo woodlands (90%) Southern Miombo woodlands (7%) Southern Rift montane forest-grassland mosaic (1.5%) Zambezan and Mopane woodlands (1.5%)	
Brief Overview and Objective	The TFCA incorporates national parks, wildlife reserves, forest reserves and game management areas. The TFCA comprises two main components: The Nyika-North Luangwa component is centred on a high undulating montane grassland plateau rising over 2 000 m above the bushveld and wetlands of Vwaza Marsh. To the south, the Kasungu-Lukusuzi component is an area of importance for biodiversity conservation in the Central Zambezan Miombo Woodland Ecoregion.	
Joint Operations and TFCA Key Performance Areas	Although this TFCA is at a well-developed stage, category A, limited data was available that indicated progress towards the TFCA Key Performance Areas (KPA 1 through to 8). Additional discussions will need to be had with the TFCA manager.	
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none">- The Nyika Plateau and Kasungu National Park areas are home to several important cultural heritage resources and artifacts including ancient dwellings with rock paintings, iron-ore mines, and remnants of complex traditional iron-working practices. Nyika also includes the Chigwere Cultural Village which is becoming a popular tourist destination to experience local culture.- Lukusuzi National Park represents the largest and last contiguous area of relatively pristine miombo woodland of the Central African Plateau- The remote North Luangwa NP provides one of the finest wilderness experiences in the entire region since it was not open to anyone but game rangers for more than 30 years- North Luangwa consists of the big five game animals plus Cookson's Wildebeest which is a rare antelope. Black Rhino was reintroduced into the park in 2003 and so this park harbours Zambia's only black Rhino population.- The Nyika National Park in Malawi is home to exceptional and important biodiversity as there are 102 mammals, 300 plant, 462 Bird, 47 reptile, 34 Amphibian, and 31 fish species as well as numerous invertebrate species including 287 species of butterflies. It also has the largest concentration of Roan antelope in Africa and supports the world's greatest blue swallow breeding population.	

	<ul style="list-style-type: none"> - Kasungu-Lukusuzi has approximately 112 mammal species, seven of which are endemic to the miombo woodland zone and over 2 000 plant species, 370 bird species and 65 amphibian & fish species.
Threats & Pressures	<ul style="list-style-type: none"> - Human-wildlife conflicts in some parts of the TFCA - Poaching in some part of the TFCA - Communities reside within the boundaries of the TFCA. Human encroachment into the TFCA and protected areas is a threat. - The overgrazing of cattle threatens the integrity of ecosystems.
Community Indicators	Communities living in and adjacent to the TFCA are engaged in smallholder agriculture. Cross-border trade and other cultural exchange initiatives are important to these communities who share many of the same traditional values.
Opportunities	As linked to the communities residing within the TFCA results in opportunities for implementing ecosystem-based approaches to land management. This would focus on the provision of ecosystem services (such as food, water, and other products) to local beneficiaries as well as the development of other services for regional and international beneficiaries (such as ecotourism, climate change and conservation value).
Data Needs & Gaps	The review requires additional analysis of institutional progress and threats as well as classification of communities residing within the TFCA. Additional discussions with TFCA management are required.

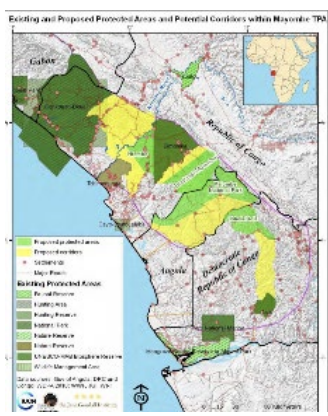
9.13 Maloti-Drakensberg Transfrontier Conservation and Development Area

Name	Maloti-Drakensberg TFCA	
Member States	Lesotho and South Africa	
Area	14 740 km ²	
Category	Category B with MoU signed in 2001 but with a draft Treaty and related process for upgrading in place.	
Timeline/ History	On 11 June 2001, an MoU was signed towards the establishment of the Maloti-Drakensberg Transfrontier Conservation and Development Area. In 2003 the Maloti-Drakensberg Transfrontier Conservation and Development project was launched by the Ministers of the Environment for Lesotho and South Africa, and the World Bank. In 2008 the TFCA management plan was completed.	
Ecoregions	Drakensberg alti-montane grasslands and woodlands (38%) Drakensberg montane grasslands, woodlands, and forests (54%) Highveld grasslands (8%)	
Brief Overview and Objective	The Maloti Drakensberg Transfrontier Conservation Area (MDTFCA) covers just less than 15 000 km ² of the Maloti and Drakensberg Mountain bioregion in the eastern highlands of	

	the Kingdom of Lesotho and the highlands of the provinces of the Free State, KwaZulu Natal and the Eastern Cape in South Africa.
Joint Operations and TFCA Key Performance Areas	<p>The TFCA is governed through a Bi-lateral Steering Committee comprised of representatives from the relevant government agencies at both national and provincial levels. The following bi-lateral working groups meet quarterly: Biodiversity and Protected Area WG, Tourism WG, Cultural Heritage WG and Security WG. The KwaZulu Natal conservation agency, Ezemvelo KZN Wildlife, maintain a small unit dedicated to coordinating the TFCA's activities in South African. In Lesotho, the Department of Environment within the Ministry of Tourism, Environment and Culture, holds this responsibility. Limited data was available that indicated progress towards the TFCA Key Performance Areas (KPA 1 through to 8).</p> <p>Additional discussions will need to be had with the TFCA manager.</p>
Water Resources	<p>The MDTFCA includes three of southern Africa's key water resource areas, or 'Water Towers' namely the Northern -, Southern – and Maloti Drakensberg (Nel et al, 2013). Strategic water source areas are those areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest and can be regarded as natural 'water factories', supporting growth and development needs that are often a far distance away.</p> <p>The Maloti-Drakensberg bioregion falls within the country's most important water supply area. River catchments within the bioregion form the source or contribute to several major rivers, including the Mzimvubu, Mzimkulu, Mkomazi and Thukela on the South African side, and the Vaal and Senqu/Orange Rivers on the Lesotho side. The rivers rising on the South African side contribute over 8 000 million m³ in mean annual runoff (MAR) to systems within the region.</p>
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - The TFCA includes the Bokong Nature Reserve and the Tsehlanyane and Sehlabathebe National Parks in Lesotho and the Golden Gate Highlands National Park in the Free State, the uKhahlamba Drakensberg Park in KwaZulu Natal and the Ongeluknek Nature Reserve in the Eastern Cape in South Africa. While the uKhahlamba Drakensberg Park was inscribed as a World Heritage Site in 2000, the Maloti Drakensberg Park, including the uKhahlamba Drakensberg Park and the Sehlabathebe National Park, was inscribed as a Transfrontier World Heritage Site in 2013. - The rock art of the Maloti-Drakensberg Park is the largest and most concentrated group of rock paintings in Africa south of the Sahara and is outstanding both in quality and diversity of subject. - The San people lived in the mountainous Maloti-Drakensberg area for more than four millennia, leaving behind them a corpus of outstanding rock art, providing a unique testimony which throws much light on their way of life and their beliefs. - The site has exceptional natural beauty with soaring basaltic buttresses, incisive dramatic cutbacks, and golden sandstone ramparts. Rolling high altitude grasslands, the pristine steep-sided river valleys and rocky gorges also contribute to the beauty of the site. - The TFCA contains significant natural habitats for in situ conservation of biological diversity. It has outstanding species richness, particularly of plants. It is recognised as a Global Centre of Plant Diversity and endemism and occurs within its own floristic region – the Drakensberg Alpine Region of South Africa. Extending along most of KwaZulu-Natal's south-western border with Lesotho, the property provides a vital refuge for more than 250 endemic plant species and their associated fauna. It also holds almost all the remaining subalpine and alpine vegetation in KwaZulu-Natal, including extensive high-altitude wetlands above 2 750m and is a RAMSAR site. It is also within a globally important endemic bird area and is notable for the occurrence of a number of globally threatened species, such as the Yellow-breasted Pipit. The diversity of habitats is outstanding, ranging across alpine plateaux, steep rocky slopes, and river valleys. These habitats protect a high level of endemic and threatened species.

Threats & Pressures	<ul style="list-style-type: none"> - Social: unsustainable subsistence farming practices including cultivation of steep slopes and mismanagement of rangelands (injudicious use of fire and over-grazing), over-harvesting of natural resources such as medicinal plants and plant materials used for fuel and building purposes, cross-border crime including the smuggling of firearms and dagga as well as attacks on hikers in the high 'berg, encroachment and expansion of settlements within and onto the boundaries of the TFCA and its protected areas, and the desecration of cultural heritage sites. - Economic: inappropriate development adjacent to and within the TFCA, such as applications for natural gas prospecting and wind-power plants on the escarpment, poorly maintained access infrastructure degrading the tourism potential of the area, and a lack of government financial support for the TFCA and its protected areas, i.e., a significant shortfall in the financial resources required for effective management. - Biological: climate change projections show a gradual decrease of grassland cover as woody vegetation proliferates, infestations of invasive alien plants (primarily wattle and bramble) and the spread of indigenous pioneering shrubs replacing the grass dominated land cover in the high 'berg,
Community Indicators	As a TFCA the area has both communities who live adjacent to the core protected areas, as well as within the TFCA. Land tenure on the Lesotho side is all communal; while on the South African side it is both private and communal, with some urban nodes. The Lesotho portion is sparsely populated and is mostly used for summer grazing of livestock while in South Africa the high-altitude areas of the TFCA are mostly within the core protected areas leaving the lower altitude areas which accommodate both commercial and subsistence agriculture and are more densely settled.
Opportunities	Key opportunities are linked to implementing ecosystem-based approaches to land management. Special focus should be made to the water regulation services as well as climate regulation and habitat supporting services. The significant presence of rural communities within the TFCA further allows for the development of natural benefits to these communities through provisioning and cultural services.
Data Needs & Gaps	The review requires additional analysis of institutional progress and threats as well as classification of communities residing within the TFCA. Additional discussions with TFCA management are required.

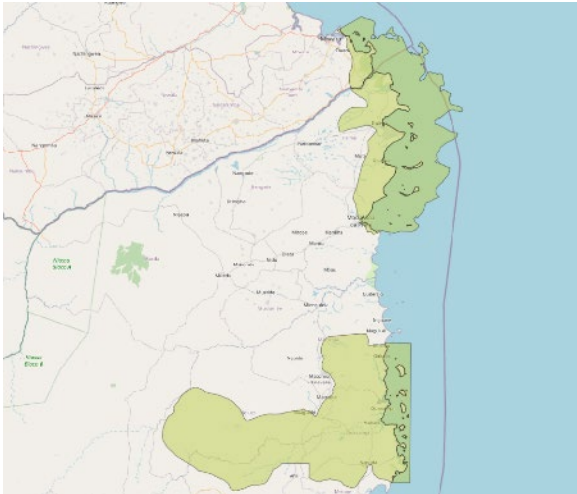
9.14 Mayombe Forest Transfrontier Conservation Area

Name	Mayombe Forest Transfrontier Park	
Member States	Angola (10%) DRC (44%) Gabon (21%) Republic of Congo (25%)	
Area	36 000 km ²	
Category	Category B - MOU Signed	
Timeline/ History	In 2000 the Mayombe Forest conservation project initiated in Angola and the transfrontier initiative was first conceptualized and promoted by the Angolan government.	

	<p>In 2002 it was adopted by the Republic of Congo and presented at the World Parks Congress in Durban in 2003. It was then adopted by the DRC in 2004.</p> <p>In 2009 all three countries signed the Cabinda Accord and MoU and 2011 saw the creation of a Strategic Plan for the TFCA.</p> <p>By February 2013 the Strategic Plan was adopted and Gabon joined the TFCA.</p>
Ecoregions	<p>Atlantic Equatorial coastal forests (81%)</p> <p>Western Congolian forest-savanna mosaic (19%)</p>
Brief Overview and Objective	<p>“The proposed Mayombe Forest Transfrontier Protected Area (TPA) encompasses the entire Mayombe forest, stretching over four countries, including the south-west corner of the Democratic Republic of Congo (DRC), Cabinda Exclave of Angola, the coastal forests of the Republic of Congo and south-west Gabon. Mayombe Forest TPA covers a total area of approximately 36 000 km² and forms the south-western part of the tropical rainforest in the Congo Basin. The Mayombe Forest TPA will encompass protected areas located in three countries, namely the Mayombe National Park in Angola, the Luki National Park in the DRC and the Dimonika Biosphere Reserve, Conkouati-Douli National Park, and Tchimpounga National Reserve in the Republic of Congo.” (SADC)</p>
Joint Operations and TFCA Key Performance Areas	<p>There is a Joint Strategic Plan and some Joint operations in place, but no Joint Management Plan currently to our knowledge. The creation and planning process of the Mayombe forest TPA will require substantial preliminary investment. The long-term effective management of the TPA requires securing financial sustainability.</p>
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - “The Mayombe forest, shared between DRC, Angola, Congo and Gabon, forms the southern-western margin of the Congo Basin’s tropical rainforest, and of the distribution of a large variety of related flora and fauna, including species of global importance such as the chimpanzees, lowland gorillas, forest elephants and many other species related to the Guineo-Congolian centre of endemism (specifically, of the Lower Guinea – the western-central part of the centre of endemism). - Faunal biodiversity in the Mayombe forest is related to the Guineo-Congolian centre of endemism and is remarkably rich. Birdlife International has identified four Important Bird Areas (IBAs) in the Mayombe area. The forest is home for a large diversity of mammal species, including species of outstanding global interest, such as the central chimpanzee, western lowland gorilla, and forest elephant. The known south-western limit of mandrill’s distribution is in Conkouati-Douli national park (NP) in the northern part of the proposed TPA, and the African manatee is found in the large rivers and lagoons related to the Mayombe area. The Mayombe forest ecosystems area crosses two ecoregions designated by WWF: the Atlantic Equatorial Coastal Forest ecoregion, and the Western Congolian forest-savanna mosaic ecosystem. It overlaps considerably with one of Conservation International’s High Biodiversity Wilderness Areas (HBWAs). The northern part of the Mayombe forest area overlaps with the southern part of the Gamba-Mayumba-Conkouati Landscape, between Gabon and Congo, one of 12 Congo Basin Forest Partnership (CBFP) Landscapes, selected as conservation priorities by the USAID-Central African Regional Program for the Environment (CARPE). The forests in the border areas between Cabinda and Congo, in and around Dimonika Biosphere Reserve and in Conkouati-Douli National Park have also been classified as Intact Forest Landscapes: large remaining tracts of forest landscapes minimally disturbed by human economic activity.” (Mayombe Strategic Plan 2013)

Threats & Pressures	“All countries in the TPA are troubled by political and economic instability. As a result of increasing population densities, the Mayombe Forest TPA is subject to a high rate of degradation mainly through heavy logging and poaching. Most of the residents in the forest rely on subsistence cultivation, small-scale husbandry, hunting, and commercial logging operations. Population in all four countries as well as an unknown number of internally displaced people and refugees, have suffered from decades of armed conflicts, the results of which include poverty, unemployment and lack of access to basic public services and commodities.”(SADC)
Community Indicators	Most of the local communities in the Mayombe forest area rely mainly on subsistence cultivation, small scale husbandry, anarchic artisanal logging, poaching and fishing. Most identified core causes of the anarchic logging and especially of poaching, in the Mayombe forest, are related to the extreme poverty, the consequences of the long armed-conflicts and post-conflict impacts, and the lack of adequate alternative livelihood opportunities, combined with the lack of effective enforcement and control mechanisms. (Mayombe Strategic Plan 2013)
Opportunities	Significant potential exists for the expansion of tourism activities in this area, as well as the exploitation of NTFPs through CBNRM activities. This will however require significant funding.
Data Needs & Gaps	We were unable to source management plans for any of the individual protected areas, and information about economic indicators and industry/land-use pressures bar some of the general conditions. A good source of information thus far is the Mayombe Strategic Plan (2013).


9.15 Mnazi Bay-Quirimbas Transfrontier Marine Conservation Area

Name	Mnazi Bay Quirimbas TFCA	
Member States	Mozambique (88%) Tanzania (12%)	
Area	8 150 km ²	
Category	Category C- Conceptual	
Timeline/ History	Unclear	
Ecoregions	East African mangroves (1%) Eastern Miombo woodlands (88%) Southern Zanzibar-Inhambane coastal forest mosaic (11%) A variety of seascapes	
Brief Overview and Objective	With a total area of 8 150 km ² and the high levels of connectivity, this coastline TFCA is a critical source and refuge for the dispersal and maintenance of reef diversity to downstream	

	<p>areas in the north and south on mainland coastal areas, and to the east-side of the Mozambique Channel. In the southeast border of Tanzania, the TFCA incorporates Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP) with a total area of 650 km². Along the northeast coast of Mozambique, Quirimbas National Park stretches 110 km along the northeast coast of Mozambique covering an area of 7 500 km². This NP is constituted of the 11 most southern the Quirimbas islands.</p>
Joint Operations and TFCA Key Performance Areas	<p>Not applicable due to conceptual phase.</p>
Water Resources	<p>Key for the protection of Corals and the Marine Ecosystem. The TFCA is globally unique, due to its mangrove, sea grasses, and rocky shores habitats.</p>
Significant Cultural and Biodiversity Features	<ul style="list-style-type: none"> - Arab trading posts and Portuguese trading routes dominated the seas around the Quirimbas Islands many decades ago. Today many of the islands remain uninhabited. Showcasing the melting pot of influences from the Arab, African, Indian, and European culture, the total of 34 Quirimbas Islands are declared as a cultural and natural national heritage by Mozambique.” - “Coral reefs within the TFCA are among the most diverse hard coral communities in east Africa. In total, 258 hard coral species have been identified in the park - coral fauna is dominated by species in the Acroporidae and Faviidae families. - There is a thousand-metre-wide tidal expanse of thick, healthy seagrass beds along the northern end of the Msimbati Peninsula; ten species of seagrass have been reported in MBREMP and are home to many marine biota. - Approximately 400 species of fish have been identified in the park. Although five species of turtle have been recorded, the most common species are the green and hawksbill sea turtles, both of which nest on the shores of the TFCA at various times of year. The IUCN has designated all turtles of the western Indian Ocean as endangered, with hawksbill and leatherback turtles considered critically endangered. - In total four species of dolphin are found beyond the shores, namely the common bottlenose dolphin, Indo-Pacific bottlenose dolphin, Indo Pacific humpback dolphin and spinner dolphin. Several whale species also occur, including the humpback whale and sperm whale. - Terrestrial fauna is understudied in the TFCA, but the area is recognised as an Important Bird Area for shorebirds and waders. The TFCA is home to a large population of crab plovers, although numbers seem to be declining. Other animals of interest include hippo, crocodile, and elephant.
Threats & Pressures	<ul style="list-style-type: none"> - Marine species poaching and illegal fishing - High rural population densities within the boundaries of the TFCA
Community Indicators	<p>Several cultures are represented within the TFCA, including the Makua, Thonga, Sena, Nyungwe and Yao people. The Makua are the largest ethnic group in Mozambique and known for their unique white “musiro” facial mask.</p> <p>In Tanzania, around 30 000 people live in and adjacent to the MBREMP component of the TFCA. These communities depend heavily on marine natural resources. Local communities are represented through village councils; each council comprises representatives of the village community. The council empowers a village liaison committee to act on their behalf. Building the capacity of communities to engage in sustainable use of resources and climate change adaptation are key focus areas to engage communities in the Mnazi Bay-Quirimbas TFCA.</p>

Opportunities	Key opportunities are linked to implementing ecosystem-based approaches to land management. The significant presence of rural communities within the TFCA further allows for the development of natural benefits to these communities through provisioning (collection of NTFP) and cultural services (i.e., ecotourism).
Data Needs & Gaps	Limited available data and literature on the TFCA has prevented a comprehensive review of the TFCA. The review requires inputs and discussions with TFCA management.

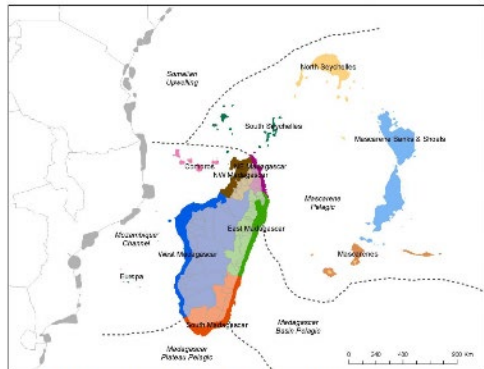
9.16 Niassa-Selous Transfrontier Conservation Area

Name	Niassa-Selous Transfrontier Conservation Area	
Member States	Mozambique (31%) Tanzania (69%)	
Area	154 000 km ²	
Category	Category B - MOU Signed	
Timeline/ History	This TFCA comprises Niassa National Reserve (Mozambique) and the Selous Game Reserve (Tanzania). Both protected areas are long established, but the creation of the Niassa Selous Corridor linked the two in a TFCA with an MOU being signed by both countries on 29 March 2007.	
Ecoregions	Eastern Miombo woodlands (84%) Northern Zanzibar-Inhambane coastal forest mosaic (5.5%) Southern Zanzibar-Inhambane coastal forest mosaic (10.5%)	
Brief Overview and Objective	“Niassa-Selous TFCA is one of the largest TFCA in Africa covering a total area of approximately 154 000 km ² . Two thirds of the area is protected by the Selous Game Reserve, the northern component of the TFCA in the United Republic of Tanzania. Encompassing 48 000 km ² , Selous is Africa’s largest single protected area. The Selous Game Reserve is also one of Africa oldest formally protected area, dating back to 1896. Its counterpart, the Niassa National Reserve, is Mozambique’s largest conservation area and covers a total area of 42 000 km ² . The two protected areas are linked by a corridor – the Selous-Niassa Wildlife Corridor, which extends for a total length of approximately 160 to 180 km following the Ruvuma River. An MOU on cross-border cooperation was signed between the Governments of Tanzania and Mozambique on 29 March 2007 to facilitate the establishment of Niassa- Selous TFCA.” (SADC)	
Joint Operations and TFCA Key	“With the mandate of the Mtwara Development Corridor Initiative and assistance from the German institute Capacity Building International (InWEnt) first official meetings between representatives of regional and provincial administrations of both countries were conducted	

Performance Areas	<p>and cross-border issues in natural resources management and conservation identified. In 2007, following the conclusion of the Joint Permanent Commission between the United Republic of Tanzania and the Republic of Mozambique, the Provincial Governments of Cabo Delgado and Niassa on the part of Mozambique and the Regional Administrations and Local Governments of Mtwara and Ruvuma on the part of Tanzania formally agreed in a Memorandum of Understanding about their regional cross-border cooperation. This included the strengthening of cross-border cooperation in environment and conservation issues, promotion of tourism development and the development towards a larger trans-boundary conservation area.</p> <p>So far, the cooperation has been intensified and made joint patrols possible. Basic communication with email and radios, exchange of information and additional cooperation with police and border police is gradually improving the poaching situation and reduces other criminal activities thus contributing to the security at the border. However, the effectiveness of the cross-border cooperation in anti- poaching still needs improvements.” (https://conservationcorridor.org/cpb/Baldus_and_Hahn_2009.pdf)</p>
Water Resources	<p>The Selous Game Reserve consists of a network of channels and lagoons running into the Rufiji River. Due to the high-water availability this area boasts a phenomenal concentration of wildlife, in particular at the end of the dry season.</p> <p>In addition, the perennial Ruvuma River runs between the two protected areas forming a component of the corridor and serving as the boundary between Mozambique and Tanzania.</p>
Significant Cultural and Biodiversity Features	<p>“The Niassa-Selous TFCA harbours around half of the world’s remaining wild dog population. Selous Game Reserve is renowned for its populations of elephant, black rhino, cheetah, giraffe, hippo, and crocodile, amongst many other species. In 1982, UNESCO enlisted the Tanzanian protected area as a World Heritage Site, emphasizing the global importance of Selous Game Reserve as one of the last relatively undisturbed wilderness areas.</p> <p>Mozambique’s Niassa National Reserve is only accessible by road during the dry season and is home to significant populations of lions, leopard, hartebeest, buffalo and elephant, and large herds of sable antelope. With its diverse landscape the TFCA also boosts over 450 bird species.” (SADC)</p> <p>From a cultural heritage perspective, the Selous game reserve “bisects the traditional lands of the Wangindo tribe of hunter-gatherers though the infertile land was always thinly settled except in the east. The area was also on the main slave-trading route to the port of Kilwa, was invaded by the Wangoni tribe, and fought over in both the 1906 colonial rebellion and World War I.” (http://www.yichuans.me/datasheet/output/site/selous-game-reserve/)</p>
Threats & Pressures	<p>Because this TFCA is so vast with high game numbers and a number of communities living on the boundaries and in the central wildlife corridor the key threats and pressures in this TFCA are:</p> <ul style="list-style-type: none"> - Human-Wildlife Conflict - Environmental degradation due to wood harvesting, agricultural and other subsistence activities - High levels of wildlife poaching resulted in the Selous Game reserve being classified as a site of World Heritage in Danger in 2014.
Community Indicators	<ul style="list-style-type: none"> - “All the communities in the corridor area engage in community-based natural resource management activities. A unique feature of the TFCA is that the corridor is located entirely on the land of 29 villages within the administrative areas of Namtumbo and Tunduru districts in the Ruvuma region; it is composed of a contiguous network of Wildlife Management Areas managed by community-based organizations. In cooperation with local and district authorities, 17 villages established two WMAs, “the

	<p>Mbarang'andu" and "Nalika" WMAs. The three community-based organizations, chingoli, Kisungule and Kimbanda, established their wildlife management areas in the southern part of the corridor and their people have been involved in capacity development.</p> <ul style="list-style-type: none"> - Maintaining a balance between village development needs and biodiversity conservation is a priority for the TFCA. - An innovative strategy to negotiate between these two priorities has been implemented in the area, involving a participatory land-use planning process. Local Communities designate areas in which they conserve and manage wildlife and other natural resources to create income from these areas. With this strategy the TFCA tries to contribute to conservation and development and poverty alleviation alike." (SADC)
Opportunities	<p>The southern portion of the Selous is demarcated as a hunting area and historically hunting has brought in most tourism income in the 80s, 90's and 2000's up to US \$2.8 million per annum.</p> <p>Non-consumptive wildlife tourism could be an additional income diversification strategy for the communities. According to a pre-feasibility study for the development of responsible tourism the southern part of the corridor, with its outstanding landscape and the Ruvuma River, has a great potential for tourism development.</p>
Data Needs & Gaps	<p>Good information exists on this TFCA from a few sources but from (https://conservationcorridor.org/cpb/Baldus and Hahn 2009.pdf)</p> <p>We have been unable to source any formal Joint management plans or individual management plans for the two protected areas.</p>

9.17 Western Indian Ocean Transfrontier Marine Park


Name	Western Indian Ocean Transfrontier Marine Park	 <p>Coastal and offshore marine biophysical provinces and sub-provinces of WIOMER</p>
Member States	Comoros, Kenya, Madagascar, Mauritius, Mozambique, Reunion, Seychelles, Somalia, South Africa, Tanzania	
Area	Not yet designated	
Category	Category C - Conceptual	
Timeline/ History	This TFMP is still being conceptualized, boundaries and extent are under discussion. No formal plans/documents exist to our knowledge	
Ecoregions	Landscapes include dune forests, coastal forest, and marine to mountain thickets as well as a variety of seascapes	
Brief Overview and Objective	“The proposed Western Indian Ocean Transfrontier Marine Park (TFMP) covers vast marine water spaces that includes the SADC island states of Madagascar, Mauritius, and Seychelles, together with the Indian Ocean Island states of Comoros and Reunion, the latter being an	

	<p>oversees territory of France. It also includes marine areas along the coastline of Mozambique, South Africa and Tanzania and others outside the SADC region such as Kenya and Somalia.”</p> <p>It comprises both marine environments and its littoral borders. “Along the shores the reefs diversity of corals and other marine flora and fauna is typically high. The oceanic waters within the TFMP range in depth and composition. Estuaries, algae, seaweed, and wetland flora abound in areas where fresh and saltwater meet, boosting a high species diversity. The pelagic zone, under continuous threat of overfishing, provides more income to nations sending trawlers than the island states. Marine biomes are divided into coral reefs, estuaries, and ocean ecosystems, all of which fall within the TFMP. The TFMP also extends to terrestrial biomes, including eastern African coastal forest and scrub and moist woodlands.” (SADC)</p>
Joint Operations and TFCA Key Performance Areas	Not applicable due to conceptual phase.
Water Resources	As the only transfrontier park that is entirely Marine focused, this TFMP will play a critical role in the conservation of important Marine Ecosystem Resources.
Significant Cultural and Biodiversity Features	<p>“The Transfrontier Marine Park encompasses the third largest coral reef on the planet, home to five of the seven marine turtle species. It is a highly diverse marine environment harbouring just under 400 coral species and over 2 000 fish species, which includes more than 30 species of ray and 27 species of shark. There are also many threatened marine mammals found in the oceanic waters, amongst them the dugong and the sperm whale. Habitat destruction and overfishing are currently threatening populations of many of these species.” (SADC)</p> <p>An “assessment of the regions’ biodiversity features revealed many global and regional highlights:</p> <ul style="list-style-type: none"> - The world’s third largest barrier reef complex buffering the western coast of Madagascar from the Mozambique Current - One of the world’s largest seagrass beds and banks of reefs in the Mascarene Shoals - The only oceanic islands with a granite continental core that are fringed with an ancient and distinctive reef fauna - A global hotspot for coral reef fish and invertebrate endemism, with a particular focus of local endemism (found nowhere else) in the Mascarenes - Some of the healthiest populations of blue, humpback, and sperm whales on the planet - Globally outstanding aggregations of seabirds and marine turtles on feeding grounds and islands - One of the least impacted tuna populations on the planet and an extraordinarily productive seamount north of the Seychelles - Highly productive upwelling phenomena driven by monsoon upwellings in the Somalian Current and gyres in the Mozambique Channel - A relatively intact population and migration of diadromous eels (return to freshwater to spawn) - Populations of several species of marine turtles, dugong, and coelacanth. <p>(Indian Ocean Commission 2010)</p>
Threats & Pressures	The key and almost singular threat to this TFCA and the resources therein is the overharvesting of Marine Resources both from commercial operators as well as local subsistence harvesters.

Community Indicators	<ul style="list-style-type: none"> - “A diverse range of communities live within the proposed Western Indian Ocean TFMP, all of which have diverse needs and challenges, depending on their country contexts and ecosystem environments.” (SADC) - “Human population and demand for marine resources are increasing dramatically on the islands. Island populations exceed 20 million people and are on a trajectory to double before 2030 (current population estimates are Comoros (798 000); Madagascar (19 625 000); Mauritius and Rodrigues (1 288 000 and 40 000); Mayotte (194 000); Réunion (827 000); Seychelles (84 000)). The combined population of Western Indian Ocean Island states is in excess of 23 million. In all the region’s countries this population is concentrated in coastal areas, which show higher rates of population growth than inland areas, a trend that is exacerbated by urbanization and migration towards coastal zones from inland areas. Existing infrastructure and amenities are often unable to support the region’s extremely rapidly growing coastal populations. In Madagascar and Comoros, growth of coastal populations is taking place more rapidly than across the country, with population doubling times of approximately 10-15 years, and women giving birth to an average of >6 children in coastal provinces. - Most coastal communities living within WIOMER are poor and are highly dependent upon their fisheries for survival and livelihoods. The coastal communities of Madagascar and the Comoros Islands fall into this category, while those of the Mascarenes and Seychelles are still active in fishing but have more diversified economies, such as tourism and agricultural sectors, and higher standards of living. Mayotte would also fall into this latter category. Most of the ‘Scattered Islands’ of France are uninhabited and managed for conservation and military purposes. - Coastal and offshore marine resources are major contributors to WIOMER national economies, as a source of food for their people, and through tourism, commercial fishing agreements, and revenues from offshore oil and gas development. (All of the ecoregion’s island countries, except Madagascar, are classified as Small Island Developing States (SIDS), acknowledged to be especially dependent on their coastal and marine resources. All have large exclusive economic zones (EEZs) in relation to their land areas. The combined EEZs cover an ocean area of approximately 3.8 million km², while the total land-cover is only 586 250 km², of which Madagascar constitutes about 99 percent). International fishing fleets and industries, focusing on species such as tuna, billfish, reef fish, sea cucumber, and octopus, and oil and gas companies are increasingly developing exploitation agreements with WIOMER nations, which can bring in revenue and provide employment, but can also bring unsustainable exploitation and disruption of ecosystems and local livelihoods and communities.” (Indian Ocean Commission 2010).
Opportunities	<p>“International tourism is booming on the island states. The best way to see the diverse marine life is through diving and snorkelling, with many diving centres situated along the beaches and coastlines. Eco-conscious travellers should look out for diving operators that adhere to sustainable diving practices. There is also a drive to promote cultural tourism for conservation purposes, ensuring that local communities begin to appreciate the benefits this potential TFMP has to offer.” (SADC)</p>
Data Needs & Gaps	<p>There is limited formal information on this TFMP presumably because of its conceptual stage. The best information sourced thus far is the 2010 report issued by the Indian Ocean Commission.</p> <p>The therefore review requires inputs and discussions with TFCA management.</p>

9.18 Zimbabwe Mozambique Zambia Transfrontier Conservation and Resource Area

Name	Zimbabwe Mozambique Zambia Transfrontier Conservation and Resource	
------	---	--

	Area		
Member States	<p>Zambia (5%)</p> <p>Mozambique (69%) Tchuma tchato Community Conservation Area; Mango National Park</p> <p>Zimbabwe (26%)</p>		
Area	29 859 km²		
Category	Category C - Conceptual TFCA		
Timeline/ History	<p>ZIMOZA TFCA is at a conceptual stage although the process towards formalizing the TFCA development was initiated in 2002. The establishment process of this ZIMOZA TFCA was first spearheaded and facilitated by IUCN from 2002 to 2003 and then later in 2008 by the African Wildlife Foundation in conjunction with the Zambia Wildlife Authority. The initiative is overseen by an intergovernmental steering committee. An international agreement was finalized after wide stakeholder consultations but still awaits approval by the respective governments.</p>		
Ecoregions	<p>Southern Miombo woodlands (30.8%)</p> <p>Zambezian and Mopane woodlands (69.2%)</p>		
Brief Overview and Objective	<p>The ZIMOZA TFCA is a transboundary initiative for managing shared natural resources through community-based resource management, infrastructural development, and policy harmonization. The area consists of four districts, which are Mbire in Zimbabwe, Zumbo, and Magoe in Mozambique, and Luangwa in Zambia. It is located in the Zambezi valley where the Zambezi River and Luangwa River meet, covering a total area of approximately 29 859 km² of National Parks, Game Management Areas, Safari Areas and communal land. ZIMOZA TFCA overlaps slightly with the Lower Zambezi – Mana Pools TFCA which lies directly on its western border. The TFCA encompasses parts of the Lower Zambezi National Park and the entire Rufunsa Game Management Area in Zambia and includes the Chewore and the Dande Safari Area in Zimbabwe. There is no formally protected area in Mozambique although the area includes communal land and provides for a good habitat for many wildlife species.</p>		
Joint Operations and TFCA Key Performance Areas	Not applicable due to conceptual phase.		
Water Resources	<p>Major rivers found in ZIMOZA TFCA include the Zambezi River, which forms the boundary of Zimbabwe and Zambia, and the Luangwa River, forming the boundary between Zambia and Mozambique.</p>		
Significant Cultural and Biodiversity Features	<p>“Bordering the Chewore Mountains in Zimbabwe, and dominated by grassland, riverine woodland and dry forest vegetation, ZIMOZA consists of many wildlife corridors and home ranges contributing to the protection of a variety of endangered species including elephant, hippopotamus, buffalo, lion, leopard, sable, roan, and over 300 species of birds.” (SADC)</p>		

Threats & Pressures	Due to the large numbers of people living within the boundaries of the TFCA, it may be expected that human-wildlife conflicts and poaching pose a not insignificant threat to the ecological integrity and social dynamics of the area. It is unclear what the land tenure arrangements are within the various parts of the TFCA. Political instability in the area may also pose significant institutional and economic threats.
Community Indicators	“Approximately 600 000 people reside inside the TFCA, many of which are heavily dependent on natural resources such as water, fish, wildlife, and forest for their livelihoods. Communities that live within the TFCA are separated by borders but not by culture and history. One of the primary aims of the transboundary initiative is to enhance community livelihoods through community ecosystem-based adaptations, mitigation, and land-use planning. Education on wildlife movement corridors to keep human settlement away from wildlife dispersal areas will also help to reduce human-wildlife conflicts in the long run.” (SADC)
Opportunities	Key opportunities are linked to implementing ecosystem-based approaches to land management. The significant presence of rural communities within the TFCA further allows for the development of natural benefits to these communities through provisioning (collection of NTFP) and cultural services (i.e., ecotourism).
Data Needs & Gaps	Limited available data and literature on the TFCA has prevented a comprehensive review of the TFCA. The review requires inputs and discussions with TFCA management.

10 APPENDIX 3: VALUATION METHODOLOGY

10.1 Overview

Ecosystem services and natural capital valuation comprises many valuation techniques, often embedded within one another. The evolution of ecosystem services valuation techniques is characterised by a historically increasing demand for precise quantification of the values of these services, and often precipitated and driven by specific environmental questions, events or even disasters (Brown 2000).

The understanding of valuation methodology starts with three key concepts (refer to Figure 10-1):

1. The valuation effort and accuracy need to match the decision that is to be supported. It is important to understand that valuation informs decisions, they do not “make” them. Thus, the ultimate valuation undertaken needs to provide sufficient and credible information management.
2. The standard of evidence needed, need to match the decision to be taken. For instance, if large investments are made, where financial and other returns are expected, high levels of accuracy of analyses are needed. In some case, where policy decisions are to be implemented the precautionary principle may provide sufficient evidence.
3. The valuation methodology contains a hierarchy within which four general steps are embedded. The four steps include:
 - a. It starts with a *systems description*, using systems ecology principles, which provide the scope and definitions of the valuation problem. The system description identifies the key social, economic, legal, and environmental characteristics of the study area. Additionally, the system description will identify the *ecosystem services* from the *ecosystem assets*, which provide benefits to society.
 - b. This is followed by a *comparative risk assessment*, which defines the important chains of causality that link ecosystems and humans and usually prioritises the ecosystem services to be valued.
 - c. The next step is the *ecosystem service valuation*, for which many valuation techniques exist and are data dependent. The specific valuation methodology selected is dependent on the data availability as well as the overall budget for the study. Methodologies for valuation can range from benefit transfers (where values from existing studies are ‘transferred’ and used as proxy values, to in-depth studies where data is collected in the study site and analysed using different valuation methodologies including the travel cost method (TCM); hedonic valuation method (HVM); contingent valuation method (CVM); and conjoint analysis (CA). These methodologies usually, follow one of two broad approaches, stated- or revealed preferences methods, to value ecosystem assets and their services. In the stated preference method, economists ask people to place a value on ecological resources. In the observed behaviour (revealed preferences) method, economists study the actual choices of people to infer the value people place on ecological resources.

- d. At the top of the hierarchy are the *comparative evaluation* techniques. The most utilised methodology in this step is the CBA which is used to understand the socio-economic cost and benefits associated with implementing a certain scenario on the baseline conditions. CBA is a widely utilised economic tool, and the methodology can be adapted to suit a variety of development applications.

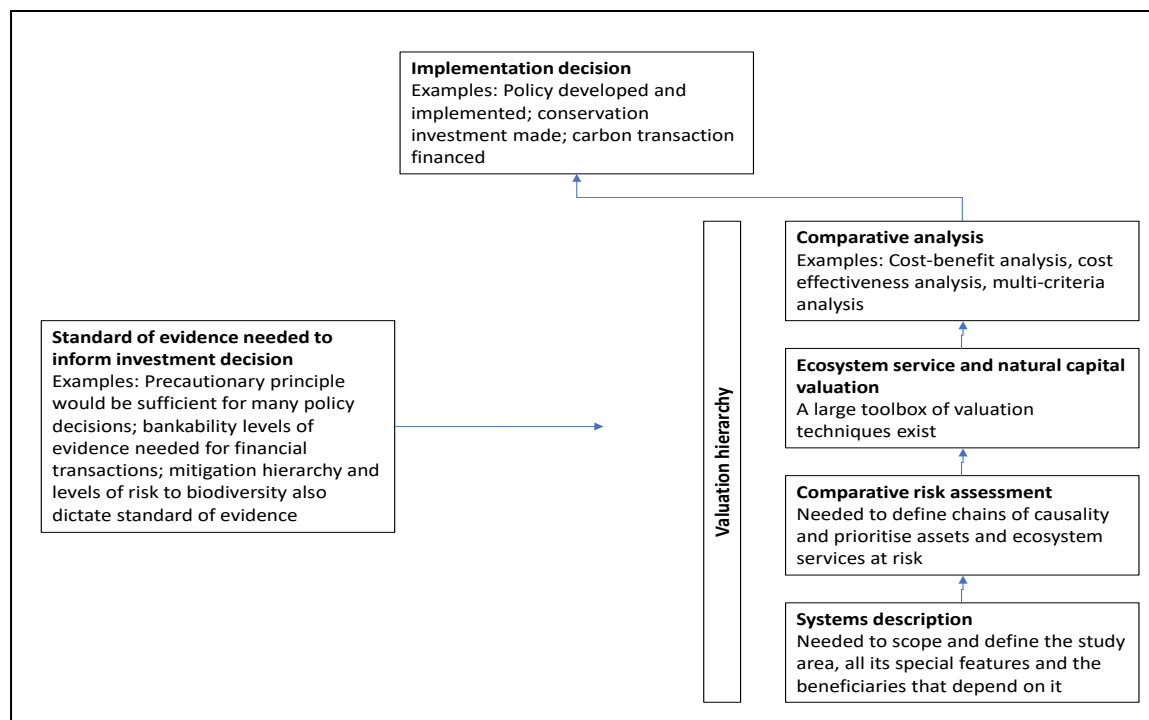


Figure 10-1. Key concepts in ecosystem service valuation process

10.2 Linking Ecosystem Assets to Ecosystem Services

The United Nations Statistics Division (UNSD) has been developing a valuation framework for measuring natural capital, termed the System of Environmental Economic Accounting (SEEA)⁵. The SEEA comprises an extensive set of technical guidelines for defining natural assets and valuing their contribution to economies. The SEEA, therefore, provides an international standard for natural capital accounting. One of the strengths of the SEEA is that it takes a systematic approach that enables natural capital accounting to be initiated, even where data and valuation techniques may not yet be perfectly in place. It does this through a system of stock- and flow accounts and through physical- and monetary accounts that enable the use of best available data as part of the accounting system. It also makes provision for a data quality assessment system that enables the use of a large variety of data sources.

The relationship between ecosystem assets and the delivery of ecosystem services is given in Figure 10-2 below. In summary, ecosystem assets are usually defined in terms of their extent (usually ha) and quality (abiotic and biotic characteristics). These assets supply a bundle of ecosystem services that reflect various ecosystem characteristics and processes as well as the ecosystem type, the extent, condition and location of the asset, and the patterns of use by economic units (including households, businesses, and governments). Ecosystem services are the contributions of ecosystems to the benefits that are used in economic and other human activity. The benefits are the goods and services that are

⁵ <https://seea.un.org/>

ultimately used and enjoyed by people and society (UN, 2021). Understanding the linkages between the ecosystem asset, ecosystem service and benefits is key to any ecosystem service valuation and the overall ESA methodology.

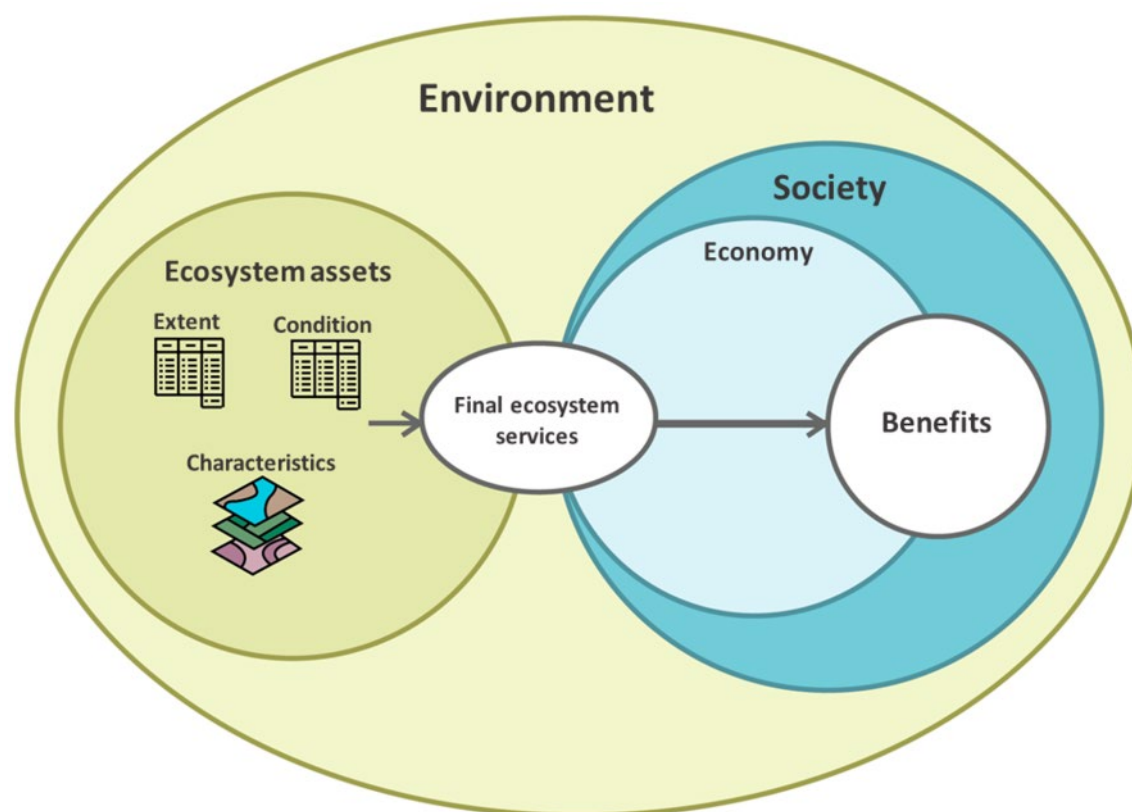


Figure 10-2. The relationship between ecosystem assets, ecosystem services and the benefits to society (Source: UN, 2021)

10.3 TFCAs Secure Natural Capital, which Delivers Ecosystem Services

As with all conventional asset classes and conventional economic goods and services, there exist many ways of expressing the value of TCFAs. Most fundamentally, we need to distinguish between the value of the annual flow of ecosystem services, and the value of natural capital, i.e., the underlying ecological assets. The annual flow of ecosystem services, in resource economic terms, can be thought of as a resource rent which the economies of SADC get as a form of income every year. In accounting terms, this would be akin to revenues reflected in the country's income statement. The value of the underlying assets can be thought of as the value of the natural capital and is akin to asset values reflected on the balance sheet of a country.

To arrive at a full accurate valuation of the ecosystem services and natural capital of TFCAs, we need each ecosystem service at each TFCA valued, to give a total annual value of ecosystem services. Thereafter, the discounted value of these benefit flows would give a valuation of the underlying natural capital.

To do such a valuation is complex and, as discussed earlier, price signals and valuation methods for accurately valuing all ecosystem services have not yet been developed. In addition, incomplete knowledge still exists to quantify the linkages between ecosystem assets and human well-being. For some ecosystem services, such as collections of food, fibre or fodder, valuation is relatively easy and requires a household survey that quantifies use in physical terms, combined with one or more simple

valuation techniques that quantify market prices, substitute prices or proxy prices. It is to be noted that even though such survey and valuation techniques are well established, it is still a resource intensive exercise that is not regularly undertaken in SADC countries. The regulating ecosystem services are regarded as the most valuable class of ecosystem services and the most challenging to value. The challenge here is that these services are not consumed directly in the economy, and thus neither markets nor people have a clear understanding of their value. Regulating services can be thought of as providing an insurance value to economies and to people. They are fundamental to the supply chain of ecosystem service delivery. We only become aware of their value once they start to degrade, and we see the effects of degradation on the larger economic system. The production function methodology is used for valuation of these services. This is a technique that analyses statistical relationships between key components of the system, and which then analyses changes in the system and its effects on final consumption values. It is also important to link natural asset values to country macro-economic models with the view to derive “green” GDP values and to interrogate how changes in natural asset extent and condition may affect national welfare. The volume of data requirements and complexity of analyses is highly time and cost consuming.

10.4 Valuing Natural Capital

Natural capital accounting would ultimately provide a comprehensive valuation of TFCAs’ ecological assets and ecosystem services. Thus, to formally measure the natural capital value of TFCAs, the country partners for each TFCA ideally need to implement a structured natural capital accounting system, which adopts the SEEA. Typically, this is a valuation approach that puts in place, over several years, a formal natural capital account for TFCAs. In the long term, this is ideally be done in close collaboration with the relevant country statistical offices.

The SEEA approach can also be applied as a planning and business case development tool, on a case-by-case basis. This can take the form of a project specific assessment, often embedded in a cost-benefit analysis, which evaluates very specific project, policy, or investment decision. Such assessments can be done a varying level of accuracy, depending on the nature and consequences of the decisions to be taken. No comprehensive natural capital accounting for SADC TFCAs have been done yet.

10.5 A Perspective on Ecosystem Services Values of TFCAs

In the sections above, we demonstrate the values of various TFCA delivered ecosystem services at the hand of various case studies, focussing on prioritised ecosystem services. Each of these services varies in its absolute value based on a range of attributes unique to TFCAs and their location within TFCAs. Together, these ecosystem services stack up to a total value that can either be expressed as an annual flow of benefits (US \$/a) or as an equivalent asset value (US \$/ha/a). Figure 10-3 below demonstrates, using indicative numbers only, how these ecosystem services values build-up to contribute to a total asset value and are influenced positively by examples of a range of attributes that define the TFCA asset condition. It is also to be noted that only a small proportion of these ecosystem service values are internalised in economic decision-making processes.

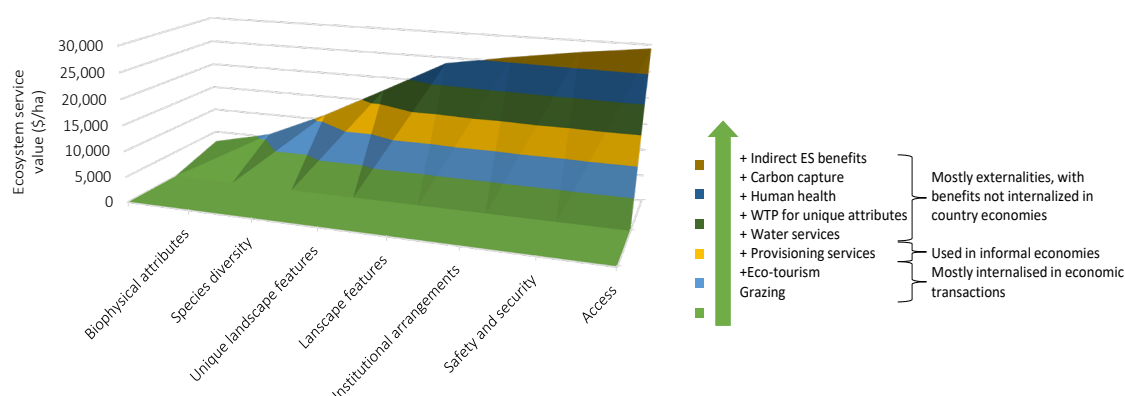


Figure 10-3. Indicative list of TFCA attributes that contribute to ecosystem service values (not exhaustive)

10.6 Methods Used for Natural Capital Valuation and Ecosystem Services Valuation

A large environmental economic valuation toolbox exists, primarily comprising the following:

- Various natural capital valuation modules available from the United Nations Statistical Division (UNSD) SEEA initiative.
- Ecosystem service valuation guidelines available from the United Nations' TEEB initiative.
- Best practices in valuation methods of cost-benefit analysis and ecosystem service valuation are available from a large array of international, peer-reviewed literature.

10.7 The Process to be Followed to Conduct Valuation

It is advisable for every TFCA to take a strategic approach to natural capital and ecosystem services valuation. Valuation should be programmatic and systematic. It is likely to be a multi-year exercise and, as with conventional accounting, needs to be designed so that it can be updated annually.

The overall valuation should be embedded in the UN's SEEA framework and any specific ecosystem valuation initiatives should be prioritised and embedded within this framework.

Valuation needs to be accurate and is, therefore, data intensive. Data needs analysis, data acquisition and data maintenance are needed to update and maintain the valuation system on an annual basis.

We, therefore, advise each TFCA to approach natural capital and ecosystem services valuation with the following steps:

1. Develop a strategic action plan for natural capital and ecosystem services valuation, identifying the valuation needs that would serve as valuation goals, and the valuation roadmap needed to achieve these goals.
2. Design a natural capital and ecosystem services valuation framework with detailed and prioritised action steps.
3. Implement the strategy by executing the valuation actions, based on good data, and using international best valuation practices.