

Development of a waste stream-specific roadmap for the circular economy of Malawi

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TNO 2022 P10786

Sub report Output 5.1 National roadmap for a circular economy in plastic waste management

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Number of pages	24 (incl. appendices)
Number of appendices	
Sponsor	
Project name	
Project number	

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Contents

1	Introduction	3
1.1	Background	3
1.2	Objectives	3
1.3	Timeline	4
1.4	Scope	4
1.5	Alignment with Malawi Vision 2063 (MIP-1)	5
1.6	Reading guide	6
1.7	Summary of the key gaps	6
2	Visual overview of the roadmap	8
3	Interventions towards a circular plastic waste system in Malawi	9
3.1	Enhancing the institutional environment	9
3.2	Promoting constructive collaboration	12
3.3	Increasing knowledge levels and availability	13
3.4	Improving the physical infrastructure	15
3.5	Operationalizing the roadmap	19
4	Gantt chart plot of the roadmap	20
5	Consulted sources	22
6	Appendix	23

1 Introduction

1.1 Background

This roadmap is the final output of the CTCN Technical Assistance study on circular economy in household waste management in Malawi. During this study, a baseline assessment for the current waste system was conducted, looking at plastics, paper, metal, glass, household organic waste and (small scale) agricultural waste. This was followed by a comparative analysis per waste stream on the potential to move towards higher levels of circularity. After a physical stakeholder consultation in Lilongwe, October 2021 the choice was made to focus on plastic waste for the remainder of the project. Following this specification, a more detailed analysis was conducted on the current status of the plastic waste management system in Malawi, looking at technology use, the policy and regulatory landscape and current markets and value chains on plastic (waste) management. The results of these three outputs combined (the baseline assessment, the comparative analysis and the plastics deep dive) have made it possible to determine the most pressing challenges and gaps in Malawi in relation to sustainable and circular plastic (waste) management. Additional literature and other roadmaps have been assessed complementarily. As a result, this document is designed to provide recommendations and suggestions for change.

1.2 Objectives

The purpose of this project was to develop a roadmap for the transition towards a circular economy in plastic waste management in Malawi. When taking apart this project purpose, it becomes clear there are several underlying themes influencing this: (1) sustainable waste solid management, (2) more circularity in plastic waste management, and (3) achieving a circular economy. The core objectives of roadmap are therefore threefold:

1. **Development and implementation of a sustainable waste management system** – in order to develop a well-developed plastic waste management system, it is paramount the underlying general waste management system improves as well.
2. **Increased recycling rate of plastics** – achieving more circularity in plastic waste management means harvesting as much value as possible from the waste. This asks for a focus on and increased levels of plastic waste recycling.
3. **Reduction of virgin material use and increased reuse of resources and products** – although the focus of this study and roadmap is on waste management and plastic particularly, achieving a circular economy is broader than waste management only. This also asks for strategies to reduce the total amount of plastics in the waste system, as well as increasing the reuse of plastics, expanding lifespans before it becomes waste. Hence, several suggestions are included in this roadmap to move towards circularity.

These objectives are interlinked to each other, as they all comprise a part of the same societal system of production, consumption and waste management. Therefore, it is possible to determine interventions on four set domains that are applicable to all three objectives. These domains are (1) Enhancing the institutional environment, (2) Promoting constructive collaboration, (3) Increasing knowledge development and availability of knowledge, and (4) Improving the physical infrastructure. Within each domain, multiple interventions have been defined that provide directions for change. Although implementing physical infrastructure is crucial, this has also proven to be very challenging

in Malawi. Thus, it is important to first focus on major improvements in the underlying supportive systems (the institutional environment, the way parties collaborate and the knowledge and awareness levels), that will enable and allow for the necessary improvements of the infrastructure.

This categorization is made to make the document cohesive and to give it a readable structure. However, it should be noted that since it address three objectives on a system level, the interventions are interlinked and influence each other as well. It is important to keep in mind that a transition to more circularity within waste and plastic waste management is thus not a linear process in which interventions and actions can be implemented one by one, but that this requires changes at various domains and across various actors at the same time.

1.3 Timeline

The timeline of the roadmap is from now tot 9 years ahead, to be in line with the first ten year implementation Plan of the Malawi Vision 2063, which runs from 2021 to 2030 (further discussed later in this chapter).

The time period of nine years is divided into three distinct phases, short medium and long term. The following phasing is used, in accordance with central government timespans:

Short term: 1-2 years

Medium term: 3-5 years

Long term: 6-9 years

The interventions in the roadmap are presented in one of the three time frames. This prioritization has been developed and validated based on the input and feedback of local stakeholders.

Even though the focus domains of the roadmap have an intentional order, as explained above, this does not indicate that all short term actions are in the first domain and all long term in the last. Instead of first fully developing the institutional environment, and then in time moving to collaboration, there will be overlap, interlinkages and simultaneous action.

Measures that are not deemed realistic to implement or at least start with within this timeframe are excluded, even if they might be very relevant for a transition to a circular economy.

1.4 Scope

The scope of the project is on household waste. Although this is part of a broader waste system in which also industry and other commercial and institutional parties play a big role, this roadmap is focussed on interventions within the household domain only.

Moreover, the interventions provided are not yet quantified; the background studies have delved into understanding the current system and determining directions for change - but it was not within the scope to quantify specific targets. This could be a follow up to this roadmap.

1.5 Alignment with Malawi Vision 2063 (MIP-1)

This roadmap is developed to be in line with the country's needs. Therefore, alignment with the Malawi Vision 2063 is paramount and thus considered for this report. In particular the first ten years of the Malawi vision, since this time frame is similar to the one of this roadmap. Alignment and complementation of certain interventions between the documents ensures a more efficient implementation and thus enhances the visioned outcomes. The Vision focuses around three pillars and 7 enabling interventions with sub-interventions. The following points are discussed in the Vision Malawi and have overlap with the interventions that can be found in this roadmap document. The following points address waste management in specific, which falls under enabler 7 of the MIP (Environmental sustainability):

- **Engage** private sector in waste management
 - Establish modern dumpsites and associated infrastructure to support recycling
 - Legislation for companies to categorize and quantify the waste (generation and disposal)
- **Incentivizing** investors specializing in waste recycling technologies
 - Tax reductions and wavers
- **Expanding** youth-led green businesses
 - Conduct green products youth exhibitions and networking conferences
 - Scale up youth-led green businesses for promoting green economy in potential areas, especially cities
- **Promoting** awareness in waste and environmental management
 - Develop management plans for national and district waste management and sanitation interventions
 - Appoint opinion leaders as champions for environmental sustainability and social wellbeing
 - Update the guide to executive decision making with environmental management tenets

Additional overlap can be found on other topics, that do not specifically address waste but are important facilitators for developing the sustainable waste management and a circular economy.

- Promotion of a digital economy and digitization of government services, for effective governance systems and institutions. Therefore, faster and affordable internet connections will be established. (*Enabler 4, private sector dynamism*)
- Anchor Firms Development, promoting the establishment of large-scale firms with strong connections to local and global market value chains. (*Enabler 4, private sector dynamism*)
- Investing in power generation and supply; transport infrastructure; and ICT. (*Enabler 4, private sector dynamism*)
- Supporting and empowering youth, women and persons with disabilities to create businesses through entrepreneurship and access to finance. (*Enabler 4, private sector dynamism*)
- Developing local manufacturing in critical sectors such as construction materials, agriculture tools and implements by collaborating with the private sector with partnerships and incentives. (*Enabler 4, private sector dynamism*)
- Education and Skills Development, including people with special needs. (*Enabler 5: Human capital development*)
- Gender equality, access to finance to encourage entrepreneurship among woman. (*Enabler 5: Human capital development*)

- Financing infrastructure, provide a legal framework that give a conducive environment to unlock alternative sources of financing, from the private sector, PPP arrangements and utilization of pension funds with legislation. (*Enabler 6: economic infrastructure*).

The Malawi vision has a strong focus on investing in and increasing raw material mining. This roadmap provides a complementary perspective of achieving development through urban mining; or in other words, through the harvesting of value from secondary products and waste, in addition to the mining of virgin materials.

Complementary to Malawi vision 2063, this roadmap discusses interventions for development of a domestic market that stimulates the use of recycled products and materials. Using recycled produce to create value is an important addition to further develop the economic situation in the country. Additionally, in this roadmap increasing infrastructure focuses also on the connection with rural areas. Furthermore, the interventions in this roadmap give more specific and elaborated indications for improving sustainable waste management and developing a circular economy, compared to the Malawi vision, in which some of the mentioned interventions have a broader approach.

In the roadmap, the interventions or specific actions concretizing an intervention that have a direct link to the Malawi Vision 2063 are indicated with a green asterix *.

1.6 Reading guide

The document presents the defined interventions per domain. Section 3.1 presents the interventions on the enhancement of the institutional framework. Section 3.3 discusses the interventions on constructive collaboration, section 3.1 discusses increasing knowledge and awareness and section 3.2 gives insights into the interventions for improving the (plastic) waste infrastructure. Each interventions is concretized by one or more specific actions, detailing key steps to take or specifications to consider that would contribute to the achievement of that intervention. First, a visual overview of the roadmap is presented, summarizing the interventions per time scale.

1.7 Summary of the key gaps

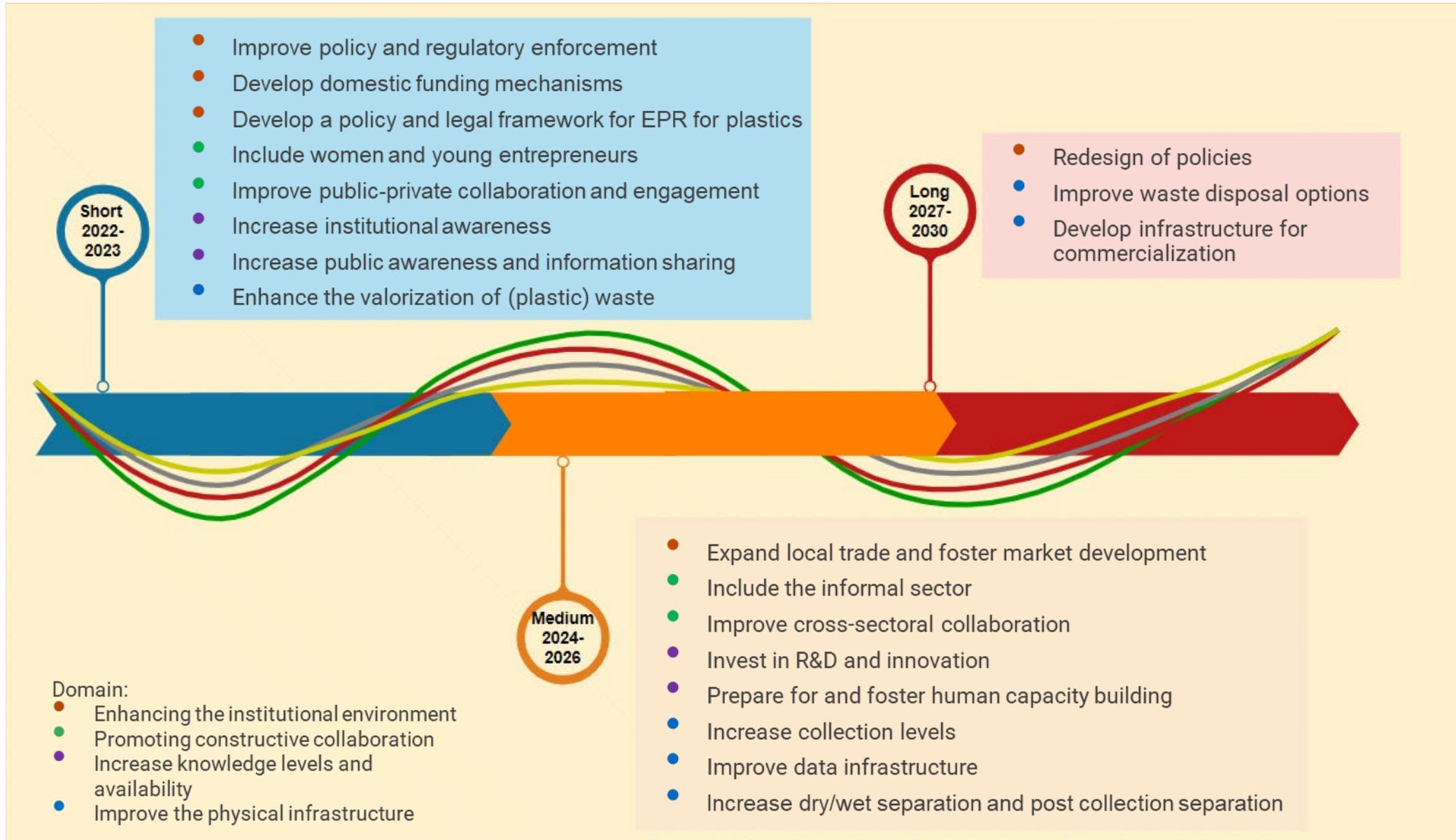
The purpose of this document is to suggest a way forward in optimizing the way Malawi may deal with (plastic) waste management. Previous reports presented an overview of the current status of waste management in general and plastic waste in particular. The conclusions and key gaps that were reported are shortly summarized below, as these form the basis of the roadmap. For a more extensive overview, the reader is referred back to the respective project documents¹.

- Malawi faces several challenges in waste management, with several uncontrolled and unmanaged waste dump sites of which none has properly engineered environmental protection measures implemented. Which leads to myriad and severe negative effects such as pollution, disease, and the hindrance of power supply in Malawi (due to the clogging of waterways of hydro), moving towards more sustainable waste management is paramount for the country.
- The collection of separated waste is really uncommon.

¹ TNO (2021) CTCN Technical Assistance Output 2 Baseline Assessment of the Current Waste Management System in Malawi, and TNO (2022) CTCN Technical Assistance Output 4 Technology, Policy and Market Analysis of the Current Plastic Waste Management System in Malawi

- Large waste build ups are a huge problem in many urban areas, particularly Lilongwe, Blantyre, Zomba, and Mzuzu.
- The low availability of waste collection vehicles affects the potential collection coverage and frequency of domestic solid waste collection.
- On average, waste is collected once a week in the three cities (Lilongwe, Blantyre, and Mzuzu) in Malawi – but only from planned settlements.
- Blantyre, Mzuzu, and the smaller Mangochi have the highest potential waste collection coverage, of approximately 30%. Lilongwe only has a maximum potential of covering 25% of its residential areas.
- Household waste is characterised as follows: organic waste forms a significant proportion of the waste generated, namely 82%. This is followed by plastic (7%), paper (4%), glass (3%), and metals (~1%), respectively. Other types of waste, including textiles, electronic waste, and diapers, contribute about 3% to the total waste.
- Lilongwe and the city of Blantyre generate the most waste, with 180,000 metric tonnes and 192,720 metric tonnes, respectively.
- 70% of the waste is not formally disposed of and only 4% of the waste is recycled.
- Although people in low-income areas have naturally developed a circular behaviour in terms of reuse and repurposing of products due to necessity, they are also largely impacted as they sometimes fall outside of the formal waste collection system, and residents do not have the financial means to participate in the first place.
- To valorize plastic waste large volumes of plastic are needed, getting sufficient volumes in an economic manner is however difficult in the country. Together with high costs for energy, frequent blackouts, problems with equipment and spare parts, this leads to low margins made from recycled plastic products. Leading to a vicious circle where collection infrastructure (e.g. separation, waste pickers, collection) does not scale due to low prices and difficulty in economy of scale, and recycling industry not getting sufficient volumes in an economic manner meaning they cannot pay collection infrastructure more for delivering plastics.
- There is little domestic development of recycling technologies and little domestic availability of spare parts. Therefore, recyclers are dependent on expensive imports of (parts of) equipment.
- As not many plastics are exported, the current market for recycled plastics is mostly domestic.
- Circularity is only slowly being implemented into current policy due to a lack of public awareness and involvement.
- Participants in the informal sector have low engagement in policy formation.
- There are few policies or incentives that steer towards value retention processes, nor are there many activities for more end-of-pipe solutions such as recycling and energy recovery.
- For the policies that are developed, there is a lack of practical implementation, partly due to a lack of appropriate funds for setting up a sound waste system.
- There is a mismatch between policy development and operationalization and enforcement.
- The engagement of private sector in policy development is low.
- MEPA is still under development and not fully capacitated.
- Currently there are hindering mechanisms in place obstructing circular activities (mainly high taxes and levies).
- Little financing mechanisms for (plastic) waste management and infrastructure.
- There is no adoption of the Extended Producer Responsibility scheme.

2 Visual overview of the roadmap



3 Interventions towards a circular plastic waste system in Malawi

3.1 Enhancing the institutional environment

The role of local and particularly national government in the transition to sustainable solid waste management and a circular economy is pivotal. Effective deployment of institutional instruments can greatly accelerate innovation and provide the underlying fabric for change to take place.

Short term focus

3.1.1 Improve policy and regulatory enforcement and evaluation

Lead actor(s): MEPA, Ministry of Local Government, Department of Environmental Affairs, local authorities, Ministry of Justice

One of the most important challenges with the current institutional framework is not so much the absence of policies, but the lack of operationalisation and enforcement, as well as monitoring on whether the aim and goal of the policies is being achieved. Malawi has plenty of legislation dedicated to combatting the waste generation and inadequate infrastructure problem generally; however, there is only one national policy and no subnational policies targeting plastic pollution specifically. For any transition to be successful, policy enforcement and evaluation is to be improved.

1. Invest in the operational capacity of MEPA to act as a monitoring and evaluation body for circular economy policies.
2. Improve enforcement of current policies, by first developing evaluation plans to assess effectiveness and by secondly developing compliance mechanisms allowing for enforcement with external actors. Focus first on the National Environmental Policy (NEP, defining separation at source), Environmental Management Act (EMA) (2017), Environmental Management (Waste Management and Sanitation) Regulations (2008), Environmental Management (Plastics) Regulations (2015).
3. With each newly enacted regulation or instrument on general waste management, set up KPI's and control mechanisms to allow for operationalization of the policy immediately. Ensure that environmental and social impacts are included in the KPI's as well.

3.1.2 Develop domestic funding mechanisms for critical infrastructure and R&D budget

Lead actor(s): MEPA, Ministry of Local Government, local authorities, Environmental Affairs Department, NCST, Economic Planning and Development

One of the key reasons current waste and recycling infrastructure is underdeveloped, and new initiatives fail to scale is the lack of finance available for basic infrastructure. It is therefore crucial to develop a concrete strategy for the acquisition of sufficient funding to prepare for future improvements of the necessary infrastructure (see also section 3.4). As

there has been a historical focus on external funding, it is advised to look inwards as well. External funding can be used as a source to complement national funding instruments.

1. Redirect part of the funding of the newly installed National Climate Fund to urban (waste management) infrastructure.
2. Dedicate part of the funding of the newly installed National Climate Fund to R&D for circular economy and waste management.
3. Redirect part of the pension fund investments to infrastructure in urban areas.
4. Develop project plans for urban waste infrastructure development and apply these with foreign investors and funding institutes. Favour investments to subsidies to decrease dependency on donor money.

3.1.3 *Develop a policy and legal framework for EPR for plastics*

Lead actor(s): MEPA, Private Sector, Local Authorities

EPR is a key instrument towards a circular economy, as this activates the responsibility of producers and importers beyond the production phase to the end-of-life management of (plastic) products. Functioning EPR schemes shift end-of-life responsibility from the shoulders of government only to industry, can provide incentives for better design aimed at recycling, and can provide a key financial resource to finance waste management and recycling infrastructure and technology.

1. Develop an EPR scheme for PET bottles and plastic packaging. Key steps²:
 - a. Clearly define actors, roles & responsibilities within the plastic value chains.
 - b. Calculate costs and fees for participating companies in the EPR system.
 - c. Establish a Producer Responsibility Organisation (PRO) for PET bottles and for plastic packaging, to fulfil the EPR obligations on behalf of the members.
 - d. Clearly define ambitious EPR targets in a participative multi-stakeholder process.
 - e. Administrating and run EPR schemes through a dedicated monitoring body, including evaluation and compliance mechanisms such reviews and penalties.
2. In due time and after experimentation with plastic packaging, expansion of EPR is advised to diapers³, beverage glass and e-waste.

Medium term focus

3.1.4 *Expand local trade and foster market development*

Lead actor(s): Ministry of Finance, MEPA, Ministry of Industry and Trade

² For an extensive guiding document on how to implement EPR for plastic products and packaging it is advised to look into the 2021 WWF document on EPR for South Africa (Arp, R. (2021) Extended Producer Responsibility for plastic packaging in South Africa: A synthesis report on policy recommendations. WWF South Africa, Cape Town, South Africa.). Available online at www.wwf.org.za/reports/EPR_policy_for_plastic_packaging_synthesis_report

³ Single use diapers are sometimes separately mentioned in this roadmap, as these are generally mainly plastic based and have shown to be a huge problem at the (illegal) dumps and as litter. Due to their ill recyclability and hazardousness they deserve separate attention.

For entrepreneurs in the waste business or working with reused or recycled products, acquiring sufficient market access is often difficult. To create a more level playing field for recycled versus virgin products it is important to support market development through public (financial) instruments.

1. Develop lower tax tariffs for secondary and recycled products.
2. Provide tax exemptions for import and purchase of waste processing and recycling technology.
3. Install higher tax rates for imported virgin plastics.
4. Adopt minimum recycled content requirements for certain plastic products. Start with rigid household products, as these are easy to produce with recycled material. Increase the recycled content demand after annual review.
5. Develop and accelerate the use of quality labels so customers are more inclined to trust the products put on the market. Start with quality labels on domestically recycled rigid plastics, expand to thin film plastics.
6. Set public procurement targets for the acquisition of reusable and recycled (plastic) products by government institutes.

Long term focus

3.1.5 (Re)design of policies for sustainable plastic (waste) management

Lead actor(s): MEPA, Ministry of Local Government, Environmental Affairs Department, local authorities, Office of the President and Cabinet (OPC)

In addition to the enactment of EPR schemes as a key enabler for end-of-life management of plastics there are several other policy domains that are currently not functioning as they could be to support the transition to a more circular plastic waste system. Therefore, (re)designing policies for sustainable plastic (waste) management is important.

1. Promoting circular waste management beyond separation by the NEP, thus also paying attention to practices such as reduction, reuse and recycling.
2. The National Climate Change Management Policy should lay out the sectors that generate GHG emissions and recommend how these can be reduced within those sectors. A clear link with waste management could strengthen actions in this sector as contribution to GHG reductions.
3. Including a focus on higher levels of circularity such as waste minimization, reuse or recycling with the NEP and the Malawi National Environment Action Plan (NEAP).
4. Although the plastic ban is finally in effect, it could be worthwhile to draft an amendment to the ban in coherence with the private sector, to ensure collaboration and support for the phase out of thin film plastics, instead of the current hostility.
5. Develop by-laws for each city, municipality or town that encourage circular practices such as waste separation, reuse and recycling.
6. Develop and mainstream gender and inclusivity guidelines and KPIs in existing (and new) policy areas, since this is currently only marginally regarded.

3.2 Promoting constructive collaboration

A circular economy asks for collaboration across various types of actors and domains, often connecting parties that have formerly not been connected. When parties operate in silos, instead of harvesting change there will be a harvest of resistance. To connect different types of actors and work towards optimal engagement of stakeholders asks for dedicated structures for collaboration to take place.

Short term focus

3.2.1 *Improve public-private collaboration and engagement*

Lead actor(s): MEPA, local authorities, Ministries of Industry and Trade, private sector, Environmental Affairs Department, NCST

Effective steering towards circularity requires open and frequent dialogue between public and private players and inclusion of the private sector into policy making processes. Currently, there is room for improvement in the relationship between the public and private sectors in Malawi, particularly on plastics. Especially when developing product regulations (e.g. on material content or phasing out products or components) it is important to consider the views and knowledge of the private sector, civil society and communities as well.

1. Develop a structural public-private sector dialogue platform for joint decision-making on sustainable plastic management in Malawi. Include MEPA and private sector players in an environment moderated by a neutral expert party, to reduce current tensions⁴.
2. Develop sectoral round tables when aiming to make decisions on the transition to the circular economy per sector. Include representatives of the public, private, and civil society. Allow for moderation and support for policy formation by neutral expert parties.
3. Experiment with public-private sector collaboration schemes when piloting waste management projects, including joint investments.

3.2.2 *Include women and young entrepreneurs*

Lead actor(s): Ministry of Industry and Trade, Ministry of Gender and Community Development, private sector, NCST, local authorities

A circular economy is inclusive. It is important to reduce the current hindrances and encourage the inclusion for youth, vulnerable groups and female entrepreneurs, enhancing creative solutions and ideas.

1. Incorporate the Ministry of Gender and Community Development in policy dialogues on solid waste management and circular economy.
2. Set targets for the percentage of female entrepreneurs and workers, youth, and vulnerable groups active in the recycling business.
3. Foster training programs for female entrepreneurs, youth and vulnerable groups in recycling or circularity businesses. 

⁴ Appendix 1 provides an outline of how such a dialogue platform could be set up. This is based on existing structures in Kenya.

4. Set up youth accelerator programs aimed at fostering young entrepreneurship in plastic waste management and circular businesses. ■
5. Develop a loan fund with longer return on investment for young and female entrepreneurs in the waste management and plastic recycling business. This can be expanded to other areas such as glass or paper once the effectiveness is proven. ■

Medium term focus

3.2.3 Include the informal sector

Lead actor(s): MEPA, local authorities, NGO's, Private Sector

The informal sector plays a crucial role in handling (plastic) waste. It is important to consider their needs and invite them at the table when developing programs or policies on waste management.

1. Facilitate CBOs and the informal sector to establish cooperatives and associations to represent their collective interests and improve information sharing. The current collaborative model between CBOs, Lilongwe City Council and Four Seasons for organic waste could be replicated for plastic focussed collaboration.
2. Invite representatives of the informal sector at the table for policy dialogues on waste management.
3. Create social protection schemes for informal sector waste workers to improve their working conditions.

3.2.4 Improve cross-actor collaboration

Lead actor(s): MEPA, Ministry of Local Government, private sector

Circularity spans multiple sectors and setting up connections between parties within value chains that have formerly not been connected, as well as developing relationships across different value chains, is key to broaden the potential for as well as to scale circular solutions. This applies to both public and private actors.

1. Within government, set up recurring inter-ministerial dialogue groups on SWM and circular economy to harmonize and align efforts.
2. Encourage multistakeholder partnerships and cross-sector dialogues between actors involved with (plastic) waste and production value chains to foster increased valorisation of waste and strengthen circular activities.
3. Monitor the number of circular businesses in the country and set up recurring cross-learning platforms for circular entrepreneurs.

3.3 Increasing knowledge levels and availability

To allow for effective scaling of sustainable waste management and the development of a circular economy, current knowledge and awareness levels as well as knowledge sharing between actor groups has to be increased.

Short term focus

3.3.1 *Increase public awareness and information sharing*

Lead actor(s): Ministry of Information and Digitalization, Ministry of Education, MEPA, NCST, local authorities, NGO's

Sustainable solid waste management is greatly influenced by the level of public participation, which asks for people to be knowledgeable. Now, many people are insufficiently aware of both the impacts of unsustainable waste management as well as on what they can and should do with their waste. Thus, public awareness and information sharing should be increased.

1. Provide information via a one-stop-shop information point on:
 - a. Where people can bring their (plastic) waste
 - b. What people can do to reduce the amount of waste they create
 - c. How people can reuse their waste
 - d. What type of businesses opportunities exist around (plastic) waste valorisation

The medium as well as language should be adapted to meet the target audience. Medium and high income citizens in urban areas can be targeted through apps for example, while for rural areas communication in local language using for example radio stations is crucial.

2. Incorporate (plastic) waste management into school programs, educating children and accelerating knowledge sharing to families as well.
3. Engage local NGO's and community organizations to create awareness on the health and environmental impact from littering.
4. Set up public awareness campaigns on the importance of dry/wet separation of waste, including how people can dispose of the two waste streams.

3.3.2 *Increase institutional awareness and information sharing*

Lead actor(s): Ministry of Information and Digitalization, MEPA, NCST, local authorities

Proper implementation of policies and incentives from government is greatly dependent on the level of knowledge and awareness amongst the relevant public officers, as well as the understanding of the public and private sector on policies and regulations. Therefore, institutional awareness and information sharing should be increased.

1. Clearly explain and disseminate waste and circular economy policies to the affected audiences: often citizens and/ or private sector. Share information on what this policy (change) means to them, how this affects their business or behaviour, and where they can direct their questions to.
2. Implement learning visits for public local authority officers on waste management and recycling between cities in Malawi, as well as outside of Malawi, to facilitate cross-learning.
3. Carry out training programs for public officers dealing with policy making on plastic waste management and circular economy.
4. Sensitization of heads of Ministries and Permanent Secretaries on circular economy and plastic waste management.

3.3.3 *Increase Research & Development and innovation in circular economy and plastic waste management*

Lead actor(s): NCST, academia, private sector, start-up representatives/ accelerators

Investing in R&D is a key contributor to increase domestic knowledge domestic creative solutions for waste management, recycling and reuse beyond the status quo.

1. Set a dedicated and annual funding budget for R&D and pilots on innovative recycling technologies (see intervention 3.1.2). Develop clear application criteria's for interested entrepreneurs and innovators and provide annual reports on the division of the budgets.
2. Strengthen academic institutions with knowledge programs on sustainable solid waste management, plastic recycling and circular economy.
3. Initiate peer-to-peer learning within African and international partners on circular economy innovations.

3.3.4 *Prepare and foster human capacity building*

Lead actor(s): NCST, academia, Local Authorities, Private Sector

The transition to a circular economy cannot be achieved without sufficient trained people and skill development. To ensure the circular economy does not stall on lack of skills and people it is important to prepare for and foster human capacity building.

1. Assess the expected capacity needed on the different terms (short to long) for a sustainable (plastic) waste management system and circular economy in terms of required skills and knowledge. What type of (technical) expertise is needed in the future? How many jobs are expected?
2. Prepare educational and capacity building programs to timely train required staff.*
3. Involve universities in the development of curricula for a circular economy.
4. Make working in the waste or recycling sector attractive to both public servants and private enterprises through awards and incentive schemes (e.g., provide free health care to waste sector employees).

3.4 Improving the physical infrastructure

A supportive physical infrastructure lies at the basis of a sustainable waste management system, and is an enabler for plastic valorisation and a well-designed circular economy. The following interventions can be taken to improve the basic waste management infrastructure for Malawi.

Short term focus

3.4.1 Enhance the valorisation of (plastic) waste

Lead actor(s): local authorities, Ministry of Local Government, Ministry of Trade and Industry, MEPA, recyclers, DIWS entrepreneurs, NCST, academia

To achieve circularity valorisation of (plastic) waste should be enhanced. This will help to achieve higher recycling percentages and to strengthen practices in reuse or refurbishment and to avoid the creation of waste in the first place. The assessment below is directed at plastics specifically, but much also applies to other streams such as glass and metal. The key valorisation pathways of interest to Malawi are open loop recycling (predominantly) and closed loop recycling (secondly). However, also reuse should be increased, in addition to recycling.

1. Increase the geographical spread of open loop recycling facilities as these now only exist in Lilongwe and Blantyre. Provide easy access to land and finance for recycling initiatives in other cities. Ideally, near the future DIWS, to minimize transport costs.
2. Expand deposit systems for plastic products to increase reuse. Start with beverage bottles in various sizes. This should also be considered for other materials, particularly glass beverages bottles as these are currently very abundant on formal and informal dumps. Focus on middle and high income areas as there is high reuse in low income areas already.
3. Support the valorisation of PET in Malawi as internationally this polymer has a high market value as recycled pellet. Provide financial support for a pelleting or open loop recycling facility for PET.
4. Pilot the closed loop recycling of rigid plastics, such as PET, HDPE or PP. Start in Lilongwe as this is the most central location with sufficient volumes.
5. Support the low tech open loop recycling of the ill and non-recyclable plastic types (multi-materials, thin films, polystyrene) through brick making (mixing with sand).

Medium term focus

3.4.2 Increase collection levels

Lead actor(s): local authorities, Ministry of Local Government, private sector

Working towards maximum coverage of waste collection from households is a basic requirement for developing any sustainable (plastic) waste management system. Moreover, current recyclers experience difficulties acquiring sufficient volumes of waste. Increased collection would reduce this challenge. To increase current collection levels the following activities are key:

1. Improve collection access in high density areas and unplanned settlements through an increase in skip bins and structured emptying of these skip bins. This allows the CBE's active in high density areas to have nearby locations to bring the collected waste.
2. Invest in and oblige a minimum amount of waste trucks and skip bins per service zone in each city. This should be based on the expected waste generation per zone divided by the capacity for a fully operational truck.

3. Oblige maintenance for waste trucks and other equipment. Currently, waste trucks are not maintained well, leading to fast deterioration and low availability of waste trucks.
4. Monitor whether each service zone collection is serviced by a public or private collector, that collects waste at least once a week, particularly in high density areas (currently in many high density zones there is no collection at all, or very infrequent).

3.4.3 Increase data infrastructure

Lead actor(s): Ministry of Information and Digitalization, MEPA, NCST, local authorities

Increasing data infrastructure is an important subset of the required infrastructure for sustainable (plastic) waste management and a circular economy. Knowledge on and access to data on volumes, quality and locations of waste is key to develop a proper infrastructure and to facilitate scaling.

1. Compile a public access national information system that collects, analyses, harmonises and disseminates data on waste. Demand the contribution of Local Authorities in terms of data provision. Include information on:
 - Waste produced in the country, per region and per service zone;
 - Waste brought to dumpsites, landfills and received at DIWS and buy-back centres;
 - Waste recycled
 - Export volumes of waste/flakes/ pellets
 - Cost database
2. Use an open access digital tool to map out the service areas in each city and to monitor the service provision, providing information on who is responsible for collection and when this is due. Allow for registration of inadequacies with collection by the public. Include information on the players active with waste or recycling in each area. Use this platform for monitoring of collection adequacies as well (see intervention 3.4.2).
3. Invest in the development of digital technology such as apps and online platforms* to connect people or institutions with collectors and DIWS to allow for private waste transfer. Existing tools such as the GWS Malawi Waste App could be built on and promoted.

3.4.4 Increase dry/wet separation at source and post-collection separation

Lead actor(s): local authorities, Ministry of Local Government , Ministry of Health (Public Health), Ministry of Water and Sanitation, MEPA, private collectors, DIWS entrepreneurs

Dry/wet separation should be increased at source and full separation should be aimed for post-collection. Separating dry fractions from organic (wet) waste at source increases the recycling potential substantially by decreasing cross-contamination. Full separation at source is not advised but can be done at dedicated waste stations, as this requires lower transport costs and less behaviour change from households. This also allows for easier acquisition of separated materials by recyclers.

1. Increase the number of material buy back centres and decentralized integrated waste stations (DIWS) by developing these as local authorities and/ or providing easy access to land and permits for entrepreneurs to develop. Eventually, targeting buy-back centres in each service zone, particularly near the higher

density areas, as these are serviced the least and waste transportation from those areas is most difficult.

2. Pilot with a centrally located DIWS, placed closely to recyclers (thus either in Lilongwe or Blantyre, although Blantyre is geographically not central) and close to access roads to allow for provision of waste from other buy-back centres. In selecting DIWS locations, consider the availability of water, infrastructure and electricity.
3. Provide subsidies for the cost parts that cannot be covered by sales of waste or recycled products.
4. To improve separation efficiency as well as working conditions conveyor belts at DIWS are key. Provide financial support mechanisms for the acquisition of this equipment.
5. Supply a wet fraction bin to households to allow for dry/ wet source separation at progressive costs (based on income level) or for free.
6. Develop two waste collection tariffs: for mixed (high) and for dry/wet separated (low) waste.
7. Provide licences for companies specializing in separate collection. Now most companies often mix waste at collection even if it is separated leading to annulment of any separation efforts.
8. Dedicate land for composting to have an outlet for the collected wet waste beyond a dumpsite. Ideally, incorporate composting at the future DIWS.

Long term focus

3.4.5 Improve waste disposal options

Lead actor(s): local authorities, MEPA, Ministry of Local Government, Ministry of Economic Planning and Development, Environmental Affairs Department

Although the aim is to reuse and recycle as much as possible, there will always be materials or products that have to be disposed of. Proper waste disposal solutions that do not harm human health and the environment are to be developed and expanded.

1. Improve access roads (change dirt to tar) to current dumpsites to avoid trucks not being able to enter and turning to illegal and early dumping of waste (before the actual site is reached).
2. Develop properly designed and maintained engineered landfills in the major cities (Lilongwe, Blantyre, Mzuzu and Zomba) first.
3. Invest in small scale incinerator at the waste dumps or future landfills for the non-recyclable and hazardous waste streams such as diapers and hospital waste.

3.4.6 Develop infrastructure for commercialization

Once pilots on valorising (plastic) waste are in place, and more research and development on recycling and waste management is conducted, it is critical to also have developed the necessary infrastructure for the commercialization of these initiatives.

1. Develop supportive policy checklists for (novel) waste enterprises to provide knowledge on what policies to take into accounts and what kind of licences to acquire.
2. Set up incubator and accelerator programs for waste start-ups that provide support on market outlets, marketing, and business management.

3. Develop communication and marketing channels for waste related start-ups and enterprises, e.g. through radio time and tv programs.

3.5 Operationalizing the roadmap

The prior studies of the CTCN TA on circularity in plastic waste management on which this roadmap is based have allowed for a thorough understanding of the current system. By identifying current hindrances and obstacles in the (plastic) waste management and circularity landscape in Malawi, it was possible to draft interventions on how to improve this situation in the presented roadmap. However, a roadmap is a strategic document, and not yet an implementation plan. During the stakeholder meeting in April 2022 in Lilongwe it was discussed how to operationalize and use the roadmap. The results of this discussion are presented below.

Direct application of the roadmap

On the short term, the roadmap and underlying studies can directly be used for dissemination of the outcomes and sensitisation to waste sector stakeholders such as local councils, NGO's and private sector players. Distributing the roadmap among the stakeholders allows them to use the roadmap for inspiration and activation; as a lobbying tool; for the redirection of funds, and; as a mapping tool for existing activities.

Translation of the roadmap into an implementation plan

Additionally, the roadmap should be used as starting point to further develop an implementation plan, by the mandate of MEPA. It was discussed this should be done in a tiered approach. First, by setting up a key Working Group, including at least MEPA, NCST, representatives of the Waste Team of at least one Local Authority, a private party (collector or recycler) and a civil society actor (non-profit based actor involved in collection, separation, recycling or awareness creation on waste). This initial group should consist of not more than 5 actors and has the responsibility to ensure continuation of the roadmap.

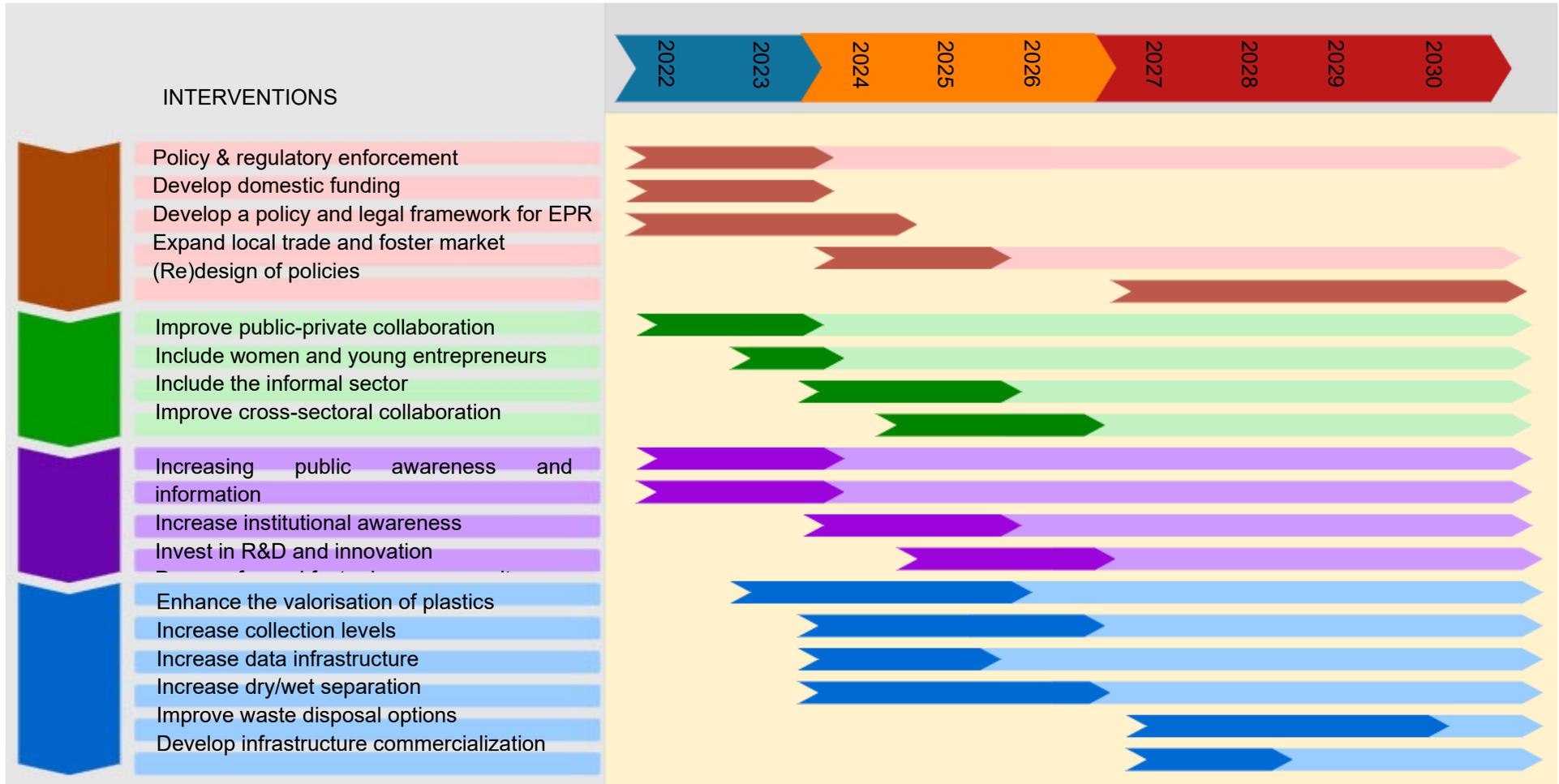
Steps that can be taken by the Working Group are to set an agenda based on the roadmap, to determine what can already be done with current available resources and where additional resources are needed. Moreover, the Working Group is responsible for the implementation of a Taskforce - a broader group of stakeholders involved for implementation of the roadmap. The Working Group can take several steps to develop such a Taskforce: (1) define necessary actors to the Taskforce, (2) define the right individuals per actor, that play a connecting role, (3) divide leads per domain as indicated in this roadmap, (4) set up a larger Advisory group (i.e. for review and feedback). Amongst the stakeholders that were present during the April stakeholder group there were multiple parties interested to form the initial Working Group as well as to be part of the Taskforce.

The Taskforce will implement all future activities related to this roadmap, to allow for harmonization of efforts, as well as ensure continuation. It is advised this Taskforce meets on a regular basis.

4 Gantt chart plot of the roadmap

As stated in the introduction, the interventions will overlap and implementing the roadmap will ask for simultaneous action. To allow for a better understanding and overview of the interventions in a system over time, the Gantt chart on the page below is drafted. This gives a quick indication of which intervention starts at which moment and which domain the intervention strengthens. A distinguishment is made in a light shading and a darker shading; the dark shading indicates that within that respective time frame, the intervention requires most effort. Moreover, this continuation of the shading indicates that this intervention is not a one-time action, but something that requires continuous efforts and attention (e.g. awareness creation should be kickstarted on the short term, but will require additional and continuous efforts over time according to changing needs in knowledge creation).

Although more interventions can be seen as important to start sooner than later, in terms of viability the choice was made to include 8 interventions in the short term. The main reason for choosing these intervention as short term interventions, is that they are key for the implementation of other interventions. The prioritization is established based on multiple discussion and validation sessions with local stakeholders.



5 Consulted sources

This roadmap is primarily based on the results of the three prior studies to the CTCN Technical Assistance on Circularity in Waste Management:

TNO (2021) CTCN Technical Assistance Output 2 Baseline Assessment of the Current Waste Management System in Malawi

TNO (2021) CTCN Technical Assistance Output 3 Comparative Analysis Circularity Potential for Six Household Waste Streams

TNO (2022) CTCN Technical Assistance Output 4 Technology, Policy and Market Analysis of the Current Plastic Waste Management System in Malawi

In addition to these studies, the following complementary sources have been consulted:

Bonnaire, S. M., Jagot, J., Spinazzé, Potgieter, J. E., Rajput, J., Spinazze, C., Hemkaus, M., Ahlers, J., Koehler, J., van Hummelen, S., & McGovern, M. (2010). European Commission Directorate-General for Environment Directorate F-Global Sustainable Development Unit F2-Bilateral & Regional Environmental Cooperation Circular Economy in Africa-EU Cooperation Country Report Senegal. <https://doi.org/10.2779/042060>

Ddiba, D., Andersson, K., Koop, S. H. A., Ekener, E., Finnveden, G., & Dickin, S. (2020). Governing the circular economy: Assessing the capacity to implement resource-oriented sanitation and waste management systems in low- and middle-income countries. *Earth System Governance*, 4, 100063. <https://doi.org/10.1016/J.ESG.2020.100063>

DSGC. (n.d.). Transition Time! A Circular Economy for Plastics Summary.

INSWMSP. (2014). National Strategic Roadmap on Integrated Waste Management Keep Sierra Leone Clean, Play your Role for Change.

NPAP. (2021). A Roadmap for Radical Reduction of Plastic Pollution in Ghana.

OECD. (2019). Waste Management and the Circular Economy in Selected OECD Countries. <https://doi.org/10.1787/9789264309395-en>

WWF. (2021). South Africa Extended Producer Responsibility for plastic packaging in South Africa a synthesis report on policy recommendations. www.wwf.org.za/reports/EPR_policy_for_plastic_

6 Appendix

Example structure for a public-private dialogue platform⁵

Discourse geared toward creating an enabling environment for businesses to operate essentially in an economy is of the essence. Key enablers to economic growth include good governance structures, appropriate laws, regulations, and policies. The ease of doing business is an indicator that directly relates to increased foreign direct investments and the formalization of SMEs. The private sector plays a critical role in contributing to economic growth through increasing GDP and employment creation. Studies have shown that the private sector sources approximately 9 out of 10 jobs globally⁶.

When East African and Southern African nations are compared, there are significant disparities in how the private sector negotiates with the government. Nonetheless, we find a more organized atmosphere that can be applied in the Southern African governments. An examination finds that the nations are organized, and that representative bodies under the sub-sectors registered as associations are established. Nonetheless, there is a need for a unified outfit for the private sector. The backdrop here is that the association will have members, and the group's goal will be to advocate for its members' difficulties to be resolved through advocacy. This paradigm allows for sector challenges to be addressed by a single entity. We note that sub-sector representative groups are critical to the sector in this context. Nonetheless, a cohesive outfit should represent the private sector in conversations with the government. In this sense, it is recommended that a single apex entity for the private sector operate as its representative, improving coordination and the quality of dialogues between the public and private sectors.

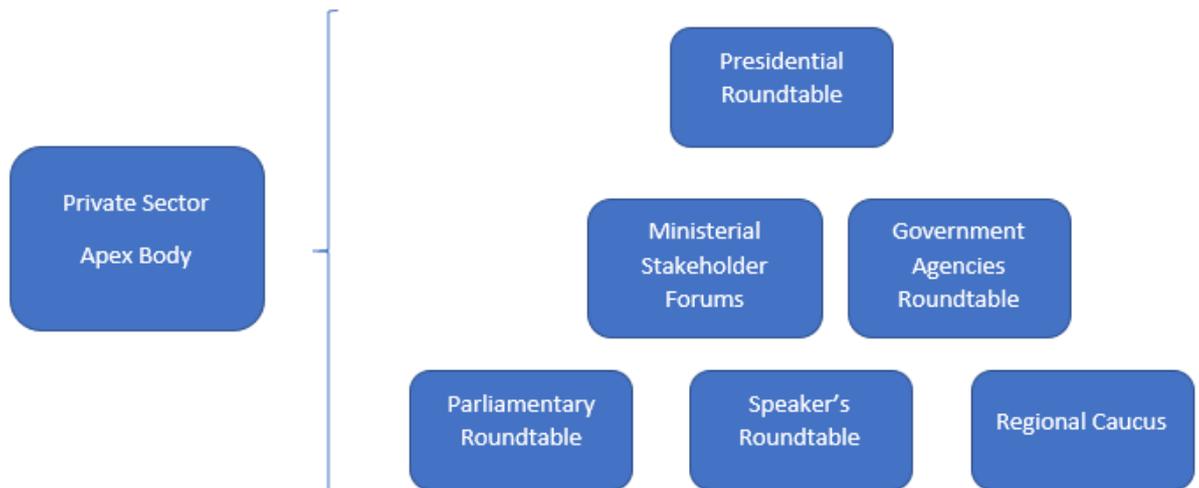
The strength of the unified outfit lies within the Public-Private Dialogue Platform, which allows for discourse between the sub-sectors and the relevant government ministries. Discussions within the platform are guided by an annual sector matrix that documents sector challenges, which members find essential to address. Within the same forum, meetings with government agencies present an opportunity to unlock bottlenecks that may hinder sector progress. The outfit for the private sector will also play a role in identifying investment opportunities, facilitating access to markets for local products, and fostering research and innovation. The organization's registration may take the form of an association or a company limited by guarantee (a kind of an NGO), with shareholders consisting of its members. A board keeps the secretariat accountable under the suggested governance system, and the board intern reports to the shareholder (which in this case are the members).

Proposed interaction between the public and private sector

The Public-Private Dialogue Platform is led by sector advisers, with thought leadership from the governing council. The Ministerial Stakeholder Forums brings the sectors together with the ministries once a quarter. Policy and regulatory review and drafting will be discussed in ministerial technical team meetings, convening as needed. The ministerial stakeholder forum's thoughts and outcomes will be shared at an annual presidential roundtable with the president. The presidential roundtable provides an opportunity for the private sector to make recommendations to the government to build an enabling environment for businesses to operate and attract foreign direct investment.

⁵ Based on similar structures in Kenya

⁶ Evert-Jan Quak and Justin Flynn (2019) Institute of Development Studies (IDS). Source; <https://includeplatform.net/wp-content/uploads/2019/12/Quak-and-Flynn-2019-PSD-interventions-and-better-quality-job-creation-for-youth-in-Africa-INCLUDE.pdf>



Government agencies are critical and cannot be ignored, and they play a key role in ensuring that the government is able to operate. The revenue authority is one such agency, which is essential in the discourse with the private sector on matters of tax and procedural challenges that the business community may encounter and would wish to raise directly with the agency. The parliament contributes greatly by enacting laws, and in this regard, one of the key groups that the private sector body will engage in providing recommendations during public participation.