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Support for the development of a SADC Response Plan to Combat Marine Pollution in the Region

DRAFT RESPONSE PLAN
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Executive Summary

Background to the Response Plan

1. Marine pollution is a complex mixture of man-made chemicals and biological material, and changes in physical conditions (e.g., turbidity, sound, and light). Pollutants enter coastal waters from multiple sources, most of which are **land-based** (80%; UNESCO, 2020), such as surface runoff, industrial discharges, agricultural and mining activities, and poor waste management, while others are **ocean-based**, primarily from shipping, commercial and recreational fishing, oil exploration, mining, and atmospheric deposition.

2. The focus of management efforts on reducing visible impacts such as solid waste generation can divert attention from the impacts of untreated domestic effluents (e.g., diseases, toxicity, eutrophication, and biodiversity loss). On the other hand, the impacts of plastic pollution, the second major pollutant identified in the regional debate, captures attention from stakeholders through emotional images of entangled biota and voluminous material on beaches. Many marine biota taxa are deeply impacted by plastic pollution, not only through entanglement but also ingestion and bioaccumulation that cause life-threatening complications.

3. Plastics make up an estimated 60 to 90 per cent of marine litter. Some of it comes from consumer packaging, including bottles, food containers, straws, and cling wrap. Plastics persist in the environment for hundreds of years and break down into microplastics that find their way into the food chain. Lost or discarded fishing gear, clothing made from synthetic fabrics like polyester, synthetic elastic fibres, and nylon, and the wear-and-tear from synthetic tyres contribute to the growing “plastic soup” in marine environments.

4. Pollution is more severe in coastal environments (e.g., mangroves, bays, and estuaries) due to proximity to land-based sources. Diffuse discharges, such as agriculture and road runoff are especially difficult to handle, because they are characterised by strong seasonal variation and poorly traceable origins due to the many possible sources. The SADC region is expected to experience an upward trend in land-based pollution sources as a result of increasing urbanisation and industrialisation in the coastal zone, and the lack of comprehensive regulation, appropriated enforcement, and weak abatement.

5. The need for strong action to prevent the worst consequences of plastic pollution on marine life and the health of the ocean has long been advocated (Van Rensburg *et al*., 2020). Improving waste management infrastructure for plastics and other pollutants along with changes in consumption habits are paramount and need concerted implementation actions by scientists, the private sector, governments, and civil society. Consequently, such a plan is not a contingency plan or an emergency response plan. This regional response plan is more strategic in nature, a management plan.

6. The overall assignment was to develop a regional response plan for the Southern African Development Community Member States (MSs) comprising 16 MSs of which Angola, Comoros, the Democratic Republic of Congo, Madagascar, Mauritius, Mozambique, Namibia, Seychelles, South Africa, and Tanzania have a coastline.

7. Following an Inception Report (February 2022), a Desk Study (August 2022) and Regional Consultations (undertaken in Angola, DRC, Madagascar and South Africa in July 2022), a results framework for a draft Response Plan has been elaborated.

This Response Plan is regional in scope and represents a set of strategic actions to support: …*the development of a SADC Response Plan to Combat Marine Pollution in the Region*.

8. Using the Sustainable Development Goals Dashboard[1] as a proxy for the ability of SADC MSs to respond to the requirements of a structured framework for improving environmental issues, it is clear that most countries have weak capacity to support a SADC Regional Response Plan. So, any plan needs to be relatively simple, have the requisite anchors to fit within existing institutions and legislation, align with existing policies and strategies, and needs to have some funding.

Vision and Scope of the Response Plan

9. The Vision can be over the same timescale as the SADC Vision, to 2050. The changes required in legislation and regulations, in new infrastructure and in public services in urban and rural areas will take at least twenty years, assuming there is adequate funding available. Also, like the SADC Vision, this Plan needs to consider industrial development and market integration, infrastructure development, and social and human capital development. In terms of Scope, this Plan primarily focuses on pollution arising from land-based sources in the general vicinity of the coast, or delivered to the coast by riverine networks.

10. Pollution that arises from other countries via oceanic transport, particularly plastics, cannot reasonably be dealt with by any single country and will rely on the endeavours of the United Nations Environment Assembly, which agreed earlier in 2022 to launch negotiations on a legally-binding global agreement to combat plastic pollution. The best that this Plan could do is to emphasise that SADC and the MSs sign up to any legally-binding global agreement to combat plastic pollution.

11. This Plan has a Vision to ensure that each SADC MSs has the appropriate legislation and implementing regulations in force supported by fully-funded institutions in order to manage land-based sources of solid waste. More simply, these institutions need to be able to deal with domestic wastes from urban areas and rural areas. This includes, the means to collect, separate and dispose of wastes whilst remaining adaptable to advances in any circular economy that may be developed in a MS.

12. It could be argued that there is also liquid-based waste arising from urban (various industries) and rural areas (agriculture and associated processing). Trying to tackle both these types of waste (liquid and solid) simultaneously would overwhelm most MSs in terms of capacity and funding. Given the emphasis in the ToR is on the plastic contribution to pollution, this Plan has focussed on solid waste.

Strategic Priorities of the Response Plan

13. There are several strategic priorities for the successful development of a SADC Response Plan to Combat Marine Pollution in the Region. Firstly, Good Governance via a Governance Committee comprising representatives of the SADC Secretariat, Member State Ambassadors and High Commissioners, SADC Country Representation and relevant Ministries of Environment (or equivalent) and Environment Agencies (or equivalent that enforces legislation/regulations). Other strategic priorities include: Industrial Development, Infrastructure Development, and Social and Human Capital Development.

[1] https://dashboards.sdgindex.org/profiles/madagascar

14. All EU-funded actions must promote the cross-cutting objectives of the European Commission: environment and climate change, rights-based approach, persons with disability, indigenous peoples, and gender equality. In addition, youth, disaster risk reduction and the SDGs have been taken into account.

Strategic Management of the Response Plan

15. A Governance Committee will be in charge of the strategic management of the Plan. This committee will be responsible for ensuring that key facilitating elements of the Plan are actively covered: Legal, Policy and Institutional Framework in each MS; Sustainable Funding Strategy; Monitoring, Evaluation and Reporting; and Communication, Visibility, and Awareness.

The Response Plan

16. The Response Plan has been conceived as a series of results within a results framework which captures the essential elements of the logical and expected cause-effect relationships among inputs, outputs, outcomes, and impact. There are several sub-goals:

For each MS:

- Identify the institution(s) able or appropriate to manage pollution
- Review and improve, if necessary, legislation for effluent and solid waste management
- Review and improve, if necessary, regulations for effluent and solid waste management
- Review and improve, if necessary, effluent and solid waste environmental quality standards
- Review and improve, if necessary, education and awareness
- Review and improve, if necessary, data collection and storage
- Review and improve, if necessary, networking and data sharing

For each coastal MS:

- Review and improve, if necessary, coastal zone management plan

For each MS with one or more boundaries with other MSs:

- Review and improve, if necessary, transboundary management plan (s)

17. At the level of Plan Implementation, day-to-day oversight, the following governance structure is proposed for the successful implementation of the Plan: Steering Committee, Reference Groups, Focus Groups, University Research Partners and Country Consultation.

Implementation

18. The Results Framework indicates various sub-goals. In essence, these are individual projects or interventions. Each of which would require formulation with its own logframe, budget and individual implementation team. These sub-goals may need projects within single MSs, or in groups of MSs, depending on the sub-goal.

Abbreviations and Acronyms

CICOS	International Commission for the Congo-Oubangui-Sangha Basin
DRC	Democratic Republic of Congo
EIB	European Investment Bank
EU	European Union
LTA	Lake Tanganyika Authority
MEA	Multilateral Environmental Agreement
MS	Member State
OKACOM	Permanent Okavango River Basin Commission
ORASECOM	Orange-Senqu River Commission
PBWB	Pangani Basin Water Board
PET	Polyethylene Terephthalate
RBO	River Basin Organisation
REC	Regional Economic Community
SADC	Southern African Development Community
SDG	Sustainable Development Goal
SES	Socio-economic status
SST	Sustainable Seas Trust
ToR	Term of Reference
TPTC	Tripartite Permanent Technical Committee
UN	United Nations
UNEP	United Nations Environmental Programme
ZAMCOM	Zambezi Watercourse Commission

1. Introduction

1. There are eight regional economic communities (RECs) in Africa:

    a) Arab Maghreb Union
    b) Community of Sahel-Saharan States
    c) Common Market for Eastern and Southern Africa
    d) (United Nations) Economic Commission for Africa
    e) Economic Community of Central African States
    f) Economic Community of West African States
    g) Intergovernmental Authority on Development
    h) Southern African Development Community (SADC)

2. The RECs have developed individually and have differing roles and structures. Generally, the purpose of the RECs is to facilitate regional economic integration between members of the individual regions and through the wider African Economic Community, which was established under the Abuja Treaty (1991). Some countries are in more than one REC and those overlapping with SADC are indicated below (Table 1).

Table 1 Countries of the Regional Economic Communities

SADC MEMBER STATE	a)	b)	c)	d)	e)	f)	g)
Angola							
Botswana							
Comoros							
Democratic Republic of Congo (DRC)							
Eswatini							
Lesotho							
Madagascar							
Malawi							
Mauritius							
Mozambique							
Namibia							
Seychelles							
South Africa							
Tanzania							
Zambia							
Zimbabwe							

3. This Report refers to SADC Member States (MSs) only.

1.1 Background

4. The overall assignment is to develop a regional response plan for the Southern African Development Community. SADC is a Regional Economic Community comprising 16 MSs of which Angola, Comoros, DRC, Madagascar, Mauritius, Mozambique, Namibia, Seychelles, South Africa, and Tanzania have a coastline.

5. The marine pollution status of the southern African coastline, although not completely documented, is considered to be a serious issue with multiple causes and multiple effects. These causes and effects differ from one member state to another. South Africa is perhaps the best documented[2].

6. A technical response plan, whilst challenging, is relatively straightforward, it is the underpinning policies and legal frameworks at sovereign level that are more challenging when designing a regional response plan so that it can be implemented. This is compounded,

[2] https://www.unep.org/news-and-stories/story/south-africa-aims-stop-marine-litter-its-source

of course, by the nature of the coastal oceanography reflecting the various effects of the confluence of the Southern Ocean, the Atlantic Ocean and the Indian Ocean. Of particular note are the complex behaviours of the Benguela and Agulhas currents which will affect the continental member states and the island member states differently.

7. So, a *SADC Response Plan to Combat Marine Pollution in the Region* will need to address the socio-economic aspects of the MSs, their policies and legal frameworks as well as the oceanographic context of those MSs. Such a plan should help MSs to work toward achievement of the Sustainable Development Goals (SDGs) 12 (Responsible Consumption and Production), 13 (Climate Action), 14 (Life Below Water) and 17 (Partnerships for the Goals). In this way, a Plan should allow co-benefits and meet multiple objectives in a coherent way.

1.2 Response versus Management

8. The focus of management efforts on reducing visible impacts such as solid waste generation can divert attention from the impacts of untreated domestic effluents (e.g., diseases, toxicity, eutrophication, and biodiversity loss). On the other hand, the impacts of plastic pollution, the second major pollutant identified in the regional debate, captures attention from stakeholders through emotional images of entangled biota and voluminous material on beaches.

9. The need for strong action to prevent the worst consequences of plastic pollution on marine life and the health of the ocean has long been advocated (Van Rensburg *et al*., 2020). Improving waste management infrastructure for plastics and other pollutants along with changes in consumption habits are paramount and need concerted implementation actions of scientists, the private sector, governments, and civil society. Consequently, such a response plan is not a contingency plan or an emergency response plan. This regional plan is more strategic in nature, a management plan.

1.3 Regional Agreements and Networks

10. The SADC region has unevenly distributed water resources compared to population and settlement patterns coupled with a variable and changing climate. Therefore, water availability and water quality are critical concerns for many SADC MSs. Water management is clearly important throughout the region, and over the years, transboundary and regional cooperation and harmonisation of legislation, policies and strategies has been promoted.

11. Therefore, water pollution is already embedded as a multi-MS issue, especially where rivers are transboundary in nature. At the core of integrated water resources management are river basin organisations (RBOs) with effective water governance relying on commitment to international agreements, and appropriate national laws and institutions that require water to be managed in accordance with the principles of integrated water resource management. These examples of multi-institutional functional arrangements could form an institutional map for a SADC Regional Response Plan.

12. In addition, Multilateral Environmental Agreements (MEAs) are legally negotiated pacts or treaties established between three or more States with the key objective or goal to protect the environment from threats, hazards or danger to humans, animals, plants, land including soil, water, air for a safe environment and sustainable development. MEAs are governed by international law and deal with global or regional environmental challenges by finding a solution to mitigate or prevent the environmental problems through established legally binding obligations or commitments. These, too, could anchor a SADC Regional Response Plan. Some countries are in more than one MEA and two MEAs relevant to this Plan with overlapping countries, with SADC, are indicated below (Table 2).

Abidjan Convention
The Convention lists the sources of pollution that require control as: ships, dumping, land-based activities, exploration and exploitation of the seabed, and atmospheric pollution. It also identifies environmental management issues related to meadows, wetlands, barriers and lagoons for which cooperative efforts are required. There is an Action Plan which is designed to link assessment of the quality of the marine environment and the causes of its deterioration with activities for the management and development of the marine and coastal environment of West, Central and, later, Southern Africa.

Other relevant aspects include adoption of regional contingency plans to prevent and combat pollution incidents; an additional protocol concerning cooperation in the protection and development of marine and coastal environment from land-based sources and activities in the Western, Central and Southern African Region supported by the *Ad Hoc* Committee on Science and Technology and a Regional Coordination Centre for Marine Pollution Emergency of the Abidjan Convention.

Nairobi Convention
The Convention provides a platform for governments, civil society, and the private sector to work together for the sustainable management and use of the marine and coastal environment of the Western Indian Ocean.

African Ministerial Conference on the Environment
More widely, there is also the African Ministerial Conference on the Environment. Its mandate is to provide advocacy for environmental protection in Africa; to ensure that basic human needs are met adequately and in a sustainable manner; to ensure that social and economic development is realised at all levels; and to ensure that agricultural activities and practices meet the food security needs of the region.

Table 2 Countries of the Abidjan and Nairobi Conventions

SADC MEMBER STATE	Abidjan	Nairobi
Angola		
Botswana		
Comoros		
DRC		
Eswatini		
Lesotho		
Madagascar		
Malawi		
Mauritius		
Mozambique		
Namibia		
Seychelles		
South Africa		
Tanzania		
Zambia		
Zimbabwe		

13. An RBO is at the core of integrated water resources management. Effective water governance relies on commitment to international agreements and appropriate national laws and institutions that require water to be managed in accordance with the principles of integrated water resource management.

14. Here are some relevant river basin institutions in the SADC region:

The **Tripartite Permanent Technical Committee** (TPTC) is a collaboration between South Africa, Mozambique and Swaziland. The cooperation on the joint management of the Inkomati Basin was initiated in 1992 with the signing of the Komati Accord between South Africa and Swaziland. Mozambique signed the Accord in 2002, making the TPTC one of the

first RBOs in Southern Africa. The mandate of the TPTC is to manage the water flow of the Inkomati River and Maputo River, specifically during times of flooding and drought;

The **International Commission for the Congo-Oubangui-Sangha Basin** (CICOS) was established in 1999. Member states of CICOS are Cameroon, Central African Republic, DRC and the Republic of Congo. The main objective of CICOS is to improve cooperation amongst the member states and eventually to promote integrated water resources management;

The Pangani River Basin covers an area of about 42,000 km^2 shared between Kenya and Tanzania. The two countries established the **Pangani Basin Water Board** (PBWB) and the Pangani Basin Water Office in July 1991 to jointly manage the water resources in the basin. The Office reports to the PBWB. The task of the PBWB is to advise the basin water officer on all matters concerning: the apportionment of water supplies, the determination, diminution or modification of water rights, measures to be taken in case of drought, and on priorities to be given to different uses of water in the basin;

The three Okavango Basin states Angola, Botswana and Namibia signed an agreement in 1994 that formed the **Permanent Okavango River Basin Commission** (OKACOM). The Agreement commits the member states to promote coordinated and environmentally sustainable regional water resources development, while addressing the legitimate social and economic needs of each of the riparian states. The three countries recognise the implications that developments upstream of the river can have on the resource downstream. Most of the river is currently undeveloped and is recognised as one of the few "near pristine" rivers in the world;

The Governments of Botswana, Lesotho, Namibia and South Africa formalised the **Orange-Senqu River Commission** (ORASECOM) through the signing of the "Agreement for the Establishment of the Orange-Senqu Commission" on November 2000. ORASECOM was the first commission established following the regional ratification of the SADC Protocol on Shared Water Course Systems;

The **Lake Tanganyika Authority** (LTA) was established in December 2008 by the governments of Burundi, the DRC, Tanzania, and Zambia. The LTA promotes regional cooperation required for socio-economic development and sustainable management of the natural resources in the Lake Tanganyika basin. The LTA coordinates implementation of the Convention on Sustainable Management of Lake Tanganyika and the Regional Integrated Management Programme, which focuses on establishment of sustainable fisheries, catchment management, pollution control, climate change adaptations, and monitoring programmes;

The agreement to establish the **Zambezi Watercourse Commission** (ZAMCOM) was signed in 2004 by Angola, Namibia, Zimbabwe, Botswana, Malawi, Tanzania and Mozambique. Currently, seven of the eight countries have signed the protocol, but only four out of the seven have ratified it, with Zambia, Malawi, Tanzania and Zimbabwe still outstanding. The Commission will only come into force when six out of eight countries ratify the Agreement. Meanwhile an interim Secretariat has been established and a draft document prepared to guide the process of operation; and

The Governments of the Republic of Mozambique and the United Republic of Tanzania established the **Ruvuma Joint Water Commission** in 2009 with the principal objective of ensuring sustainable development and equitable utilisation of common water resources of Ruvuma River basin. The Ruvuma River forms the boundary between Mozambique and Tanzania for a length of 650 km from the coast and has a total length of about 760 km. The entire area of Ruvuma River basin is about 152,200 km^2 of which 65.39% are in Mozambique, 34.30% are in Tanzania, and 0.31% are in Malawi (SADC 2008).

15. These examples of multi-institutional functional arrangements could form an institutional map for a SADC Regional Response Plan. However, given the clear lack of communication (perhaps through indifference or work overload) from the RBOs during the fact-finding part of this Plan, the RBOs may not, after all, be suitable models.

16. Using the Sustainable Development Goals Dashboard[3] as a proxy for the ability of SADC MSs to respond to the requirements of a structured framework for improving environmental issues, it is clear that most countries have weak capacity to support a SADC Regional Response Plan. So, any plan needs to be relatively simple, have the requisite anchors to fit within existing institutions and legislation, align with existing strategies and needs to have some funding.

2. Situational Analysis and Trends

2.1 Global Context

17. In general, marine pollution is a complex mixture of man-made chemicals and biological material, and changes in physical conditions (e.g., turbidity, sound, and light). Pollutants enter coastal waters from multiple sources, most of which are **land-based** (80%; UNESCO, 2020), such as surface runoff, industrial discharges, agricultural and mining activities, and poor waste management, while others are **ocean-based**, primarily shipping, commercial and recreational fishing, oil exploration, mining, and atmospheric deposition.

18. Anthropogenic activities such as agricultural discharges, nutrients and pesticides, animal waste and runoff, are significant sources of nitrogen and may lead to harmful algal blooms. Similarly, atmospheric deposition in the downwind plumes from major cities can have negative environmental impacts, while harbour and shipping activities cause the introduction of invasive species and the release of fossil fuel gases. Additionally, urban settlements release a variety of different pollutants including nutrients, metals, pharmaceuticals, among others.

19. The cumulative effects[4], added to the impacts of global change (e.g., changing water temperature, deoxygenation, acidification, sea level rise, extreme events, and coastal erosion), can bring even more complexity to ecosystems, changing both the environmental conditions (e.g., anoxia) and the state of ecosystems, causing, for instance, loss of habitats and associated services. Global environmental changes superimposed upon the effects of local pressures can maximise the remobilisation of pollutants accumulated in soils and sediments, which are long-term archives of contaminants (United Nations Environment Programme, 2019; Lacerda *et al*., 2020), leading to an increase in pollutant fluxes into the ocean.

20. It is then expected to see an enhancement of contaminant bioaccumulation in coastal food webs (Emmerton *et al*., 2013; Miranda *et al*., 2021), and loss of ecosystem services which may translate into food insecurity and impacts on cultural integrity, health, and wellbeing (Newton *et al*., 2020). Ocean acidification, associated with global changes, may also modify the speciation of metals in seawater, which can alter their bioavailability and therefore toxicity (Millero *et al*., 2009).

21. Anthropogenic pressures change the dynamics of ecosystem functions, affecting their natural resilience as well as eventual impacts on human welfare such as food safety, public health, and decrease fisheries and aquaculture revenues. Preventing degradation, setting measurable pollution reduction goals, and implementing improved management practices provide a way for scientists, the private sector, non-governmental organisations (NGOs), citizens, and government agencies to form the basis for the ambitious United Nations (UN)

[3] https://dashboards.sdgindex.org/profiles/madagascar
[4] Consists of “additive” effects and “synergistic” effects; the later occur due to some sort of reaction between pollutants (IEMA, 2020)

Decade of Ocean Science for Sustainable Development[5] (2021-2030) which is a framework to create a sustainable and well-managed global ocean by 2030.

22. Plastics make up an estimated 60 to 90 per cent of marine litter. Some of it comes from consumer packaging, including bottles, food containers, straws, and cling wrap. Plastics persist in the environment for hundreds of years and break down into microplastics that find their way into the food chain. Lost or discarded fishing gear, clothing made from synthetic fabrics like polyester, synthetic elastic fibres, and nylon, and the wear-and-tear from synthetic tyres contribute to the growing "plastic soup" in marine environments (Dauvergne, 2018).

23. Extended producer responsibility schemes, where they exist, do not cover all plastics, and are far from being global in scope. Such schemes and related measures, such as deposit return schemes, environmental taxes, and "pay as you throw" programmes could help curb the flood of plastic waste (Raubenheimer and Urho, 2020).

24. The Global Programme of Action launched the Global Partnership on Marine Litter at the UN Conference on Sustainable Development (Rio+20) in 2012.

2.2 Context and Status of Plastics Pollution in SADC Member States

25. The focus of management efforts on reducing visible impacts such as solid waste generation can divert attention from the impacts of untreated domestic effluents (e.g., diseases, toxicity, eutrophication, and biodiversity loss). On the other hand, the impacts of plastic pollution, the second major pollutant identified in the regional debate, captures attention from stakeholders through emotional images of entangled biota and voluminous material on beaches. Many marine biota taxa are deeply impacted by plastic pollution, not only through entanglement but also ingestion and bioaccumulation that cause life-threatening complications (Vegter *et al*., 2014).

26. The share of plastics in municipal solid waste increased from less than 1% in 1960 to more than 10% by 2005 in middle-and high-income countries (Jambeck *et al*., 2015) and correlates strongly with gross national income per capita (Wilson, 2015). As economies in the SADC region develop further, it is expected that this pattern will also emerge.

27. Plastics are stable, durable, and resistant to degradation, they persist for decades in the marine environment and travel considerably long distances, resulting in a rapid and substantial increase in plastic debris in all ocean basins (Barnes *et al*., 2009). Plastics and fibres can be a major vector for the dispersal of fouling organisms including hazardous microbes, being vectors for human disease (Zettler *et al*., 2013). Typically, about 500 items of anthropogenic debris strand on the Atlantic side of southern Africa per linear kilometre per year (Barnes and Milner, 2005). South Africa is among the top 20 countries responsible for 80% of the land-based plastics that end up in the ocean (Jambeck *et al*., 2015). Recently, the first global review using a holistic approach to assess the ecological, social, and economic impacts of marine plastic pollution suggested that all ecosystem services are impacted to some extent by the presence of plastics (Beaumont *et al*., 2019).

28. The need for strong action to prevent the worst consequences of plastic pollution on marine life and the health of the ocean has long been cautioned (Van Rensburg *et al*., 2020). Improving waste management infrastructure of plastics and other pollutants along with changes in consumption habits are paramount and need concerted implementation actions of scientists, the private sector, governments, and civil society. A detailed assessment of all sources is essential in order to identify and prioritise the resolution of problems associated with all potential pollutants (e.g., plastics, carbon dioxide (CO_2), domestic sewage, nutrients, metals, technology critical elements, pesticides, exotic species, noise, etc.).

[5] https://ioc.unesco.org/ocean-decade

29. Although detailed pollutant source inventories are often lacking, several contaminants, such as metals, are already well understood in terms of sources, sinks, fate and toxicity (Iwamoto *et al*., 2010; Abdel-Shafy and Mansour, 2016; Gworek *et al*., 2016; Bradley *et al*., 2017) and evidence exists to warrant a reduction of inputs if political actions are motivated (e.g., Clean Air Act Amendments, Minamata and Stockholm Conventions).

30. At the same time, new groups of, yet unregulated, contaminants (e.g., plasticisers, personal care products, pharmaceuticals, rare earth elements, and platinum group elements), have attracted attention and their continual introduction into surface waters may lead to still unknown adverse effects.

2.3 Coastal Context

31. Pollution is more severe in coastal environments (e.g., mangroves, bays, and estuaries) due to proximity to land-based sources. Diffuse discharges, such as agriculture and road runoff are especially difficult to handle, because they are characterised by strong seasonal variation and poorly traceable origins due to the many possible sources (Houtman, 2010).

32. The SADC region is expected to present an upward trend in land-based pollution sources as a result of increasing urbanisation and industrialisation in the coastal zone and the lack of comprehensive regulation, appropriated enforcement, and weak abatement.

33. There are several commonalities regarding the main problems associated with the dense demographics and amount of waste per capita of the diverse coastal zones and those further inland bordering main river systems. While pollutants derive mostly from industrial activities and burning of fossil fuels by developed economies, the lack of adequate sewage systems and wastewater treatment plants tends to be more of a concern to developing economies. Untreated sewage discharged to aquatic systems contains high loads of organic matter that may cause deoxygenation and increase dead zones, altering biogeochemical cycles and marine biodiversity (Breitburg *et al*., 2018).

34. Sewage also presents a myriad of toxic pollutants, some carrying human pathogens and some others contaminating the food chains in detrimental ways to ecosystems and human wellbeing (Iwamoto *et al*., 2010; Bradley *et al*., 2017; Nilsen *et al*., 2019). These have a disproportionately greater impact on traditional communities' economic security and health, mostly because marine resources (fish and shellfish) tend to play a fundamental role in providing food and financial resources to these communities (de Souza *et al*., 2011; World Bank, 2020; Miranda *et al*., 2021). Coastal economic activities, such as fisheries, aquaculture, and tourism are also acutely dependent on the ocean environmental quality and the increasing changes in environmental quality status.

35. Untreated or partially treated sewage may also cause eutrophication in rivers, bays, and coastal waters. In addition, there is also increasing concern about the spread of antibiotic-resistant pathogens (Gullberg *et al*., 2011). Since they do not degrade in the environment, bacteria reproduce and can amplify antibiotic resistance genes and pass them through the microbial community and, thus, can represent a critical environmental and human health risk (Pruden *et al*., 2006). The introduction from land-based allochthonous[6] bacteria carrying resistance genes may account for the acquisition of anti-microbial resistance by indigenous pathogens such as *Vibrio*[7] (Landrigan *et al*., 2020).

36. Untreated sewage, sewer overflows, wastewater treatment plant effluents, ocean submarine outfalls, and land runoff are vehicles of diseases and parasites (e.g., typhoid and cholera) that cause gastro-intestinal illness as well as life-threatening diseases in humans with

[6] Coming from a significant distance away from where it is found

[7] usually associated with eating undercooked seafood and occurring in coastal environments

mortality rates attributable to unsafe water and lack of sanitation in the region being generally higher than world's average.

Land Ownership

37. Governance factors, such as lack of expertise, disorganised management, political influence and corruption; and the affordability of land, infrastructure and operational costs; have been shown to hinder the implementation of effective solid waste management in developing and middle-income countries (Hardesty *et al*. 2021). When cities rapidly expand without waste management infrastructures the availability of suitable land on which to develop the necessary infrastructure subsequently rapidly declines (see siting criteria in Section 3.3). For example, in the DRC the local landfill site is located 40 km outside of Kinshasa which, together with limited waste removal trucks, perpetuates poor waste management.

Existing Conditions/Legislation

38. While legislation governing environmental issues and environmental protection has been implemented in SADC countries, most of these focus on environmental management issues relating to social and economic development. Laws on pollution and ocean governance, in particular, are not well developed or integrated and there is a lack of implementing regulations and co-ordination among the relevant managing and enforcing agencies.

39. Plastic consumption in Africa has increased with rapid economic growth and changes in consumer behaviour, however, weak solid waste management systems mean that a significant portion of this and other waste streams are being introduced into the marine environment as litter. Without suitable waste management, this increase of pollution/marine litter into the oceans could negatively affect the economies of coastal African countries (UNEP 2018).

40. According to the Africa Waste Management Outlook (2018) report, more than 90% of waste generated in Africa is disposed of at uncontrolled dumpsites and landfills. Approximately 13% of sub-Saharan Africa's municipal solid waste is composed of plastic (UNEP 2018). In most of the countries, there is a lack of information, in the form of comparable data, regarding solid waste, the quantity and quality of waste produced/generated and the volumes of various waste streams that are processed and/or mismanaged. Poor data quality and comparability will undermine the potential benefits of any regional response plan unless more accurate waste management data collection are undertaken (Eckelman *et al.* 2014).

41. It has been suggested that a greater understanding of the distribution patterns and diversity of litter can help guide successful development of management opportunities (Hardesty *et al*., 2021). In all SADC countries, with the possible exception of South Africa, the capture of *in situ* data is required to understand the main factors associated with poor land-based waste management. These data will assist to predict where and how waste enters the environment, thus providing opportunities for more focused, low cost, achievable and effective interventions to be put in place (Schuyler *et al*., 2022).

42. Beach surveys are considered the easiest and most inexpensive way to study large-scale trends in marine debris. For example, throughout 2021, the National Waste Agency of the Ministry of Culture, Tourism and Environment in Angola undertook several coastal clean-up and pollution awareness campaigns in support of the 'Angola without plastics Project'. These campaigns provided an opportunity to simultaneously collect valuable data.

43. However, it is important that any data collected are comparable across the region as well as with globally-collected data. Therefore, it is important for a standardised method to be utilised and for the various agencies to co-ordinate and share available data. For example, the Commonwealth Litter Programme methodology is a simple, efficient, effective and cheap plastics sampling technique, which is being rolled out in multiple Commonwealth countries, therefore allowing for significant amounts of comparable data to be collected. It is worth

investigating possible techniques to ensure that a single standardised methodology is suggested for use in SADC countries.

2.4 SADC Socio-Economic Context

44. The rapid increase in pollution, specifically plastics pollution, has become a key environmental issue, affecting wildlife, human health, and the economy. This is highlighted in the UN SDGs, e.g., SDG 14 is to 'reduce marine pollution of all kinds, particularly from land-based activities'. Given that it is estimated that the mis-management of land-based waste contributes to 80% of marine plastic pollution (Derraik 2002), it is critical that appropriate policy and legislation be implemented to ensure improved solid waste management.

45. One of the known factors potentially influencing the distribution of litter or anthropogenic debris is socio-economic status (SES). Higher mis-managed waste densities are expected in less wealthy/low SES countries and communities, while wealthier nations are more able to afford waste management infrastructure, as well as the enforcement of legislation (Hardesty *et al*., 2021).

46. While the need for better waste management and pollution reduction is generally understood/accepted at government level across SADC MSs, achieving this goal is limited by a lack of existing policy and legislation, suitable waste management infrastructure and a lack of education and awareness regarding the impacts of pollution in the general population, especially in low SES communities.

47. The *per capita* income categories of SADC MSs indicate that only two countries are consistently high-income, three are categorised as upper middle-income and the remainder fall in the lower middle- and low-income categories (Table 3). Despite this, in 2020 the majority of the SADC population (~82%) was living below the highest UN poverty line, with approximately 48% of the population within the SADC region living below the international poverty line (Table 4, Simkins, 2021). This suggests that the initial starting point for any successful Response Plan will need to include increased education and awareness in local communities.

Table 3 The per capita income categories of the 16 SADC MSs

Income per capita category 2019	SADC countries
High	Seychelles, Mauritius
Upper middle	Botswana, South Africa, Namibia
Lower middle	Eswatini, Angola, Zambia, Comoros, Zimbabwe, Lesotho, Tanzania
Low	DRC, Madagascar, Mozambique, Malawi

Table 4 Percentage of the SADC population living below the UN poverty lines

Poverty lines (US $ PPP*/day)	Monthly equivalent in 2020 (USD)	Per cent of SADC population below line (2020)
$ 1.90	$ 26	48
$ 3.20	$ 45	68
$ 5.50	$ 78	82

** Purchasing Power Parity*

48. It is expected that the higher the population density, the more waste is generated, however, the leakage of waste into the environment is generally lower in highly populated areas, such as cities, due to the presence of better waste management services, such as waste removal and street cleaning (Jambeck *et al*., 2015; Hardesty *et al*., 2021).

49. For example, in Botswana, government-operated waste removal is conducted more regularly in urban areas, than in rural areas. In part, not only because the density of waste is higher in these urban areas, but also due the greater distance travelled, and time needed in order to collect waste from more widely-distributed rural communities.

50. In 2021, Hardesty *et al*. suggested that interventions targeting low-wealth/high-infrastructure areas (cities and large towns) will likely provide the biggest payoffs/successful outcomes in regard to reducing negative impacts of poor waste management on the environment.

Social and Cultural Values

51. Other factors influencing the distribution of litter include local cultural factors and social norms (Pandey et al 2018). For example, in the early days, before Kinshasa became so large and densely populated, it was common practice for a household to pile its rubbish on the pavement outside the property, to be collected by government waste removal. However, as the city grew and the capacity of the government to collect the waste declined, no alternatives were instigated, and it has become common practice to leave loose/unbound domestic waste on the pavement where it goes largely uncollected until heavy winds and/or rains transport it into the surrounding river systems and ultimately to the marine environment.

52. By contrast in Madagascar, low-income communities act as recyclers, exploiting waste materials for constant re-use and re-purposing. Certain items, especially plastic bottles, are collected and used either for storage of household requirements (water or cooking oil), for direct resale empty, or for containment and sale of products such as honey. These bottles are sufficiently valued to the point that locals will ask international tourists, known for only consuming bottled water, for their empty bottles rather than begging for cash.

53. Additionally, based on lessons learnt during the field mission, the success of any donor organisation implemented intervention is dependent on local community buy-in. Often the community will go along with a plan or project while it is being funded, or while the responsible parties are on-site and in country, but as soon as these parties, considered outsiders, depart the community reverts to business as usual. Therefore, it is crucial to incorporate local communities in project implementation, to build networks, engage community leaders and foster local champions on the ground who are suitably trained and rewarded to continue supporting and promoting the plan.

54. The inclusion of youth and the facilitation of stewardships can greatly assist. South Africa is implementing a programme whereby river clean-up activities are undertaken in pollution hotspots by local youths. This provides job opportunities and promotes project sustainability. Similarly, in Madagascar the upkeep and protection of portions of indigenous forest is undertaken by the local communities. Tourists are only allowed to visit these parks and view the unique endemic species in the company of a local guide who is then paid for their time. Therefore, because the livelihoods of many local families depend on the health and continued survival of the forest, they refrain from illegal deforestation and hunting/trapping, and provide their own enforcement of these regulations.

55. It is similarly important to consider local conditions within each MS. In Madagascar where plastic bottles are highly valued and constantly reused, the rivers are instead littered with laundry soap powder sachets. Many women earn a living by washing clothing in local rivers, however, they cannot afford to buy laundry powder in bulk, instead retailers sell small, single use sachets with just enough powder for one wash. These sachets are then discarded and simply allowed to float downstream with the remaining soap suds. Given the small size and light weight, they often end up being transported all the way to the ocean. It is possible that a deposit-return system or other incentive-based option may help reduce this source of litter.

Economic Values

56. Research shows that items that have attached financial value for recycling, are less frequently found littered in the environment than items that currently have no monetary value,

suggesting that incentives are effective at reducing the presence of these items in the environment (Schuyler *et al*., 2018). In lower socio-economic areas, where littering is generally at its highest and formal waste management at its lowest, incentives are popular solutions known to increase recovery rates of target items (Schuyler *et al*., 2018) e.g., fewer beverage bottles end up as mis-managed coastal waste in regions that utilise a cash deposit-refund incentive.

57. In South Africa, the percentage of post-consumer Polyethylene Terephthalate (PET) bottles recycled increased from 16% in 2005 (a year after it was initiated) to 55% in 2016, with a target of 70% set for 2022[8]. In 2016, the recycling of PET bottles created approximately 62 000 job opportunities for small and micro waste collectors, who were paid a total of approximately USD 24 500 and ~90 750 tonnes of PET were recycled, therefore saving significant volumes of space within existing landfill sites.

58. In Angola, informal recycling or resale of recyclable materials is commonly undertaken by groups of women, however, the formalisation and regulation of this activity, to standardise resale prices and prevent injustices, could offer greater job opportunities as well as encourage reuse and recycling among the general population.

Environmental Context

59. It is important to consider that environmental conditions vary significantly across the 16 SADC MSs and that environmental factors can influence the distribution of litter (Schuyler *et al*. 2022). It is generally accepted that areas near water tend to have higher litter loads. In some cases, this is because open areas, especially those next to drainage channels, rivers, wetlands and waterways are frequently, and often illegally, used as indiscriminate dumping sites (UNEP 2018).

60. Additionally, during adverse weather conditions, land-based litter is washed or blown into watercourses which then act as conduits for transporting the waste downstream to the ocean. Therefore, weather patterns, such as rainfall and wind direction can also influence the distribution of litter. The riverine transport of waste means that MSs with large river systems are likely to experience higher litter loads than those without.

61. Furthermore, in addition to solid waste pollution, some regions may experience environmental pollution as a result of human activities. For example, deforestation in Madagascar has resulted in increased run-off making its way into riverine systems and the sea. This increases sediment transport and turbidity, and introduces higher loads of organic pollutants from agricultural land or chemical pollutants from mining activities into the system.

[8] https://www.productstewardshipcouncil.net/news/member-news/pet-recycling-growth-in-south-africa/

3. Vision, Mission, and Principles

3.1 SADC Vision 2050

62. SADC Vision 2050 is expressed in three pillars namely; Industrial Development and Market Integration, Infrastructure Development in Support of Regional Integration, and Social and Human Capital Development; and is built on a firm foundation of Peace, Security, and Good Governance. It is anticipated that by 2050, SADC would represent a peaceful, inclusive, competitive, middle- to high-income industrialised region, where all citizens would enjoy sustainable economic well-being, justice and freedom. The Vision is complementary to the UN 2030 Agenda for Sustainable Development, and the African Union Agenda 2063 and its flagship projects and varied continental frameworks.

63. Critical to the above are some key requirements:

- Regional cooperation and integration with free movement of goods, labour, capital, and services;
- Successful mobilisation of resources with a shift from a previous reliance on international cooperating partners towards a more diversified approach that would be better integrated and complementary;
- Institutional reforms at the operational level with SADC Secretariat at the regional level, and SADC national committees and national contact points at the national level;
- Strengthen compliance through effective monitoring and assurance mechanisms to track progress in implementation of SADC programmes and compliance with its protocols and legal instruments; and
- Magnify visibility and awareness as a means to trigger and maintain the interest, awareness, and participation of SADC citizens in driving the regional integration agenda.

64. The above requirements fit well with the proposed Regional Response Plan and can be mirrored in the latter.

3.2 Vision and Scope of the Response Plan

65. The Vision can be over the same timescale as the SADC Vision, to 2050. The changes required in legislation and regulations, in new infrastructure and in public services in urban and rural areas will take at least twenty years, assuming there is adequate funding available. Also, like the SADC Vision, this Plan needs to consider Industrial Development and Market Integration, Infrastructure Development, and Social and Human Capital Development.

66. In terms of Scope, this Plan primarily focuses on pollution arising from land-based sources in the general vicinity of the coast or delivered to the coast by riverine networks.

67. Pollution that arises from other countries via oceanic transport, particularly plastics, cannot reasonably be dealt with by any single country and will rely on the endeavours of the United Nations Environment Assembly, which agreed earlier in 2022 to launch negotiations on a legally-binding global agreement to combat plastic pollution. The future agreement will need to close gaps that existing initiatives and agreements do not address, especially at design and production phases of the plastics life cycle. It should also aim to eliminate the leakage of plastic into the environment. The solution will lie in prevention, proper design and production of plastics, their resource-efficient use, and robust waste management.

68. In the above respect, the best that this Plan could do is to emphasise that SADC and the MSs sign up to any legally-binding global agreement to combat plastic pollution.

69. This Response Plan has a Vision *to ensure that each SADC MSs has the appropriate legislation and implementing regulations in force supported by fully-funded institutions in order to manage land-based sources of solid waste*. More simply, these institutions need to be able to deal with domestic wastes from urban areas and rural areas. This includes the means to collect, separate and dispose of wastes whilst remaining adaptable to advances in any circular economy that may be developed in a MS.

70. It could be argued that there is also liquid-based waste arising from urban (various industries) and rural areas (agriculture and associated processing). Trying to tackle both these types of waste (liquid and solid) simultaneously would overwhelm most MSs in terms of capacity and funding. Given the emphasis in the ToR is on the plastic contribution to pollution, this Plan has focussed on solid waste (as indicated earlier).

3.3 Principles of the Response Plan

71. Firstly, a word of caution. The term “best practice” is commonly used in the absence of peer-review. Just because a certain practice has become a standard way of doing things, for example, a standard way of complying with legal or ethical requirements, it does not make it “best” practice. It is merely current practice. A “best practice” is a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means. It is rare to find that a particular practice has been scrutinised sufficiently rigorously to warrant a designation of “best”.

72. It is usually safer to say current practice rather than attempt to designate the practice with a badge such as “good” or “best”, unless it has been subject to rigorous peer review or can be assessed in some way against a specific standard.

73. The standard international hierarchy concerning waste management is as follows. This is used, typically, when considering industrial wastes. Domestic waste can also follow this route where appropriate:

    AVOID ~ where possible the production of waste should be avoided. Every waste stream needs to be examined to look for opportunities to feed back into the process or to be avoided in the first place or replaced with an alternative that has less environmental or climate change impact;

    REDUCE ~ where possible the volume of waste produced should be reduced, if it cannot be avoided in the first place, and then feed the reduced volume back into the process where possible;

    RE-USE ~ not to be confused with Recycling. Re-use means to use again without changing its form, whereas;

    RECYCLE ~ turning the waste into raw materials which can be used again, usually for a completely new purpose ~ this usually has extra (energy-using) steps than simply re-using;

    RECOVER ~ means any operation by which *waste* serves a useful purpose by replacing other materials which would otherwise have been used. The main difference between recycling and recovery is the final product, which in the case of Recycling is to turn the waste into raw material to be used again, whereas in the case of Recovery this a waste (not reduced to its raw materials) that can be used for a useful purpose (e.g., biogas from sewage plants used to produce energy);

TREAT ~ this depends on the specific kind of waste and may involve sophisticated technologies (e.g. stabilisation and solidification, bio-treatment, thermal treatment) often in combination; and

DISPOSE ~ via on-site or off-site burial: placement of waste in man-made or natural excavations, such as pits or landfills. When wastes are required to be stored prior to treatment or disposal, there are several considerations:

- Facilities and sites used for the storage or disposal of wastes should be operated and managed at all times to prevent contamination of groundwater and surface water, soil and air, protect public health, safety and the environment, and prevent property damage;

- Facilities and sites operated specifically for the storage or disposal of non-hazardous wastes should not receive, collect, store, or dispose of any wastes that are listed or defined as hazardous;

- Disposal of wastes into landfills may be considered. Such disposal should be conditional, and should only be allowed where the landfill is designed to contain such wastes, and the wastes contain no free liquids and are not mixed with hazardous wastes prior to disposal;

- Technical criteria for siting, construction, and operation of waste storage facilities should be flexible enough to address site-specific conditions;

- Siting Criteria include:

    - No waste management facility should be located near a flowing or intermittent stream;

    - No new waste management facilities to be located in close proximity to existing residences, schools, hospitals or commercial buildings; and

    - Generally, siting requirements should address factors such as depth to, and quality of, groundwater, wetlands, flood plains, topography, proximity to existing drinking water supplies and wells, geology, geological hazards, and other environmentally sensitive areas.

4. Strategic Priorities for the Response Plan

74. There are several strategic priorities for the successful development of a SADC Response Plan to Combat Marine Pollution in the Region and these are described below.

4.1 Good Governance

75. There needs to be high-level governance oversight and it is proposed that this should be administered through a dedicated committee.

Governance Committee

76. This committee could comprise a representative of the following:

SADC Secretariat

77. The SADC Secretariat is the principal executive institution of SADC, responsible for strategic planning, co-ordination and management of SADC programmes. It is also responsible for the implementation of decisions of SADC policy and institutions such as the Summit, the Troikas and Council of Ministers. It is headed by an Executive Secretary and has its headquarters in Gaborone, Botswana.

78. The Secretariat would be responsible for overseeing the implementation of the Response Plan, given that the Plan is a high-level, multi-MS Plan.

79. Specific roles of the Secretariat would be to:

- Obtain the necessary permissions and agreements of the MSs to accept and implement the Plan;
- Draw up annual work plans and monitor the MS work plans that should be nested within the overall work plan, which is managed by the Secretariat;
- Obtain the necessary funds and draw up annual budgets to implement the Plan at Secretariat level;
- Assist MSs in accessing funds sufficient to budget for implementation at MS-level; and
- Make an annual report concerning the Plan, to the SADC Chairperson who oversees the highest level of the governance structure of SADC, and among others, has the overall mandate of providing policy direction, and controlling the functions of SADC.

80. The SADC Secretariat will also provide updates to the African Ministerial Conference on the Environment, and to Member State Ambassadors, as required.

Member State Ambassadors

81. SADC has a Committee of Ambassadors and High Commissioners, established by the Council of Ministers in 2005. Its functions (as revised in 2012) are to:

- Advise the SADC National Committees on issues related to the implementation of SADC programmes and activities (this would include the Response Plan);
- Facilitate interaction and consultations between MSs and the SADC Secretariat (this could concern matters of the Response Plan);
- Consider matters related to the implementation of the Regional Indicative Strategic Development Plan and the Strategic Plan of the Organ (SIPO) and make appropriate recommendations to the SADC National Committees;
- Follow-up the implementation of Council decisions; and
- Carry–out any other functions as required by Council.

82. So, this committee provides a layer of scrutiny and knowledge sharing concerning the Response Plan whilst being responsible for the strategic management of the Plan (see Section 5).

SADC Country Representation

83. SADC does not have country offices in MSs. Instead, a part of Government is designated as the focal point for SADC which then liaises with the rest of government on matters concerning SADC. The role of this focal point would be to receive information from the SADC Secretariat concerning the Response Plan and act as conduit for SADC matters and disseminate accordingly through government.

Ministry of Environment (or equivalent)

84. The relevant ministry in each MS would provide technical support and policy advice, on behalf of each MS government, in respect of the implementation of the Response Plan at national level. Specifically, it would conduct a gap analysis to identify what additional laws (or amendments to existing laws) would be needed in order to provide the legislative framework for full implementation of the Response Plan.

85. Following the gap analysis, it would then take the lead on initiating new laws or amendments and/or new regulations, or amendments. It would provide an annual Progress Report to the Secretariat.

Environment Agency (or equivalent that enforces legislation/regulations)

86. The relevant agency in each MS would provide full enforcement of the existing, and additional laws (or amendments to existing) to support the full implementation of the Response Plan. It would provide an annual Progress Report to the relevant ministry.

4.2 Industrial Development

87. In developed countries, approximately half of plastics production is for use in industrial, building, construction, and agricultural activities, while the remaining ~50% is produced for household use (Cordier *et al* 2021). In developing countries, this proportion is likely skewed towards more plastics produced for the former use than the latter. Therefore, it is important for these sectors to be considered and included with regard to necessary outcomes of the Response Plan.

88. Additionally, industrial areas will produce more liquid and solid waste than residential areas, and because these areas do not have high cultural or aesthetic values, or value as tourism hotspots, the rate of littering in surrounding areas is likely to be higher (Schuyler *et al* 2022). New or updated waste management policies and legislation will need to be sector specific and reference groups should include members from both public and civil industry (see section 6.2).

4.3 Infrastructure Development

89. Infrastructure development is required to support the legislative requirements to control and reduce solid waste (and plastics). This would include requirements to control generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economic, aesthetic, engineering, and other environmental concerns.

90. It is important to note that the rate at which infrastructure development occurs should be judged based on specific country present macroeconomic structures (Benn *et al.,* 2022). For example, immediate implementation of measures towards a circular plastics economy, in countries with little to no current recycling and/or re-use, can lead to positive cumulative economic effects. However, immediate implementation of structural changes in a country that

already has a significant recycling and circular plastics economy could have short term negative economic efforts. In the case of the latter, incremental infrastructure changes will help minimise negative impacts on the existing plastics value chain (Benn et al. 2022).

91. Research shows that litter loads tend to be higher in sites with less infrastructure (fewer roads, transport networks) that are surrounded by more densely-populated areas (Schuyler *et al.* 2022). Therefore, proposed interventions should be priorities in communities that fit this description.

4.4 Social and Human Capital Development

92. Positive and negative interactions between the Plan and its implementers, industry, and civil society will be crucial to good decision-making. For these purposes, **social capital** is defined as the value added by the Plan's activities, results and outcomes to the affected wider communities. These could include relationships of individuals and groups of people internally and externally, and between the Plan, its results chains and the diverse communities and locations where it is being implemented. **Human capital** is the knowledge, skills and attributes of those implementing the Plan and others affected by the Plan, across the results chain, that contribute to a successful Plan.

93. In practice, the Plan could encounter both human and social capital impacts and dependencies. For example, the development of a solid waste management plan could generate employment opportunities at several stages of the waste management cycle. It could also generate significant opportunities for technical training.

94. This Plan has the potential for supporting the SADC objectives of regional integration and economic development, specifically Pillar III on Social and Human Capital Development in the Regional Indicative Strategic Development Plan (2020-2030) which is a crucial component of industrialisation and regional integration. The development of solid waste management plans, for instance, could support improvement in cleaner industrialisation. Acting regionally, the Plan has the opportunity to support recycling sectors at scale.

95. The Plan has the potential to support SADC in seeking an increase in job creation, with decent work opportunities for full and productive employment across the region, especially providing access to productive employment opportunities for young people.

96. A transition towards a more circular plastics economy has been shown to increase the demand for both skilled and unskilled labour, and both informal waste-sector workers and waste-sector dependants stand to benefit (Benn *et al.,* 2022). For example, in South Africa the introduction of PET recycling facilitated 62 000 job opportunities. Similarly, the introduction of incentives and/or deposit return policies has the dual benefit of both reducing litter loads and providing some income for low economic status communities who collect these items in order to receive the cash deposit (Schuyler *et al*. 2018).

4.5 Cross-Cutting Issues

97. All EU-funded actions must promote the cross-cutting objectives of the European Commission: environment and climate change, rights-based approach, persons with disability, indigenous peoples, and gender equality. In addition, it would be appropriate to take into account youth, disaster risk reduction and the SDGs.

Environment and Climate Change (and Disaster Risk Reduction)

98. As required by European Union (EU) treaties, environmental protection requirements must be integrated into the definition and implementation of EU policies and activities, in particular with a view to promoting sustainable development. The linkages between development, the environment and climate change are required to be mainstreamed, which allows opportunities to enhance the performance of development initiatives addressing environmental and climate change challenges and minimising environmental and climatic risks.

99. The key issues to be considered fall broadly under:

- Deforestation;
- Climate Change;
- Energy;
- Water;
- Biodiversity and Land Use;
- Chemicals, Toxics and Heavy Metals;
- Air Pollution;
- Waste Management;
- Ozone Layer Depletion; and
- Oceans and Fisheries.

These can be considered under each of the sub-goals in Table 5.

Rights-Based Approach

100. The following aspects need to be factored into the eventual formulation of interventions based on this Plan:

- Availability of legal services and justice to women and men in different stakeholder groups affected by, or participating in, a formulated intervention;
- Enforcement of legislation related to the protection of human rights of women and men in different stakeholder groups affected by, or participating in, a formulated intervention;
- Changes in access to information about claims and decisions related to human rights violations towards women and men in different stakeholder groups affected by, or participating in, a formulated intervention;
- Change in rights-holders' ability to claim rights, and how, if affected by, or participating in, a formulated intervention;
- Change in responsiveness to claims related to human rights violations towards women and men in different stakeholder groups (timeliness, rights holder satisfaction) affected by, or participating in, a formulated intervention; and
- Effect of the enforcement of legislation in terms of treatment of offenders against women and children or other human rights violations affected by, or participating in, a formulated intervention.

Youth

101. The following aspects need to be factored into the eventual formulation of interventions based on this Plan:

- Ability to make small or large contributions independently to a formulated intervention;
- Extent to which they have greater economic autonomy, both in public and private aspects of a formulated intervention;
- Extent of training or networking among women and men of different stakeholder groups in a formulated intervention;
- Mobility of women and men in different stakeholder groups within and outside their residential locality, if participating in a formulated intervention; and

- Self-perceptions of changed confidence or capacity in women and men of disadvantaged or marginalised groups, affected by, or participating in, a formulated intervention.

Persons with Disability

102. The following aspects need to be factored into the eventual formulation of interventions based on this Plan:

- Reduction or removal of physical or architectural barriers to participation in the Plan;
- Reduction or removal of informational or communicational barriers to participation in the Plan;
- Reduction or removal of technological barriers to participation in the Plan;
- Reduction or removal of organisational barriers to participation in the Plan; and
- Reduction or removal of attitudinal barriers to participation in the Plan.

Indigenous Peoples

103. The following aspects need to be factored into the eventual formulation of interventions based on this Plan:

- Respect and enhance indigenous identities, ways of life and right to traditional lands, territories and natural resources;
- Extent to which indigenous peoples can be involved meaningfully in a formulated intervention; and
- Extent of training or networking among indigenous peoples and their level of participation in a formulated intervention.

Gender Equality

104. The following aspects need to be factored into the eventual formulation of interventions based on this Plan. Ensure gender is reflected in:

- Outputs and outcomes as indicated by specific gender indicators, through dis-aggregated data;
- Progress reports and monitoring data, all through dis-aggregated data;
- Participation in capacity-building programmes; again, as indicated through dis-aggregated data; and
- Extent to which women and men of different stakeholders groups have access to networks or negotiation spaces to realise or resolve conflict.

Sustainable Development Goals

105. The Plan potentially aligns with the following SDGs:

	Sustainable Development Goal	Main Elements	Potential Plan Alignment
1	No Poverty	Access to basic human needs of health, education, sanitation	Improved waste management will improve citizen health
2	Zero Hunger	Providing food and humanitarian relief, establishing sustainable food production	With the introduction of recycling/sorting etc, there will be job creation which could help alleviate hunger
3	Good Health and Wellbeing	Better, more accessible health systems to increase life-expectancy	Improved waste management will improve citizen health
4	Quality Education	Inclusive education to enable upward social mobility and end poverty	Environmental awareness campaigns will support improved education
5	Gender Equality	Education regardless of gender, advancement of equality laws, fairer representation of women	Plan provides for gender equality
6	Clean Water and Sanitation	Improving access for billions of people who lack these basic facilities	Improved waste management will improve quality of local water sources

	Sustainable Development Goal	Main Elements	Potential Plan Alignment
7	Affordable and Clean Energy	Access to renewable, safe and widely available energy sources for all	Improving sewage treatment could allow for the collection of biogas which could be used for energy production
8	Decent Work and Economic Growth	Creating jobs for all to improve living standards, providing sustainable economic growth	Improved waste management provides opportunity for job creation
9	Industry, Innovation and Infrastructure	Generating employment and income through innovation	Improved waste management provides opportunities for improved infrastructure and innovation
10	Reduced Inequalities	Reducing income and other inequalities, within and between countries	Improved waste management provides opportunity for job creation. A plan spanning all SADC countries helps reduces the effects of competition that could arise from taxes/levies/charges
11	Sustainable Cities and Communities	Making cities safe, inclusive, resilient and sustainable	Improved waste management provides for cleaner cities and communities
12	Responsible Consumption and Production	Reversing current consumption trends and promoting a more sustainable future	Improved waste management and awareness campaigns potentially stimulates responsible consumption
13	Climate Action	Regulating and reducing emissions and promoting renewable energy	Improved waste management provides opportunity for methane management
14	Life Below Water	Conservation, promoting marine diversity and regulating fishing practices	Improved waste management provides opportunity for controlling/preventing land-based sources of wastes from reaching the coastline
15	Life on Land	Reversing man-made deforestation and desertification to sustain all life on earth	No direct alignment
16	Peace, Justice and Strong Institutions	Inclusive societies, strong institutions and equal access to justice	Improved waste management provides opportunity for improved laws and regulations and stronger waste management institutions
17	Partnerships for the Goals	Revitalise strong global partnerships for sustainable development	The Plan requires strong regional partnerships, and also participation in the global partnership to manage plastics

106. When designing the intervention, activities could focus on specific targets within the relevant SDGs goals indicated above.

5. Strategic Management of the Response Plan

107. The Governance Committee (Section 4.1) will be in charge of the strategic management of the Plan. This committee will be responsible for ensuring that key facilitating elements of the Plan (see below) are actively covered.

5.1 Legal, Policy and Institutional Frameworks

108. An appropriate legal, policy and institutional framework in each MS is on the critical path for a successful implementation of this high-level Plan. The Results Framework (Section 6.1) indicates how this is to be accomplished and the role of the Governance Committee would be to work at high level within each MSs to facilitate this.

109. While these laws and policies will likely need to be tailored to the specific needs of each MS, it would be advantageous for countries without any current legislation to align with those that have existing legislation.

5.2 Sustainable Funding Strategy

110. Also crucial to a successful implementation of this Plan is funding that endures after the initial donor funding ceases. The Governance Committee should convene a regional donor coordination conference to draw up a map of who is funding what and where. A permanent web-based platform should be established both to avoid duplication and potentially contradictory outputs.

111. For instance, the European Investment Bank (EIB), in conjunction with the German development bank KfW[9], has established the Clean Oceans Initiative which is committed to mobilising money to finance projects to clean the ocean and address activities that contribute to ocean pollution, sanitation and waste management. It would seek to mobilise grant funding for several projects in Sub-Saharan Africa, mostly based around integrated solid waste management and storm water management. There are several countries involved from the SADC region: Comoros, Madagascar, Seychelles and Tanzania. The implementation of this Response Plan should not either duplicate or contradict efforts already made or planned by the EIB.

112. There are known instances of existing projects that the Response Plan could contradict if not appropriately designed, such as work conducted by the Sustainable Seas Trust (SST) in South Africa. The SST African Marine Waste Network is mandated to help the people of Africa's coastal and island states develop and implement better waste-management strategies. In order to achieve this goal, they have built a network of interested and affected parties, held workshops and conferences and developed standardised methods for monitoring Marine litter – "The African Marine Litter Monitoring Manual" (Barnardo & Ribbink, 2020) and will soon publish recommended waste management guidelines. It is vital that the Governance committee keeps up-to-do with existing and future project work conducted by the SST and others who may be running related programmes.

[9] Kreditanstalt für Wiederaufbau

5.3 Monitoring, Evaluation, and Reporting

113. The Governance Committee should also oversee the monitoring, evaluation and reporting of the Plan at prescribed intervals.

Monitoring

114. To be clear, monitoring means to observe. Monitoring of outputs means to observe whether intended outputs of the Plan (e.g. a specific piece of legislation) are delivered and whether implementation is on track. Monitoring also observes changes in the result indicators (policy monitoring). Tracking the values (proposed limits or targets) of result indicators allows a judgement on whether or not the indicators move in the desired direction. If they do not, this can prompt reflection on the appropriateness and effectiveness of interventions and on the appropriateness of the result indicators chosen. Note that policy monitoring means tracking the development for all potential beneficiaries, not just for actual beneficiaries. The values of result indicators, both for baselines and at later points in time, in some cases can be obtained from national or regional statistics. In other cases, it might be necessary to carry out surveys or to use administrative data, such as a registry of recycling enterprises or employment statistics (dis-aggregated where possible of course).

Evaluation

115. Evaluation is more about the mechanics of the delivery of the Plan and, typically, would follow the usual OECD-DAC[10] criteria of Relevance, Coherence, Effectiveness, Efficiency, Sustainability and Impact.

Reporting

116. It would be expected that monitoring reports would be issued annually whilst a Mid-Term Review and a Final Evaluation would be undertaken and reported accordingly. In addition, given the long-term aspiration of the Plan, there should also be an *ex post* Evaluation.

5.4 Communication, Visibility, and Awareness

117. As previously mentioned, it will be important for the Governance Committee to keep up to date with existing and new programmes relating to waste management and marine litter. Similarly, all implementations undertaken for the Response Plan should be highly visible and well-advertised to reduce the likelihood of contradictory guidelines or protocols being implemented. In addition, the more visible the Plan the more likely it is that suitable collaborations with related programmes can be identified and facilitated.

118. Public awareness is important for the success of the Plan. Research has shown that marine waste is increasing in countries with a lower education index (Cordier *et al.* 2022). Similarly, the African Waste Management Outlook report emphasised the "*urgent need*" for greater public awareness, not only for the importance of reduced waste generation and better waste management, but also the dangers of uncontrolled dumping, open burning and the impacts these have on both human health and the environment (UNEP 2018).

119. It was proposed that education and training was needed high up, at political and governmental levels, as well as on the ground, in local communities, and waste management staff in municipal and private sectors. Educating the youth and children of a community often leads to more positive outcomes than educating the older generations because children take the lessons learnt home extending the reach of the information taught.

[10] Organisation for Economic Co-operation and Development, Development Assistance Committee

6. The Response Plan

6.1 The Results Framework

120. The Response Plan has been conceived as a series of results within a results framework which captures the essential elements of the logical and expected cause-effect relationships among inputs, outputs, outcomes, and impact.

121. For the avoidance of doubt, outputs are considered as the particular goods or services provided by an intervention; outcomes as benefits of that particular good or service to the target population; and impact refers to evidence on whether outcomes are actually changing beneficiary behaviour or longer-term conditions of interest.

122. Defining cause-effect linkages for one or more interventions lays the groundwork for a results framework. Thus, the development of a good results framework requires clarity with respect to the theory of change—the reasons why the project, programme, or strategy will lead to the outputs; why those outputs are likely to lead to the outcomes; and how those outcomes are (at least hypothetically) linked with longer-term impact.

123. The theory of change also requires knowing or estimating how long it will take to achieve each stage of the programme and how much of the outcome is likely to be achieved. Thus, defining cause-effect linkages for one or more development interventions lays the groundwork for a results framework.

124. Outcomes and impacts are the main focus of a results framework; project inputs and implementation processes are generally not emphasised, although outputs are often noted. This conceptual presentation of a results chain (outputs, outcomes, and impacts) is often accompanied by a more detailed plan for monitoring progress toward the ultimate objectives through measuring the achievement of outputs, outcomes, and impacts at different intervals of time.

125. Results are typically defined through indicators, which are often, though not always, quantifiable and measurable or observable (some indicators are qualitative). The monitoring plan typically includes baseline values and targets expected for outputs and outcomes, and it specifies the measures that will be used for data gathering to ensure that the results framework is actually populated with data, updated with information at key points during programme/project implementation, and used in decision making.

126. A results framework also often identifies any underlying critical assumptions that must be in place for the intervention to be successful, that is, to lead to achieving the targeted outcomes and impacts.

127. Based on the above, Table 5 sets out the outline of a results framework for the SADC Regional Response Plan. It highlights the key linkages in the theory of change that underpin the intervention. A simple but clear results framework engages constituents in thinking through the theory of change underpinning the intervention. Discussion of a results framework often requires programme staff and other constituents to identify the development hypothesis—Why would a particular intervention lead to the outputs identified and the outcomes expected? How does it link with the ultimate objective? This participatory discussion serves a critical role in building consensus and ownership around shared objectives and clarifying different interpretations of the elements of the hypothesis.

128. It is necessary to establish an evidence-based approach to monitoring and evaluation. By including specific indictors of outcomes and impacts and identifying baselines and targets to be achieved, results frameworks help answer the question, How will it be known that the Plan has succeeded?

129. The emphasis on outcomes rather than on the completion of activities (outputs) requires that plan implementers monitor key outcome variables and make mid-term corrections as necessary. A results framework is therefore a useful management tool, with plan implementation assessed in direct relationship to progress in achieving results, at the outputs, outcomes, and impact levels.

130. The strategic priority is the ultimate driver of a plan. Interventions might range in complexity from a simple intervention in a community to a number of interrelated interventions at a national level. A results framework can include outcomes of many related projects or of non-project activities, if they are relevant to the strategic objective, rather than simply charting the expected achievements of an isolated development initiative. All intermediate results needed to achieve the strategic objective can be specified, allowing partners to harmonise their efforts or to identify areas where additional plan activities will be needed (see Table 5).

Table 5 Outline of a SADC-Level Results Framework

SADC Member States Marine Pollution Sub-Goals	Issues, Barriers, Critical Assumptions	Outputs	Outcomes	Monitoring
For each MS: Identify the institution (s) able or appropriate to manage pollution	Ensure: • Appropriate legal mandate • Appropriate funding • Appropriate training • Appropriate systems	• Legal mandate • Treasury funding • Capacity Building Programme • Functional Systems	• Ability to manage pollution • Sustainable funding for management actions • Updated and maintained capacity building programme • Trained staff to operate and maintain the systems	Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of the adjacent requirements over a five-year period: Year 1 - 5
For each MS: Review legislation for effluent and solid waste management	• Check what the MS already has and if fit-for-purpose • Either update existing legislation or propose new specific legislation	• Marine pollution control legislation • Solid waste management control legislation	• Ability to control marine pollution • Ability to control solid waste	Assumes institutions identified above are fully functional and resourced Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of legislation over a five-year period: Years 1 - 5
For each MS: Review regulations for effluent and solid waste management	• Check what the MS already has and if fit-for-purpose • Either update existing regulations or propose new specific regulations	• Marine pollution control regulations • Solid waste management control regulations	• Ability to police marine pollution • Ability to police solid waste	Assumes institutions identified above are fully functional and resourced Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of regulations over a five-year period: Years 1 - 5
For each MS: Review effluent and solid waste environmental quality standards	• Check what the MS already has and if fit-for-purpose • Either update existing standards or propose new specific standards	• Marine pollution control standards • Solid waste management control standards	• Ability to sample and analyse marine pollution • Ability to sample and analyse solid waste	Assumes certified laboratories are available and fully functional and resourced Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of sampling over a five-year period: Years 1 - 5

SADC Member States Marine Pollution Sub-Goals	Issues, Barriers, Critical Assumptions	Outputs	Outcomes	Monitoring
For each coastal MS: Review coastal zone management plans	• Check what the MS already has and if fit-for-purpose • Either update existing plan or propose new plan	• A fully-functional updated plan • A fully-functional new plan	• Ability to manage defined coastal area	Assumes institutions identified above are able to adopt and be responsible for a fully functional and resourced plan Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of the coastal zone management plan over a five-year period: Years 1 - 5
For each MS with one or more boundaries with other MSs: Review transboundary management plans	• Check what the MS already has and if fit-for-purpose • Either update existing plan or propose new plan	• A fully-functional updated plan • A fully-functional new plan	• Ability to manage defined area	Assumes institutions identified above are able to adopt and be responsible for a fully functional and resourced plan Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of the transboundary management plan over a five-year period: Years 1 - 5
For each MS: Review status of education and awareness	• Check what educational materials or awareness campaigns are already in place for the general public • Check what training is provided to staff in the waste management sector	• Educational material/ posters or programmes developed to emphasise the need for better waste management and waste sorting at source and the impacts of poor waste management	• Ability to deliver training from both a top-down and a bottom-up perspective (political level and public low SES level training)	Assumes resources are made available to undertake training. Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of training and awareness campaigns over a five-year period: Years 1 - 5
For each MS: Review status of data collection and storage	• Check what historical waste management data are available	• A complete database		Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of the transboundary management plan over a five-year period:

SADC Member States Marine Pollution Sub-Goals	Issues, Barriers, Critical Assumptions	Outputs	Outcomes	Monitoring
	• Check what data/research are presently being undertaken • Recommend a standardised data collection method	• A list of existing and current related research projects • Facilitate the collection of comparable data on the quality and quantity of solid waste produced in each MS	• Ability to better understand the extent of waste mismanagement and the sources of solid waste entering the ocean	Years 1 - 5
For each MS: Review status of networking and data sharing	• Check what educational materials or awareness campaigns are already in place for general public • Check what training is provided to staff in the waste management sector	• A complete list/register of all affected parties is created • Develop and maintain an electronic data sharing platform	• Ability for those working in/researching waste management and pollution to be able to access and share relevant data	Assumes resources are made available to maintain an online platform Set baseline (Year 0) Set Indicator (s) to show the existence and the effectiveness of the transboundary management plan over a five-year period: Years 1 - 5
Need for "green" sustainable development strategies	Such strategies would need to be developed in conjunction with other sectors* of the economy, and so are not elaborated here **specifically within the context of a circular economy*			
Need for ecosystem planning	Such planning would need to be developed in conjunction with other sectors* of the economy, and so are not elaborated here **specifically within the context of conservation*			
Need for nature-based solutions	Such solutions would need to be developed in conjunction with other sectors* of the economy, and so are not elaborated here **specifically within context of climate change and MS Nationally Determined Contribution*			
Need for country-wide Waste Management Strategy	Such strategies would need to be developed in conjunction with other sectors* of the economy, and so are not elaborated here **specifically within the context of a circular economy*			
Need for Waste Management Plans for each urban area	Such plans would need to be developed in conjunction with other sectors* of the economy, and so are not elaborated here **specifically within the context of a circular economy*			

6.2 Governance Arrangements

131. At the level of Plan implementation, day-to-day oversight, the following governance structure is proposed for the successful implementation of the Plan (and would also work for an individual marine plastics programme in the future).

Steering Committee

132. This committee would comprise technical representative (s) from each MS depending on the thematic sector being addressed. The committee should meet quarterly during the first year of the Plan implementation and six-monthly thereafter. Its role is to monitor the individual sub-goals of the Results Framework (Table 5) to ensure focus, and budget expenditure for each results chain.

Reference Groups

133. Reference Groups should be formed, under the Steering Committee, to monitor and review Plan technical direction generally, and specifically to review and comment on provided technical deliverables.

Focus Groups

134. Focus Groups of technical specialists should be assembled on an as-needed basis to contribute to any specific technical discussion, in support of the Plan implementation.

University Research Partners

135. University research groups (e.g., the Plastics in the Environment Programme, of the FitzPatrick Institute of Africa Ornithology, University of Cape Town, South Africa, or the Fishery and Marine Science Institute of the University of Toliara, Madagascar) could also be involved to provide a basis for considering and deploying current and latest technologies and innovations.

Country Consultation

136. Regular country consultation of civil society would be beneficial in order to retain focus and benefits at that level.

6.3 Implementation

137. The Results Framework (Table 5) indicates various sub-goals. In essence, these are individual projects or interventions. Each of which would require formulation with its own logframe, budget and individual implementation team. These sub-goals may need projects within single MSs, or in groups of MSs, depending on the sub-goal.

138. Table 5 indicates for each intervention, relevant issues, barriers and critical assumptions, outputs and outcomes. It also indicates monitoring needs to be undertaken by the Steering Committee.

7. Annexes

7.1 Document Sources

YEAR	SOURCE	TITLE
	EU Delegation	
2021	EU Delegation Botswana & SADC	Support for the development of a SADC Circular Economy Strategy
2021	EU Delegation Botswana & SADC	A formulation mission for a programme in support of strengthening the TFCAs network in Southern Africa
2021	EU Delegation Botswana & SADC	Support for the development of the SADC Digital Transformation Strategy (SADC-DTS)
2021	EU Delegation Botswana & SADC	Support for the development of the SADC Blue Economy Strategy and Action Plan
2021	EU Delegation Botswana & SADC	Multi-Annual Indicative Programme for sub-Saharan Africa (2021-2027)
2021	EU Delegation Mauritius	E€OFISH Programme Update
	SADC Region or General	
1995	Kimball L.	An international regime for managing land-based activities that degrade marine and coastal environments. Ocean & Coastal Management 29 (1–3) 187-206
2000	SADC	Revised Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC) Region
2001	O'Toole M.J. *et al*	Integrated Management of the Benguela Current Region A Framework for Future Development Science and Integrated Coastal Management. Eds B. von Bodungen and R.K. Turner. Dahlem University Press
2002	Derraik J.	The pollution of the marine environment by plastic debris: a review. *Marine Pollution Bulletin* 44 842–52.
2004	Islam M. & M. Tanaka	Impacts of pollution on coastal and marine ecosystems including coastal and marine fisheries and approach for management: A review and synthesis. *Marine Pollution Bulletin,* 48 (7–8) 624-649
2006	Beintema N. *et al*	Summary Report of the Second Intergovernmental Review Meeting of the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities: 16–20 October 2006. *Earth Negotiations Bulletin*
2007	UNEP	Regional Overview & Assessment of Marine Litter, Western Indian Ocean
2008	European Commission	Marine Strategy Framework Directive
2008	Vander Zwaag D. & A. Powers	The Protection of the Marine Environment from Land-Based Pollution and Activities: Gauging the Tides of Global and Regional Governance. *Int. J Marine and Coastal Law, 23* (3) 423-452
2011	SADC	Regional Strategic Action Plan Integrated Water Resource Management III (2011-2015)
2013	Meier-Wehren B.	The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities. *New Zealand Journal of Environmental Law,* 17, 1–40
2014	Eckelman M. *et al*	Island Waste Management Systems Statistics, Challenges, and Opportunities for Applied Industrial Ecology. Journal of Industrial Ecology. 18(2) 306-317
2015	Petts *et al*	Broad coastal biogeographic zonation patterns on the southern Africa coast

YEAR	SOURCE	TITLE
2016	Camara de Industria y Comercio Santa Cruz	Bolivia y Santa Cruz en Cifras. Santa Cruz de la Sierra. https://openknowledge.worldbank.org/bitstream/handle/10986/29492/124332-WP-P161389-15-3-2018-15-24-6-WSantaCruzdela.pdf?sequence=5
2018	Ahlström H. & S. Cornell	Governance, polycentricity and global nitrogen and phosphorus cycles. *Environmental Science & Policy,* 79, 54-65
2018	Dauvergne P.	Why is the global governance of plastic failing the oceans? *Global Environmental Change,* 51, 22-31
2018	European Commission	Strategy for Plastics
2018	European Commission	EU Amended Waste Framework Directive
2018	Jambeck J. *et al*	Challenges and emerging solutions to the land-based plastic waste issue in Africa. Marine Policy 96 256-263
2018	Moseley A.	Oceans Governance, Barbados
2018	Pandey R.U. *et al*	Exploring linkages between sustainable consumption and prevailing green practices in reuse and recycling of household waste: Case of Bhopal city in India. *Journal of Cleaner Production* 173, 49–59.
2018	Schuyler Q. *et al*	Economic incentives reduce plastic inputs to the ocean. *Marine Policy* 96, 250–255.
2018	UNEP	The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities: A 20-year Perspective on a Unique Programme to Advance the Ocean Agenda
2018	UNEP/GEF	From Source to Sea: Protecting Our Oceans through Partnership and Investments.
2018	World Bank	Wastewater: From Waste to Resource: The Case of Santa Cruz de la Sierra, Bolivia
2019	Benkenstein A.	Towards a SADC Blue Economy
2019	European Commission	Port Reception Facilities Directive
2019	European Commission	Environmental and Health Risks of Microplastic Pollution
2019	European Commission	Directive on Single Use Plastics and Fishing Gear
2019	Ryan P. *et al*	Rapid increase in Asian bottles in the South Atlantic Ocean indicates major debris inputs from ships. Proceedings of the National Academy of Sciences, 116 (42) 20892-20897
2020	European Commission	Circular Economy Action Plan
2020	Finke G. *et al*	Marine Spatial Planning in the Benguela Current Large Marine Ecosystem, Elsevier B.V
2020	IEMA	Demystifying Cumulative effects, Impact Assessment Outlook Journal 7 1-3
2020	Portz L. *et al*	Marine litter arrived: Distribution and potential sources on an unpopulated atoll in the Seaflower Biosphere Reserve, Caribbean Sea, Marine Pollution Bulletin, 157
2020	SADC	Southern African Development Community (SADC) Regional Indicative Strategic Development Plan (RISDP) 2020–2030, Gaborone, Botswana, 2020.
2020	SADC	Southern African Development Community (SADC) Vision 2050, Gaborone, Botswana, 2020
2020	Raubenheimer K. & N. Urho	Rethinking global governance of plastics – The role of industry. *Marine Policy,* 113
2020	The Pew Charitable Trusts	Breaking the Plastic Wave: A Comprehensive Assessment of Pathways Towards Stopping Ocean Plastic Pollution

YEAR	SOURCE	TITLE
2020	UNEP	Nutrient management: the issue. https://www.unenvironment.org/explore-topics/oceans-seas/what-we-do/addressing-land-based-pollution/globalpartnership-nutrient-0
2020	Vesman A. *et al*	Marine litter pollution on Northern Island of the Novaya Zemlya archipelago, Marine Pollution Bulletin, Volume 150
2021	African Development Bank	Programme for improving fisheries governance and blue economy trade corridors in SADC region
2021	Cordier *et al*	Plastic pollution and economic growth: The influence of corruption and lack of education. *Ecological Economics* 182 106930
2021	GESAMP	Sea-based sources of marine litter. Ed. Gilardi, K.) (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP/UNDP/ISA Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Rep. Stud. GESAMP No. 108, 109 p.
2021	Hardesty B.D. *et al*	Socioeconomics effects on global hotspots of common debris items on land and the seafloor. Global Environmental Change 71 102360
2021	Hatje V. *et al*	Pollutants in the South Atlantic Ocean: Sources, Knowledge Gaps and Perspectives for the Decade of Ocean Science, Front. Mar. Sci.
2021	IISD	Ministerial Conference on Marine Litter & Plastic Pollution: 1-2 Sept. 2021; Marine Litter & Plastic Pollution Bulletin
2021	IISD	Protecting the Marine Environment from Land-based Activities
2021	Knoblauch D. & L. Mederake	Government policies combatting plastic pollution. Current Opinion in Toxicology, 28: 87–96
2021	Simkins C.	The Southern African Development Community – Economy: Levels, Growth, Structure, Income Distribution and Happiness.
2022	Schuyler Q. *et al*	Environmental context and socio-economic status drive plastic pollution in Australian cities. *Environmental Research Letters* 17 045013.
	Angola	
2002	SADC	Protocol on Forestry
2004	Zambezi Watercourse Commission Secretariat (ZAMSEC)	The agreement on the establishment of the Zambezi Watercourse commission
2009	Government	Framework Report on Angola's Biodiversity
2011	National Waste Agency	Presidential Decree No 261/11 Water Quality
2012	National Waste Agency	Presidential Decree No 190/12 Waste Management Regulation
2012	National Waste Agency	Presidential Decree No 196/12 Strategic Plan for Management of Urban Waste
2014	National Waste Agency	Presidential Decree No 181/14 Organic Statute
2018	Ministry of Economy and Planning	National Development Plan 2018-2022 Vol. 1
2018	UN	Common Country Analysis 2020
2019	African Development Bank	Climate Change Integration In Environmental Management and Sustainable Land Use Project
2019	Huntley B. *et al*	Biodiversity of Angola

YEAR	SOURCE	TITLE
2019	Ministry of Environment	6th National Report on Biodiversity in Angola and the Achievement of the AICHI Goals 2011-2020
2019	World Bank	Environment and Renewable Natural Resources in Angola - Opportunities to Diversify the National Economy, Generate Income for local communities, enhance environmental management capacity and build resilience to climate change
2020	Yale University	Environmental Performance Index
2021	Government	Voluntary National Review Report
2021	Government	Diary of the Republic. Official Body of the Republic of Angola Series No 150
2021	UN	Sustainable Development Goals Report
2022	Ministry of Culture, Tourism & Environment, National Waste Agency	Actions Implemented by the National Waste Agency and Partners around Marine and Coastal Pollution
	Botswana	
2017	Wiston M.	Status of Air Pollution in Botswana and Significance to Air Quality and Human Health. J. Health & Pollution 7 (15)
	Comoros	
2013	UNEP	Environmental Emergencies, Comoros
2018	Cowburn B. *et al*	The current status of coral reefs and their vulnerability to climate change and multiple human stresses in the Comoros Archipelago, Western Indian Ocean. Marine Pollution Bulletin 133:956-969
2020	Yale University	Env Performance Index
2021	Ministry of Agric., Fisheries, Env. Tourism and Crafts	Nationally Determined Contribution: Comoros
	Democratic Republic of Congo	
2011	Kennedy K.B.	L'exploitation du pétrole du Lac Edouard et la loi environnementale en République Démocratique du Congo: *Legal aspects of sustainable natural resources, Legal Working Paper Series,* CISD, p. 7
2011	Cabinet of the President of The Republic	Law N°-11-009-DU 09 July 2011 Laying down fundamental principles relating to the protection of the environment
2019	UN	Common Country Analysis 2020
2020	UNESCO IOC	Technical report on the status of coastal vulnerability in central African countries (DRC)
2020	Yale University	Env Performance Index
2021	UN	Sustainable Development Goals Report
	Eswatini	
2020	Yale University	Environmental Performance Index
	Lesotho	
2020	Yale University	Environmental Performance Index

YEAR	SOURCE	TITLE
	Madagascar	
2013	World Bank	Addressing household air pollution. A case study in rural Madagascar, Policy Research Working Paper No. 6627
2015	Ministry of the Environment, Ecology, Sea and Forests	Order No 32534/2015 Laying down the measures applicable to biodegradable plastic bags and bags in the Malagasy national territory
2016	UNFCCC	Nationally Determined Contribution: Madagascar
2017	Gjerdseth E.	Quantitative Analysis of Debris and Plastic Pollution on Beaches in Northern Madagascar
2017	Ministry of the Environment, Ecology and Forests	Decree No 2017-010 Prohibiting the production, import, marketing, stockpiling and use of sachets, and plastic bags on the national territory.
2017	UN	Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment on his mission to Madagascar
2018	Barimalala R. *et al*	Madagascar Influence on the South Indian Ocean Convergence Zone, the Mozambique Channel Trough and Southern African Rainfall. Geophysical Research Letters 11,380–11,389
2020	Indian Ocean Commission	Promotion of African and Indian Ocean Island Developing States Blue Economy through the Southwest Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish2) - Terms of reference for the recruitment of an individual consultant for the elaboration of action plans for the reduction of marine plastic pollution caused by plastic water bottles and single-use plastics in the AIODIS
2020	UN	Common Country Analysis 2020
2020	Yale University	Environmental Performance Index
2021	Commonwealth Secretariat	Coastal Risk Information Service – Madagascar, Mauritius, Mozambique, South Africa
2021	Kelleher K.	Prevention, reduction and control of Marine Plastic Pollution in African and Indian Ocean Developing Island States (AIODIS)
2021	UN	Sustainable Development Goals Report
2022	Randriamiarisoa	Strategy and National Action Plan for the Management of Marine and Plastic Waste and Mahajanga Local Marine and Plastic Waste Management Plan
	Malawi	
2020	Yale University	Environmental Performance Index
	Mauritius	
2020	Yale University	Environmental Performance Index
2021	EU Delegation Mauritius	E€OFISH Programme Updates
2021	UNFCCC	Nationally Determined Contribution: Mauritius
2021	Commonwealth Secretariat	Coastal Risk Information Service – Madagascar, Mauritius, Mozambique, South Africa
	Mozambique	
2012	UNESCO	Assessing Marine World Heritage, from an Ecosystem Perspective, the Western Indian Ocean (Mozambique)

YEAR	SOURCE	TITLE
2015	IUCN	Resilience of Coastal Systems and their Human Partners: Ecological & Social Profile of Coastal Systems: Mozambique, Tanzania
2020	Yale University	Environmental Performance Index
2020	Da Silva, A.	Legal, political and institutional frameworks for the management of marine plastics in Mozambique
2021	CARDNO	National analysis of marine litter in Mozambique; Fact Sheet Legal and institutional framework (various factsheets)
2021	Commonwealth Secretariat	Coastal Risk Information Service – Madagascar, Mauritius, Mozambique, South Africa
	Namibia	
2017	Government	National Marine Pollution Contingency Plan, Namibia
2019	Min Fisheries & Mar Resources	Marine Spatial Planning in Namibia
2020	Yale University	Environmental Performance Index
	Seychelles	
2020	Yale University	Environmental Performance Index
2021	UNFCCC	Nationally Determined Contribution: Seychelles
	South Africa	
2003	O'Donoghue S. & D.J. Marshall	Marine pollution research in South Africa: A status report, South African Journal of Science 99 (7):349-356
2017	Ribbink A. *et al*	Strategy for Marine Waste: Guide to Action for Africa
2018	UNEP	Africa Waste Management Outlook. United Nations Environment Programme, Nairobi, Kenya.
2019	UNEP	Small Island Developing States Waste Management Outlook. Nairobi
2020	Barnardo T & Ribbink AJ (Eds.)	African Marine Litter Monitoring Manual. African Marine Waste Network, Sustainable Seas Trust. Port Elizabeth, South Africa.
2020	IUCN	Policy on Marine Plastics South Africa
2020	UN	Common Country Analysis 2020
2020	Vilakati B. *et al*	Characterization of plastic micro particles in the Atlantic Ocean seashore of Cape Town, South Africa and mass spectrometry analysis of pyrolyzate products
2020	Yale University	Environmental Performance Index
2021	Commonwealth Secretariat	Coastal Risk Information Service – Madagascar, Mauritius, Mozambique, South Africa
2021	Preston-Whyte F. *et al*	Meso- and microplastics monitoring in harbour environments: A case study for the Port of Durban, South Africa
2021	Sadan Z. & L. De Kock	Plastic Pollution in Africa: Identifying policy gaps and opportunities. WWF South Africa, Cape Town, South Africa.
2021	UN	Sustainable Development Goals Report
2022	Benn H. *et al*	Economic case for a circular plastics economy in Africa: Findings and recommendations for Côte d'Ivoire, Kenya and South Africa. WWF South Africa, Cape Town, South Africa.
	Tanzania	

YEAR	SOURCE	TITLE
2010	Machiwa J.F.	Coastal Marine Pollution in Dar es Salaam (Tanzania) relative to Recommended Environmental Quality Targets for the Western Indian Ocean, *Western Indian Ocean J. Mar. Sci. Vol. 9,* No. 1, pp. 17 -30, 2010
2015	IUCN	Resilience of Coastal Systems and their Human Partners: Ecological & Social Profile of Coastal Systems: Mozambique, Tanzania
2020	Yale University	Environmental Performance Index
	Zambia	
2020	Yale University	Environmental Performance Index
	Zimbabwe	
2020	Yale University	Environmental Performance Index