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

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Sub report Output 5
National roadmap for a circular economy in plastic waste management

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

1. **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.
2. **Development and implementation of a sustainable waste management system** – in order to develop a well-developed plastic waste management system, it is paramount that the underlying general waste management system improves as well.
3. **Reduction of virgin material use and increased reuse of resources and products** – 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.

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 Zambia. Thus, it is important to first focus on major improvements in the underlying supportive systems (the way parties collaborate, the institutional environment 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 addresses 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 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.

Where possible, the interventions were made as concrete as possible by the definition of sub-actions specific to Zimbabwe. Yet, a roadmap is a strategic document presenting directions for change. It is not yet an action or implementation plan, providing insights at tactical and operational level – as often, this requires further study (e.g. quantification of specific targets) as well as decision-making on political levels. Further researching how to operationalize several of the interventions could well be a follow up to this Roadmap.

1.4 Time scale

The Roadmap spans a time period of ten years and is divided into three distinct phases – short, medium and long term. The following division is used, in accordance with central government timespans:

Short term: 1-2 years
Medium term: 3-5 years
Long term: 6-10 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.

The timeline of the Roadmap is from 2022-2032. 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.

In some cases, sub-actions are included that might not be feasible within the time span where the main intervention in placed (e.g., public awareness creation is a short-term intervention; however the last sub-action of adapting school curricula will most probably on be achievable in the long term). However, the time frames do not mean each activity is to be *finalized* within those years, but merely that that activity is to be *started* in those years. This allows for strategic prioritization and to take into account sequentially.

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 way parties collaborate, then moving to the institutional framework and only afterwards to awareness creation, there will be overlap, interlinkages and simultaneous action.

The clustering of the interventions to each time frame has been done based on consultation of the key stakeholders to the plastic waste management system in Zambia.

1.5 Summary of key gaps defined

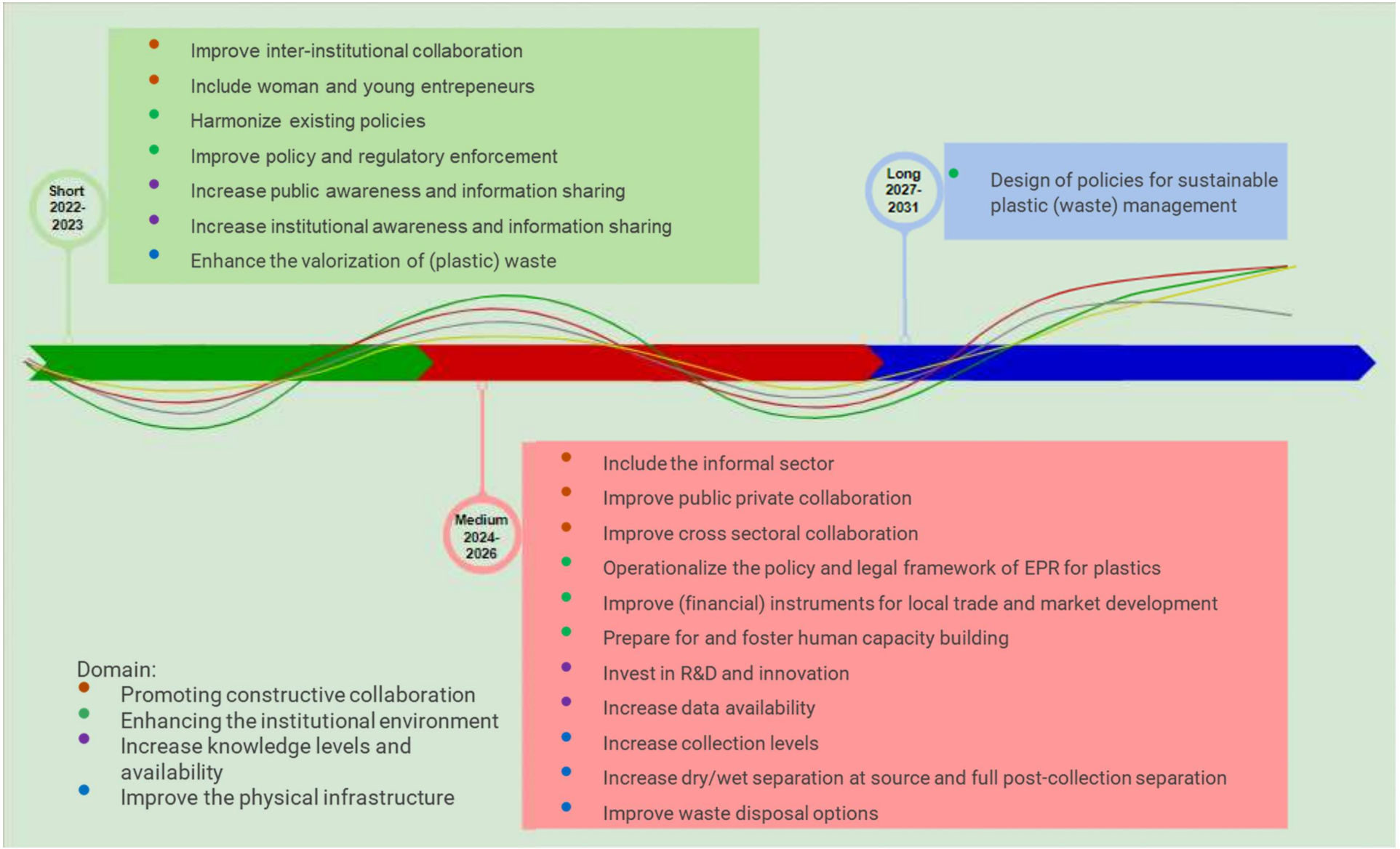
The purpose of this document is to suggest a way forward in optimizing the way Zambia may deal with (plastic) waste management. This is based on assessments done in previous studies, in which an overview of the current status of waste management in general and organic waste in particular was given. The conclusions and key gaps that were reported in these documents are shortly summarized below, as these observations form the basis under the roadmap. For a more extensive overview, the reader is referred back to the respective project documents[1].

- In Zambia large amount of waste is not handled or managed sustainably, putting people's health at risk as well as causing environmental degradation and resource depletion. Apart from some organic waste separation for domestic composting and a low level of plastic separation (mainly organized directly from higher-income households by private players), proper separation at the source is almost non-existent. Because of the lack of separation of different waste streams, different types of waste become contaminated, reducing the potential for downstream recycling.
- Local governments face significant challenges in collecting waste, such as a lack of budget and infrastructure. As a result, the vast majority of waste is collected by several private companies or Community Based Enterprises (who serve the high-density areas). Most of the waste collected ends up on open dumpsites controlled by local authorities. The country only has one engineered landfill, located in Lusaka.
- In terms of distribution, organic waste accounts for most household waste, accounting for 51% on average. Plastic is the second largest waste stream, accounting for approximately 14% of total waste. Paper, metal, and glass account for 6%, 9%, and 4% of total household waste in Zambia.
- In terms of technology application, Zambia has quite some open loop recycling but on very limited geographical scopes (mainly in Lusaka).
- There is barely any closed loop recycling in the country.
- There is little domestic development of recycling technologies, nor little domestic availability of spare parts.
- Zambia’s policy framework for waste is covered predominantly in the Environmental Management Act, 2011 [No. 12 of 2011] and the Solid Waste Regulation and Management Act, 2018 [No. 20 of 2018]. Zambia policies are intentionally aligned to circular economy principles and there are provisions in the two acts for further statutory instruments to be developed to address any gaps that the country may identify in future. There may be no need to develop new policies specifically to assist the country to transition to circularity in the waste sector.
- However, there is currently a lack in guidelines to operationalise the two Acts.
- The synergy of the policies is observed as a weak and creates confusion amongst stakeholders interpreting the law.
- There is a lack of financial instruments to support value chain partners to implement higher levels of material recovery and lower disposal of recyclable waste at landfills, even though this is addressed in the two Acts.
- Insufficient enforcement on the regulations that promoted separation at source of waste.
- Insufficient incentives to use recyclable waste.
- A disbalance between waste dumps and landfills versus collection centres. Private sector urges for more waste collection centres than landfills.
- Local Authorities should be mandated to produce reports on waste collected and generated by type.

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

- The process of obtaining licences for waste entrepreneurs is experienced as too complex and unclear.
- Remanufacturing is currently not included in and supported by the waste regulations.
- Tax and tariff incentives from the EMA insufficiently target include small business. Currently only larger industry is targeted explicitly.
- Insufficient balance between of capacity building and compliance, with ZEMA now focussing mainly on performing a penalising role.
- Incentives for equipment importation do currently not apply to all companies in the waste value chain.
- Waste related businesses experience insufficient land to be available and difficult to get a license for.
- Insufficient opportunities for Public Private Partnerships exist.
- Private sector currently feels insufficiently involved in policy making processes.
- The current EPR regulation is anchored in law but not yet operationalized.
- Dissemination of data on waste collected is currently low.
- Current value chain players experience difficulties in acquiring the necessary volumes for valorisation, leading to low margins, which results in a vicious circle where collection infrastructure (e.g. separation, waste pickers, collection) does not scale due to low prices, and recycling industry not getting sufficient volumes in an economic manner meaning they cannot pay collection infrastructure more for delivering plastics.
- Insufficient clarity on and dissemination of the key waste policies. Most of the policy gaps that interviewed stakeholders identified were already covered in the two Acts analysed, but private players did not seem to be aware of this.

2 Visual overview of the roadmap



3 Interventions towards a circular plastic waste system in Zambia

3.1 Assessment of existing activities and efforts

Before moving into and discussion the directions for change, it is important to highlight the importance of valuing and building on those initiatives that already exist within the country. Therefore, it is advised for the start of each intervention to conduct an assessment of existing initiatives, harvesting the efforts from private and civil society actors, potentially accelerating their work and building on it. This can relate to physical innovations in the recycling of plastics, but also in terms of policy development, public awareness campaigns (e.g. as developed in Lusaka). In the Gantt Chart in section 3.6 this assessment of existing initiatives in included visually as well.

Domains of intervention

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. This asks for a dedicated focus at creating the right environment for collaboration to take place.

Short term

3.2.1 *Improve inter-institutional collaboration*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, local authorities

Effective steering towards circularity requires open and frequent dialogue among different institutions, to avoid working in silos, unclarity over roles and responsibilities as well as the risk of developing similar initiatives in parallel. The current level of inter-interinstitutional coordination in Zambia with regards to waste management and recycling leaves room for improvement.

1. Within government, set up inter-ministerial dialogue groups on SWM, plastic waste management and circular economy to harmonize and align efforts. Incorporate at least MOGEE, ZEMA, MLGRD and local authority representatives.
2. Increase clear clarification of the goals of the different policies, the roles of the different institutions and their responsibilities in relation to circular economy and (plastic) waste management.
3. For drafting Green Growth and CE strategies, include representatives of various Ministries to facilitate an integral approach (for example, Local Government and Finance or Technology and Science).

3.2.2 *Include women and young entrepreneurs*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, Ministry of Technology and Science, private sector, National Technology Business Centre

A circular economy is inclusive. It is important to reduce the current hindrances and encourage the inclusion for youth and female entrepreneurs, enhancing creative solutions and ideas. Especially, since inclusive job creation is currently not explicitly mentioned in the waste management policies.

1. Develop gender and inclusivity guidelines for mainstreaming existing and new policy areas and conduct gender analyses of existing policies. Gender inclusion needs to consider four gender lenses - women in the value chains; women as entrepreneurs; women as customers (of waste or finished products) and women in the waste management workforce. Gender inclusivity is mentioned in the NEP and NCP, but not operationalized nor is it articulated or strategized in any other policy.
2. Set targets for the percentage of female entrepreneurs and workers active in the recycling business.
3. Foster training programs for female entrepreneurs in recycling or circularity businesses.
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

3.2.3 *Include the informal sector*

Lead actor(s): Ministry of Local Government and Rural Development, local authorities

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. There are multiple NGO's within Zambia already active with the organization of waste pickers, and their guiding frameworks and project can be built on and used as a starting point[2]. Nevertheless, below are three key actions to consider when considering the relation of the informal sector to waste management.

1. Encourage CBOs and the informal sector to establish cooperatives and associations to represent their collective interests and improve information sharing. Manja Pamodzi or the former Separation at Source models can be used as examples.
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 public-private collaboration*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, ZEMA, private sector

Inclusion of the private sector in the transition towards a circular economy is critical. This asks for open and frequent dialogue between public and private players, where both sides can interact and learn from each other. Moreover, inclusion of the private sector into policy making processes

[2] For guidance 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 the port by GAIA (2021) on www.no-burn.org/Strengthening-Waste-Picker-Organising-in-Africa

on circularity is key. Especially when developing product regulations (e.g. on material content or phasing out components) it is important to consider the views and knowledge of the private sector as well. Also, knowledge from the private sector can be of great value to policy making processes and should not be disregarded. The current efforts of Zambia in linking the public-private sector (PPS) can be expanded to explicitly address circularity.

1. Develop sectoral (theme-based) 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.
2. Expand the existing PPS structures (e.g. the Ward Development Committees (WDCs), the District Development Coordinating Committees (DDCs), Provincial Development Coordinating Committees (PDCC), the Cluster Advisory Groups) to specifically target and develop an action agenda for circularity.
3. Experiment with public-private sector collaboration schemes when piloting waste management projects, including joint investments. Increase dissemination on opportunities for PPP's to the private sector.
4. An option for Zambia could be to develop a dedicated Plastic Pact - aligning with the Plastic Pacts network initiated by the Ellen MacArthur Foundation. Such a Plastic Pact aims to set ambitious targets to enhance a circular economy in plastics and creates a network where lessons learnt and best practices are shared amongst the participating countries and players from across the value chain are brought together[3].

3.2.5 *Improve cross sectoral collaboration*

Lead actor(s): Ministry of Green Economy and Environment, 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.

1. Facilitate 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. This should include actors from up and down the value chains of plastic products (collectors, producers, but also different types of users, as well as civil society).
2. Monitor the number of circular businesses in the country and set up occasional cross-learning platforms for circular entrepreneurs.

3.3 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. For several key policies, no or insufficient enforcement schemes or bodies are in place, leading to a lack of enforcement and effect. Effective deployment of institutional instruments can greatly accelerate change.

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[3] The Plastics Pact is a collaborative initiative that brings together businesses, governments, researchers, NGOs, and other stakeholders from across the value chain to create time-bound commitments to change the present linear plastics economy into a circular one. Zambia can establish a pact to support the elimination of unnecessary and problematic plastic packaging. The pact's goal will align with the Ellen MacArthur Foundation's New Plastics Economy's circular economy concepts. According to the agreement, the platform is based on businesses, government, research institutions, and civil society from throughout the plastics value chain. All participants agree to a shared set of ambitious and time-bound goals, assuring that this partnership will result in meaningful change. See for more info on The Plastics Pact Network the site of the Ellen MacArthur Foundation (2021): Plastics Pact Network (ellenmacarthurfoundation.org)

Short term

3.3.1 *Harmonize existing policies and align with the circular economy*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, local authorities, ZEMA

A key hindrance to effective waste management in Zambia is the fact that the current policy framework is not in tandem; and in some cases the policies are contradicting or not supporting circularity, even though many principles of the circular economy are included in the two key Acts. Alignment and harmonization is key to ensure effective steering towards circularity and (plastic) waste management.

1. Improve the synergy between the EMA and the SWRMA in terms of fully clarifying and aligning the responsibilities on waste disposal and valorisation.
2. Critically assess the current regulations and improve their enforcement so that the regulation becomes in line with the circular economy.
3. Harmonize the processes for acquiring licences and reduce any unclarities and unintentional double work for entrepreneurs.
4. Besides the support of reuse, recycling and safe disposal also include remanufacturing, to support the efforts of some private remanufacturers.

3.3.2 *Improve policy and regulatory enforcement*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, local authorities, ZEMA

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. For any transition to be successful, enforcement is to be improved.

1. Develop guidelines for the operationalisation of the EMA and the SWRMA.
2. Install an independent or overarching body (comprising of ZEMA and Ministry of Local Government) targeting waste management and circular economy initiatives that monitors and evaluates the enforcement of policies and regulations, as well as its effectiveness by assessing the pre-defined KPI's, integrating both the EMA and SWRMA, to ensure harmonization.
3. With each newly enacted regulation or instrument on general waste management, set up concrete implementation actions, KPI's (for waste management these can come from the NSWMS) and control mechanisms to allow for operationalization of the policy, include environmental and social KPI's as well.
4. Improve enforcement of the EMA, the NSWMS and the current EPR. Proceed with the operationalization as well as geographical expansion of the Solid Waste Management Utility as this has only been designed but not implemented, and only targets Lusaka.
5. Enforce the regulations for separation at source, that are already in place.

Medium term

3.3.3 *Operationalize the policy and legal framework for Extended Producer Responsibility for plastics*

Lead actor(s): Ministry of Green Economy and Environment, ZEMA

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 can provide incentives for better design aimed at recycling, can contribute to the financial resources needed for proper management of (plastic) waste and materials and shifts end-of-life responsibility from the shoulders of government only to industry as well. Currently Zambia does have an EPR for plastics, but this is not yet operationalized and thus does not have any effect yet. It is crucial to build on the preparatory work done by the Zambian government (through the incorporation of EPR in the law) by operationalizing and enforcing the scheme. Key steps to include are[4]:

1. Clearly define actors, roles & responsibilities within the plastic value chains.
2. Calculate costs and fees for participating companies in the EPR system.
3. Establish a Producer Responsibility Organisation (PRO) for PET bottles and for plastic packaging, to fulfil the EPR obligations on behalf of the members.
4. Clearly define ambitious EPR targets in a participative multi-stakeholder process.
5. Administrating and run EPR schemes through a dedicated monitoring body, including evaluation and compliance mechanisms such reviews and penalties.

Eventually, EPR can be expanded to other crucial and impactful waste streams such as diapers[5], beverage glass and e-waste. However, it is advised to first work on the operationalization of the current EPR for plastics, while expansion to other streams can be considered on the longer term.

3.3.4 *Improve (financial) instruments for local trade and market development*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, local authorities, ZEMA

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 a national Green or Circular Economy Fund with dedicated budget for waste management infrastructure *and* higher levels of circularity (reuse, remanufacturing, recycling, etcetera). This could be supported by the set-up of a climate fund which is based on contribution from the respective related sectors and potentially coupled to the currently under development Green Growth Strategy.
2. Shift the balance from a punishment oriented approach to one of both compliance and incentivization (ZEMA).
3. Develop tax incentives on the following areas:
    - Develop lower tax tariffs for reused and recycled products (e.g. no new tax on secondary products made from plastics, or lower tariffs for products with minimum of 50% recycled content);

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[4] 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

[5] 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.

- Provide tax exemptions for import and purchase of waste processing, recycling and particularly also waste aggregation technology;
- Expand tax and tariff incentives from the EMA to include small business as well. Currently only larger industry is targeted, while smaller companies are particularly important since there are no large scale domestically owned recycling businesses.

4. Discourage export of plastic waste, flakes and pellets with higher export tax.
5. Make the process of acquisition of licences for waste entrepreneurs easier by developing a “one stop shop” office or platform where companies can get all their paperwork approved at once (see also intervention 3.3.1).
6. 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.
7. Develop and accelerate the use of quality labels so customers are more inclined to trust the products put on the market.
8. Set public procurement targets for the acquisition of reusable and recycled (plastic) products by government institutes. Beyond plastics, procurement can support to create a market for reusable and recycled furniture, office supplies and building materials, for example.

Long term

3.3.5 *Design of policies for sustainable plastic (waste) management*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, local authorities, ZEMA, Zambia Bureau Standards

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 insufficiently developed or not develop at all that are important to consider, particularly also on hazardous substances. Therefore, policies should be designed to support sustainable plastic (waste) management.

1. Policy topics that are not yet in place but are to be considered:
   - Phase out single use plastic products.
   - Phasing out dumping or landfilling of recyclable materials. Start with PET, PP and PE.
   - Phasing out household products with hazardous chemicals, containing for example BPA.
   - Phasing out non-recyclable plastics such as multi-layered plastics.

3.4 Increasing knowledge development 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

3.4.1 *Increase public awareness and information availability/sharing*

Lead actor(s): Ministry of Green Economy and Environment, Ministry of Local Government and Rural Development, local authorities

Sustainable solid waste management is greatly influenced by the level of public participation, which asks for people to be informed and supportive. Therefore, the public awareness and information sharing and availability should be increased.

1. Provide information via a digital one-stop-shop information point (app) 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
2. Set up public awareness campaigns on dry/wet separation of waste.
3. Engage local NGO's and community organizations to create awareness on the health and environmental impact from littering.
4. Introduce and incorporate (plastic) waste management into school programs, educating children and accelerating knowledge sharing to families as well.

3.4.2 *Increase institutional awareness and information sharing*

Institutional awareness and information sharing should be increased, because 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. Currently, there is insufficient clarity on and dissemination of the key waste policies.

1. Clear explanation and dissemination of 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. This is particularly important in relation the EMA and SWRMA.
2. Carry out training programs for public officers dealing with policy making on plastic waste management and circular economy.
3. Sensitization of heads of Ministries and Permanent Secretaries on circular economy and plastic waste management.

Medium term

3.4.3 *Prepare and foster human capacity building*

Lead actors: Ministry of Technology and Science, Ministry of Education, academia

The transition to a circular economy cannot be achieved without sufficient trained people and skill development. Preparing and fostering human capacity building is an important activity to ensure the circular economy does not stall on lack of skills and people.

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)

3.4.4 *Invest in Research & Development and innovation*

Lead actor(s): Ministry of Technology and Science, Ministry of Education, National Institute for Scientific Research and the National Technology Business Centre

Investing in R&D and innovation 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. Develop clear application criteria's for interested entrepreneurs 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.

3.4.5 *Increase data availability*

Lead actor(s): Ministry of Local Government and Rural Development, ZEMA, local authorities

The availability of data should be increased since it is an important subset of the required infrastructure for sustainable (plastic) waste management and a circular economy. Increased knowledge on and access to volumes, quality and locations of products and waste is key to develop a proper infrastructure and to facilitate scaling.

1. Mandate all Local Authorities to produce reports on waste collected and generated per type. This should include data by the private sector and CBE's, as they perform a large part of the collection services.
2. Compile a public access national information system that collects, analyses, harmonises and disseminates data on waste. Demand contribution of the Local Authorities in terms of data provision. Include information on:
    - Waste produced in the country, per region and per service zone (based on the data as discussed in point 1);
    - Waste brought to dumpsites, landfills and received at DIWS and buy-back centres;
    - Waste recycled
    - Export volumes of waste/flakes/ pellets
    - Cost database
3. 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, to connect actors.
4. 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 as well.
5. Once developed, ensure to disseminate the locations and access potential to these online tools to private sector and citizens.

3.5 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 Zambia.

Short term

3.5.1 *Enhance the valorisation of (plastic) waste*

Lead actor(s): local authorities, Ministry of Local Government and Rural Development, private recyclers, ZEMA

To achieve circularity within waste management it is essential that higher percentages of the waste generated are recycled. To achieve circularity in general, it is also key that products are reused or refurbished more 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 Zambia are open loop recycling (predominantly) and closed loop recycling (secondly). However, also reuse should be increased, in addition to recycling. Thus, the valorisation of (plastic) waste should be enhanced.

1. Increase the amount of material buy-back centres and number of deposit systems in the country. This also allows for easier access for recyclers to feedstock and reduces pressure on dumps and landfills.
2. Pilot with plastic buy-back centres linked to a central low tech recycling facility. See the accompanying Output 5.2 document on the pilot concept for more detail. Ideally, ensure these PBBC's are connected to existing Waste Stations, to avoid these locations becoming yet another (uncontrolled) waste dump.
3. Provide easier access to land and finance for recycling initiatives in cities. Work towards designating areas in each region where waste management entrepreneurs can acquire licences more easily.
4. Increase the geographical spread of open loop recycling facilities as these now only exist in Lusaka and Kitwe. Ideally, near the future DIWS, to minimize transport costs. Particularly Livingstone, due to the high amounts of waste from the tourist industry.
5. Implement deposit systems for plastic products to increase reuse. Start with beverage bottles in various sizes. This should also be considered for other materials, particularly green glass beverages bottles as these are currently very abundant on formal and informal dumps.
6. Expand current closed loop recycling practices (only woven sacks) towards initiatives aimed at high quality products such as PET as internationally this polymer has a high market value as recycled pellet, but is not recycled yet in the country. Provide financial support for a pelleting or recycling facility for PET. Start in Lusaka to build on existing initiatives as well as ensure sufficient volumes. Livingstone could also be interesting due to volumes. There are no initiatives there yet.
7. Support the low tech recycling of the ill and non-recyclable plastic types (multi-materials, thin films, polystyrene) through brick making (mixing with sand). There are social entrepreneurs in for example Lusaka working on this already.

Medium term

3.5.2 *Increase collection levels*

Lead actor(s): local authorities, Ministry of Local Government and Rural Development

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. Therefore, collection levels should be increased.

1. Set higher annual budget from national government specifically for waste collection infrastructure. This allows local authorities to contract more private waste collectors, as local authority capacities are underdeveloped.
2. Ensure in each service zone collection is organized by a public or private collector, that collects waste at least once a week, particularly in high density areas.
3. Invest in and oblige a minimum of amount of waste trucks 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.
4. 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.
5. Alter the institutional embedding of the CBE's, this allows for more certain working conditions and steady budgets, which is necessary to get more frequent collection of higher quality.

3.5.3 *Increase dry/wet separation at source and full post-collection separation*

Lead actor(s): local authorities, Ministry of Local Government and Rural Development, 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 already increases the recycling potential substantially by decreasing cross-contamination. Full separation into distinct fractions can be done at dedicated waste stations, as requires lower transport costs. This also allows for easier acquisition of separated materials by recyclers and asks less behaviour change by households.

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. Eventually, targeting a DIWS in each service zone. It is advisable to pilot with this outside of Lusaka, e.g. in Livingstone. Lusaka has the presence of Manja Pamodzi, while in Livingstone there is only one small Waste Station.
2. Provide financial support mechanisms for the acquisition for equipment needed to improve separation and working conditions such as conveyer belts at DIWS.
3. Supply a wet fraction bin to households to allow for dry/ wet source separation at progressive costs (based on income level) or for free.
4. Develop two waste collection tariffs: for mixed (high) and for dry/wet separated (low) waste.
5. Provide licences for companies specializing in separate collection, to ensure waste stays separated during collection
6. Dedicate land for composting to have an outlet for the collected wet waste beyond a dumpsite. Ideally, incorporate composting at the future DIWS.
7. Provide separate collection targets and mechanisms for single use diapers.

3.5.4 *Improve waste disposal options*

Lead actor(s): local authorities, of Local Government and Rural Development, ZEMA

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. Thus, proper waste disposal solutions that do not harm human health and the environment are to be developed and expanded.

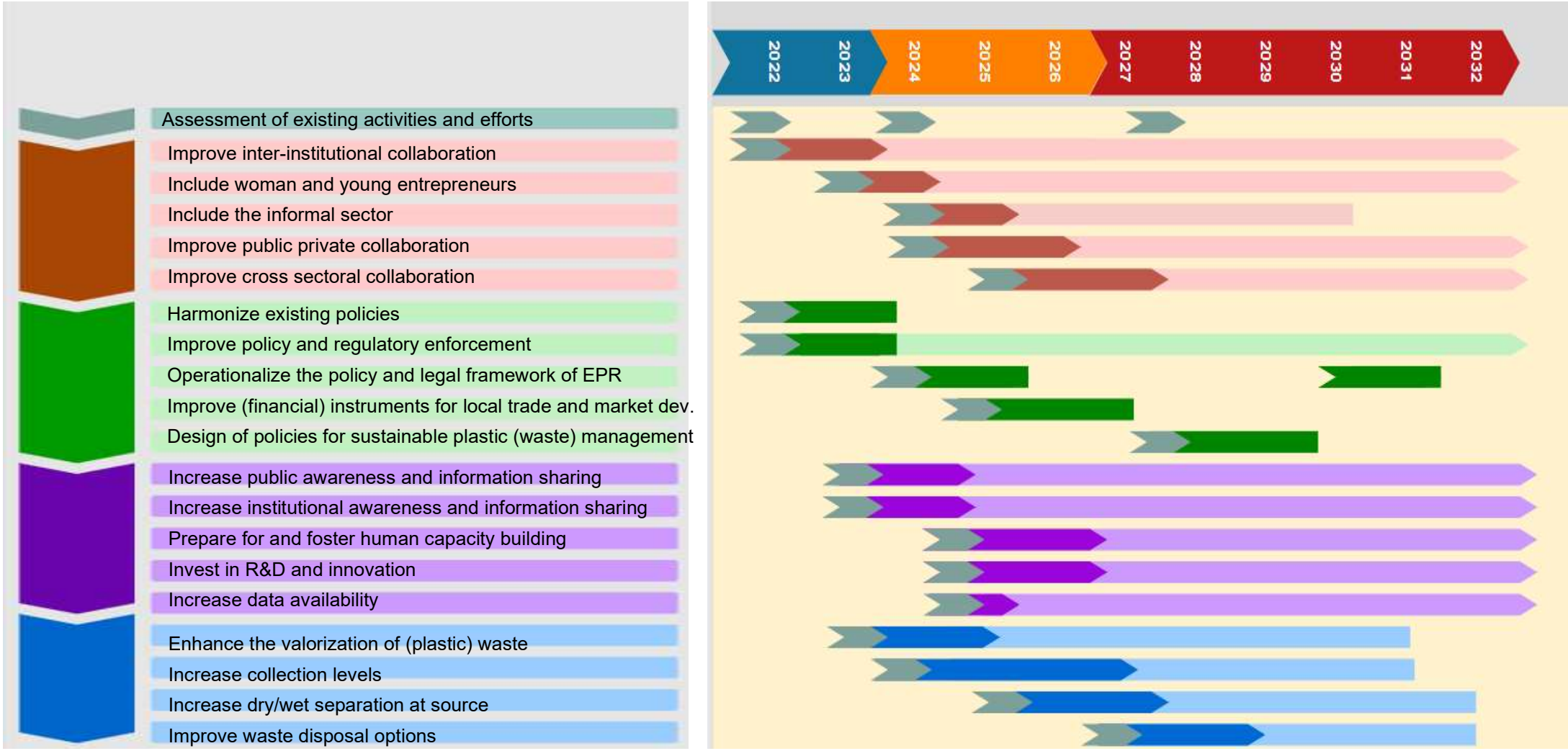
1. Improve access roads (change dirt to tar) to current dumpsites to avoid trucks not being able to enter and turning to illegal and early dumping of waste (before the actual site is reached). Pay special attention to improving access to the landfill in Livingstone during the rainy season.
2. Develop and improve properly designed and maintained engineered landfills in the major cities (except Kitwe as one is currently developed). Improve the landfill in Lusaka, and develop new landfills in the other cities (a.o. Livingstone).
3. Pilot with or develop a first waste-to-energy installations for the non-recyclable waste streams in Lusaka, to allow for sufficient volumes.
4. Expand the activities of the small-scale incinerator at the Chunga waste dump to process diapers as well. Expand to other dumps and landfills.

3.6 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).

Based on the discussions with stakeholders three interventions were deemed crucial to implement, to allow for change to be possible in all the other interventions. These are improving institutional collaboration, harmonizing the policy framework and improving the enforcement of current policies. Hence, these three are targeted to be addressed on the shortest term, starting in 2022. The other short-term measures can follow as from 2023.

The prioritization is based on multiple discussion and validation sessions with local stakeholders.


2022
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Assessment of existing activities and efforts
Improve inter-institutional collaboration
Include woman and young entrepreneurs
Include the informal sector
Improve public private collaboration
Improve cross sectoral collaboration
Harmonize existing policies
Improve policy and regulatory enforcement
Operationalize the policy and legal framework of EPR
Improve (financial) instruments for local trade and market dev.
Design of policies for sustainable plastic (waste) management
Increase public awareness and information sharing
Increase institutional awareness and information sharing
Prepare for and foster human capacity building
Invest in R&D and innovation
Increase data availability
Enhance the valorization of (plastic) waste
Increase collection levels
Increase dry/wet separation at source
Improve waste disposal options

3.7 Operationalizing the roadmap

The prior studies of the CTCN TA on circularity in plastic waste management on which this roadmap is based have predominantly allowed for a thorough understanding of the current system. By identifying current hindrances and obstacles in the (plastic) waste management and circularity landscape in Zambia, it was possible to draft interventions on how to improve the current situation. Due to limitations in scope and time, the study has not however further developed these interventions into quantified targets (e.g., how *much* recycled content for which types of plastics exactly?). In order to operationalize this roadmap, it is advisable to use this roadmap as a basis to develop substantiated and quantified targets on the different interventions. Moreover, a coordinating body (e.g. a Technical Working Group) should be implemented that comes together on a regular basis, to oversee and harmonize the various efforts, as well as to monitor progress and effectiveness. This should be done by including all relevant stakeholders.

4 Consulted sources

Primarily this roadmap is 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 Zambia

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 Zambia

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_