PROJECT DOCUMENT

The Democratic Socialist Republic of Sri Lanka

Project Title: Scale-up and Sustain the Low Carbon Municipal Solid Waste Management and Resource Recovery in Sri Lanka

Project Number: 01004813

Implementing Partner: United Nations Development Programme

Start Date: 04 September 2025 **End Date:** 31 December 2027 **PAC Meeting date:** 07 October 2025

Brief Description

Improving Municipal Solid Waste Management (MSWM) is a priority to achieve inclusive sustainable development in Sri Lanka. This project presents an opportunity to consolidate past efforts, scale up proven practices, and introduce sustainable, system-wide approaches that go beyond isolated interventions, ensuring long-term environmental, social, and economic benefits. The project interventions introduce integrated MSWM solutions that address the entire chain from waste generation to final disposal.

The objectives of this project are to:

1. Review, strengthen and develop inclusive policy, regulatory, institutional, and green financing frameworks on municipal solid waste management (MSWM) at provincial and local levels.
2. Demonstrate viable, sustainable Public Private Partnership (PPP) options for total MSWM solutions and a system for GHG emission reduction management in the selected Local Authorities (LAs).
3. Gather and share knowledge, support training, replication, and scalability of project results, and manage, monitor, and evaluate the project performance including GHG emission reduction.

The project aims to achieve these results through four (4) project outcomes: **Outcome 1:** Inclusive policy, regulatory, and institutional frameworks for meeting the MSWM targets at provincial and local authority levels in accordance with the national policy; **Outcome 2:** Total solid waste management solutions demonstrations and monitoring GHG emission reduction in selected local authorities adapting local and international best practices, with the support of the selected Korean agency/ies; **Outcome 3:** Viable and sustainable financial models for potential partnerships between the LA and the private sector (PPP) for collaborative investments and MSWM operations, and **Outcome 4:** Knowledge management, outreach, and project monitoring and evaluation.

Improving MSWM in Sri Lanka is closely linked to achieving UN Sustainable Development Goals (SGDs) 3, 6, 11, 12 14, 15 and 8. This project will also assist Sri Lanka to achieve the 05 waste sector Nationally Determined Contributions (NDCs) targets and meet related obligations towards climate change and other international environmental conventions, by strengthening MSWM across the country. Further, it will also allow the government to set up a system to monitor MSW sector GHG emission reductions, which will help Sri Lanka to start engaging in the Implementation of Article 6 of the Paris Agreement.

In addition to providing a total solution for the two selected Local Authorities to improve MSWM, it is expected that the Project will contribute to total emission reduction potential of at least 269,470 tCO_2e over a 10-year period.

Contributing Outcome (UNSDCF, CPD, RPD): UNSDCF OUTCOME 3: By 2027, people and communities in Sri Lanka, especially the vulnerable and marginalized, are more resilient to climate change and disaster risks, have enhanced water and food security, and equitably benefit from ambitious climate action and increasingly sustainable management and protection of the environment and natural resources. Indicative Output(s) with gender marker: CPD Output 2.1: Development, financing and implementation of pro-poor, inclusive green growth policies strengthened and Output 2.3: Sustainable natural resource management, biodiversity conservation and eco-system services improved through innovative partnerships and investment solutions. **GEN2**	**Total resources required:**	**4,726,516.48**
	Total resources allocated:	**UNDP TRAC:** - **Donor: Republic of Korea** **4,726,516.48** **Government:** - **In-Kind:** -

Agreed by:

UNDP		
Print Name: Ms. Azusa Kubota Resident Representative UNDP Sri Lanka		
Date:		

I. DEVELOPMENT CHALLENGE

(A) Situation Analysis

Municipal Solid Waste Management (MSWM) in Sri Lanka

Municipal Solid Waste Management (MSWM) is a key development challenge in Sri Lanka which causes serious social, environmental, and economic concerns. With an average 0.4-1 kg daily per capita waste generation, Sri Lanka produces 10,786t[1] of waste per day. According to the Waste Management Division of the Central Environmental Authority (CEA) of Sri Lanka, only about half of daily waste generated gets collected as municipal waste. Only a minor share of the collected MSW is processed. The balance, which is about 85% of the waste generated, is disposed inappropriately, mainly through indiscriminate open dumping and burning, giving rise to health and environmental impacts.

Analysis of waste characteristics has been carried out by the Sri Lanka Sustainable Energy Authority (SLSEA) in 2016 based on the ASTMD5231-92-2008 standard, for waste generated in Colombo (Figure 1). The results show that the percentage of degradable material in total waste is 52.73%. Waste is assumed to be of roughly similar composition in other Local Authority (LA) areas across the country.

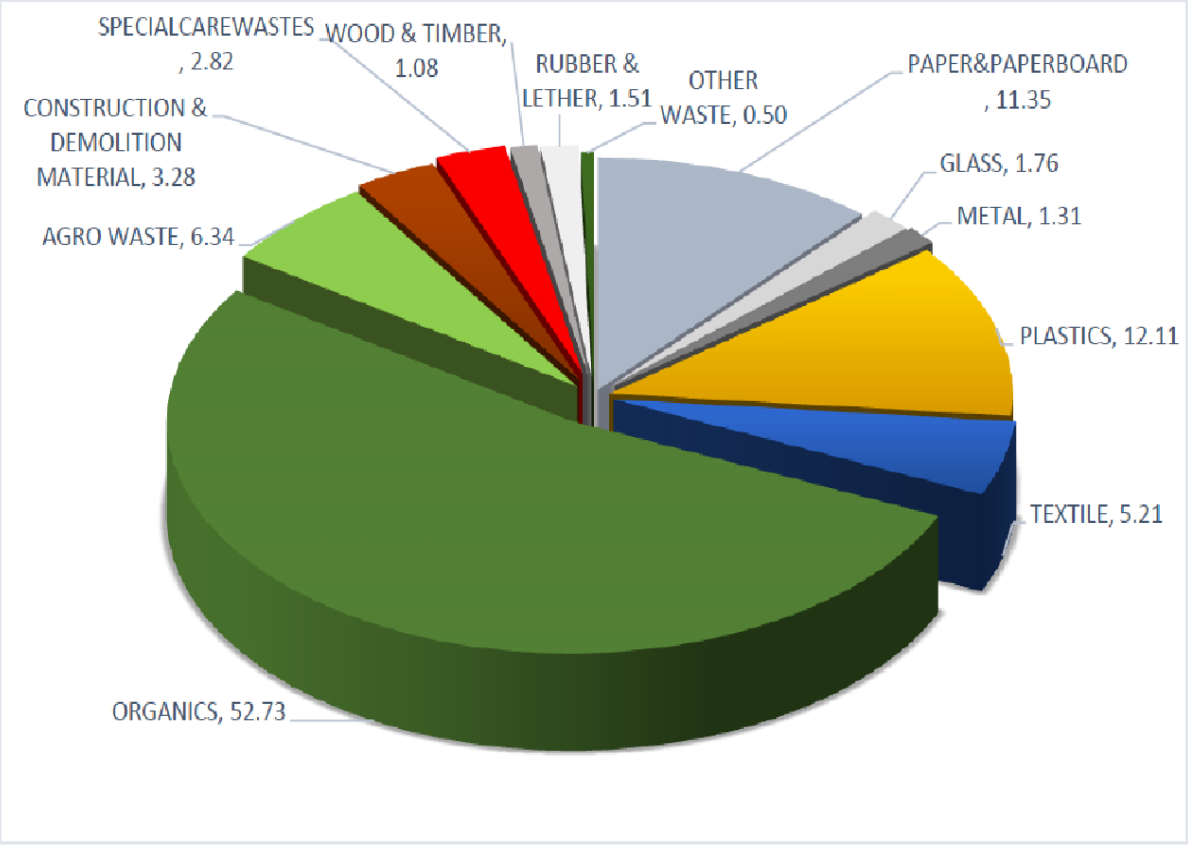


Figure 1. Characteristics of MSW in Colombo Municipal Council

Source: Sri Lanka Sustainable Energy Authority

[1] Jayathilake, N.; Kumara, I.U.; Fernando, S. 2020. Solid and Liquid Waste Management and Resource Recovery in Sri Lanka: A 20-city analysis. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 87 p.

National Waste Management Scenario

Table 1 below presents an overall picture of MSWM in Sri Lanka.

Table 1. Key indicators related to Solid Waste Management in Sri Lanka.

Key Indicators	Current Status Measure
MSW collection efficiency	27%
a. Recyclable	46% [12% of waste generated]
b. Composting	25% [7% of the waste generated]
c. Other	29%
MSW collection at local authority level	
a. Municipal Council	50%
b. Urban Council	17%
c. Pradesiya Sabahs	33%
Open dumping percentage	85%
Composting percentage	10%
Recycling percentage	5%

Source: Municipal Solid Waste Management Practices & Challenges in the Southeastern Coastal Cities of Sri Lanka[2]

Improving MSWM is a priority to achieve sustainable development in Sri Lanka. As such, it is closely linked to achieving UN Sustainable Development Goals (SGDs); Goal 3 (Ensure healthy lives and promote well-being for all at all ages), Goal 5 (Achieve Gender Equality and Empower All Women and Girls), Goal 6 (Ensure availability and sustainable management of water and sanitation for all), Goal 11 (Make cities and human settlements inclusive, safe, resilient and sustainable), Goal 12 (Ensure sustainable consumption and production patterns), Goal 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development), Goal 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss) and Goal 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all).

Sri Lanka must also achieve the five waste sector Nationally Determined Contributions (NDCs) targets. Sustainable management of MSWM will also help to meet related obligations towards climate change and other international environmental conventions.

(B) Baseline Context of MSWM in the Country

1) **Baseline scenario and associated baseline projects**

Sri Lanka has taken many initiatives to strengthen MSWM during last few decades, although many of them have not achieved the expected overall results. The country is yet to engage in comprehensive MSWM solutions based on sustainable options for managing waste from generation to final disposal. Most past projects have targeted solving a specific issue or a key component of the MSWM, rather than aiming for total solutions. Some of the key MSWM initiatives that Sri Lanka has worked in the past are as below.

1. 'Pilisaru" is the name of the National Solid Waste Management Programme conducted island-wide programme by the Central Environmental Authority (CEA) in 2008. It provided technical and financial assistance to about 115 Local Authorities (LAs) to set up MSW-based composting facilities. Pilisaru also engaged intermediaries in resource recovery, who collected and sold specific non-degradable waste (e.g., from glass/paper manufacturers, grocery stores, etc.) to recyclers. Pilisaru was a key step in the right direction, promoting options for recycling and adding value, but not all LAs embraced Pilisaru interventions enthusiastically for many different reasons. Even for those LAs that did, it only provided partial options and a bulk of the MSW continued to be openly dumped, giving rise to environmental

[2] *A.M.A. Saja, A.M.Z. Zimar and S.M. Junaideen, 20th April 2021*

consequences.

2. A mechanised semi-automated composting system was introduced to Sri Lanka around 2016 by the National Waste Management Coordination and Support Centre under the Ministry of Provincial Councils and Local Governments. Aiming to provide a faster (capacity up to 50 metric tons (MT) waste/day), aerobic biodegradation and production of high-quality compost, these composting plants were installed across all provinces. Yet only some of these plants are successfully operated at their optimum capacity with many preforming under capacity. Some of the problems encountered are longer than anticipated processing time (two months compared to the expected two weeks), requirement of a large space, high operational costs including energy cost, reduction of quality of output, i.e., risk of pathogens and weed seeds remaining in the end product.

3. Only one of the three *Waste-to-Electricity* projects approved by the Government of Sri Lanka in 2015 were established and is being operated by Western Power Pvt. Ltd in Muturajawela, Colombo. This BOO (build, operate and own) project processes waste received from Colombo. It has the capacity to provide an equivalent of 10 MW electricity to the national grid, but it is not functioning at full capacity as far as it does not receive the expected amounts of waste from the neighbouring LAs. The Ceylon Electricity Board (CEB) provides a special tariff in purchasing electricity from this plant while the total investment was made by the private sector with a government bank guarantee.

4. UNDP assisted a relatively large municipality in the Western province, the Municipal Council of Kaduwela (KMC), to strengthen its MSWM facility. This initiative introduced a biogas unit which has a feeding capacity of 10 tonnes daily. The output consists of biogas converted to electricity, connected to the grid equivalent to 320kWh, and 7,500 litres of liquid which is used as bio-fertilizer supplement, on a daily basis. The facility is operating successfully at present.

5. Biogas technology options have been designed and tested for MSWM in Sri Lanka considering the waste characteristics of MSW over the last two decades or so, with only a few success stories. Smaller biogas units are used successfully for MSWM in a few LAs setup with support of NGOs (i.e., Kuliyapitiya Urban Council and Local Authority of Pannala have cost effective biogas units for MSWM with capacities of 600 and 400 kg /day, respectively). These units have been operating well for over 7 years. Both the senior management and the operation staff of these LAs are highly committed to these projects, and incentive schemes for the operational staff have been introduced based on the earnings. Lessons learnt from these units resulted in the designing of the larger biogas system at the Kaduwela Municipal Council (KMC).

6. Most LAs have their own independent MSWM systems. A major share of degradable MSW is composted based on manual operations which often do not break even. Although the semi-automatic mechanical composting systems are designed to operate efficiently, their performances are affected by the lack of adequate operational space and sufficient quantities of waste received. Quality issues of compost produced at LAs in general may have limited its extensive use. Managing cost of MSWM is a big challenge to LAs. Some LAs sell non-contaminated polythene and plastics segregated from waste for recycling. Yet, funds generated from recycling and compost sales is inadequate to fund the MSWM operations. A nominal fee collected by the LAs as rates and taxes and service charges from the commercial sector is used for MSWM along with other LA expenses. As such, financial strength of the LAs at present does seem to allow much room to increase investment to improve the existing MSWM systems or adopt new technologies.

   Efforts have been made to move away from open dumping to landfills, in the recent past, again with only limited successes. A successful example is the Sanitary Landfill in Dompe, Western province, which is the first engineered landfill in Sri Lanka. The landfill with the capacity of 20,000 tonnes per day has leachate treatment facility of 40 t/d and incinerates leachate gases. It was constructed from September 2008 to July 2015 by the Local Authority of Dompe with financial assistance by KOICA (Korea International Cooperation Agency) at a total cost of US$ 6M. The landfill functions well to date, overseen by the CEA (Central Environmental Authority). The KOICA experts supervised the landfill construction, and assisted LA/CEA in policy development, as well as training local cadre on Operation & Management (O&M).

   More have been constructed since then, but only a few are operated successfully at present. The most

recent sanitary landfill constructed at Aruwakkalu in Puttalam, faces challenges, details of which are given under Section (B) II (1) below.

7. Feasibility studies conducted over the last 30 years show that Sri Lanka's focus has mainly been for centralized solutions such as landfills. Focus has also been on the MSWM in the Western Province given its high waste generation, but landfill site locating has been some distance away from the province due to difficulties in allocating land in urban areas (i.e., the newly introduced landfill at Aruwakkalu). Apart from the transport issues, the cross-border waste movement has also given rise to public protests encouraged by both environmentalists as well as political interest groups in most cases, making implementation of these landfills practically difficult, even if technically feasible.

8. In June 2022, the government proposed a new tariff structure in the amended Electricity Act, introducing a separate tariff category for power generation from Municipal Solid Waste (MSW) for the first time in Sri Lanka. The new tariff structure proposes paying 50% of the total tariff by CEB and the balance by the respective Local Authority. Under this scheme, if a Waste to Energy project is developed and operated by a LA, the net earnings by selling electricity to CEB is only 50% of the overall sale to the CEB.

(C) Anticipated Transformation

Figure 2: Overall Waste Flow Chart

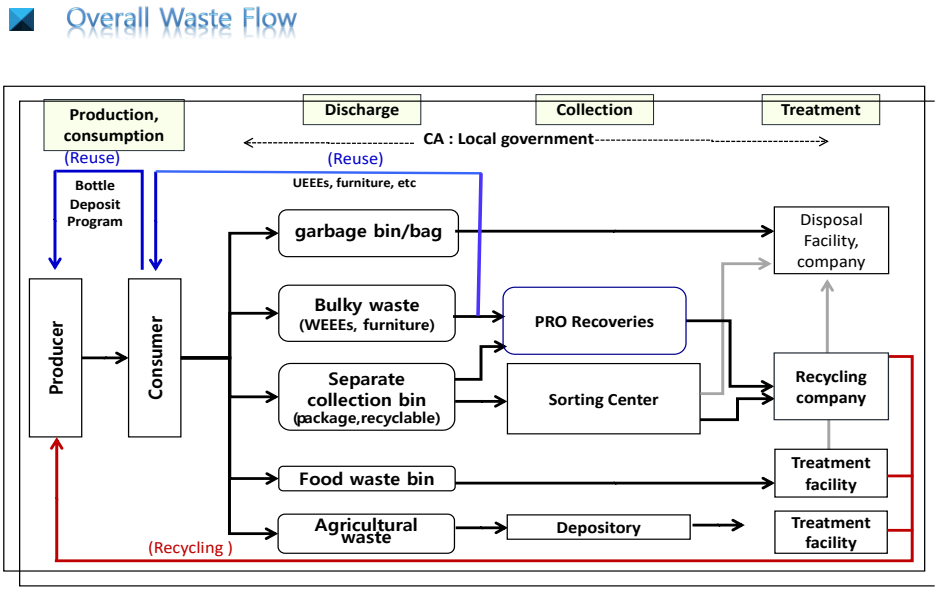


Figure 2 illustrates the overall waste management and waste flows within a given system such as a local area. Waste flows are indicated at the top, from left to right in the diagram. MSW is created by various sources such as producers (i.e., industries, and commercial establishments) and consumers (i.e., households). Segregation of MSW at the source and implementing 3R (refuse, reduce, and reuse indicated by blue lines in the diagram) facilitates better resource recovery. Sorted MSW is channelled to different treatment pathways depending on the type and nature of the waste.

Organic waste (food waste, agricultural waste) is sent for treatment and processes such as composting or anaerobic digestion. Nondegradable waste of waste gets further sorted; fractions such as WEEE, furniture, etc., are sent back to producers as per EPR regulations. The waste fractions such as paper, plastic, and glass, are diverted to respective recycling centres for processing. Products made by recycling are channelled back to production systems as indicated by the red arrow.

The non-recyclable waste proceeds to disposal facilities/companies where it undergoes processes like incineration or landfilling, in line with local regulations. Incineration involves the controlled burning of waste to generate energy, while landfilling is about the disposal of waste in designated land areas.

Effective waste management systems strive to minimize waste sent to landfills and maximize the recovery and recycling of valuable resources to achieve environmental and economic sustainability.

Waste collection and transportation too, are important aspects of MSWM. A systematic collection of waste from households and commercial areas and swift transfer to appropriate treatment and disposal facilities are key features of efficient MSWM systems.

Overall, the diagram given in Figure 1 provides an overview of how the waste should flow from its generation to its destination, highlighting essential processes and the different pathways of managing MSWM efficiently.

Despite some past efforts to improve MSWM, Sri Lanka is yet to satisfactorily engage in the comprehensive and holistic waste management approaches described above. Key barriers to moving towards and achieving comprehensive waste management are given below.

(D) Barriers that Need to be Addressed

1. Use of limited technologies options and approaches that cannot provide sustainable and total MSWM solutions.

Many LAs are taking interest in processing degradable waste but the solutions adopted by most LAs are inappropriate and incomplete. Manual composting methods used by many LAs across the country are not efficient and do not produce high quality compost. Although nine (9) LAs across the country use mechanical composting machines which can technically be operated efficiently to produce high quality products, they mostly run at suboptimal levels (under capacity) due to capacity mismatch and inadequate space for its operation. The non-degradable fraction of the waste, including special care waste, is often not properly collected and inadequately processed/recycled for value addition. It mostly goes for open dumping or direct combustion, both options which give rise to environmental concerns.

2. Having limited knowledge on BAT and BEP for MSWM

LAs have low knowledge of and low access to BAT and BEP options as well as to research and development in MSWM. Weak capacity at LA level is a key reason for this and this is particularly significant for staff engaged in waste collection, transportation and working in waste yards.

3. Financial barriers for the development of MSWM systems

No tipping fees are charged from waste generators for waste collection by LAs. As mentioned above MSWM systems are maintained using funds generated through rate and taxes and services charges from commercial sectors. Increasing public tax for supporting MSWM is not politically favourable. Alternative sustainable financing mechanisms for MSWM which also support income generation for LAs are yet to emerge.

4. Substantial environmental and social costs of dumping

The 341 LAs in Sri Lanka have nearly 340 open dump sites. Many dump sites are located near environmentally sensitive areas. This causes numerous negative environmental impacts such as ground and surface water pollution, air pollution, health hazards, infrastructure degradation and clogging drains and local flooding in the area. The dumpsites which are within the municipal areas are located closer to people, especially to low-income settlements. Initiatives have been taken to address these issues through the introduction of sanitary landfills (e.g. Aruwakkalu), but they have also not been successful in general. Apart from this, in many instances public protests have been raised due to cross border issues.

5. **New tariff structure proposed for Waste-to-Energy projects** has been under discussion for a while and has not been approved yet.

6. Inability to reach waste sector NDC targets.

Nearly 16% of the country's total GHG emissions is generated from waste. Having little or no new/alternative solutions and slow implementation, it is unlikely that Sri Lanka will be able to fulfil NDC waste sector obligations fully unless focused programmes and projects are implemented over the coming years.

While certain initiatives implemented by LAs contribute towards NDCs even these are generally inadequate to meet expected targets given the timeframe (i.e., The NDC targets to increase MSW segregation categories, source segregation, collection up to 60-75% and recycling up to 5 - 7% and composting up to 30% of collected compostable waste). There are also areas of NDC commitments that need more and serious effort or initiatives. These are: updating and introducing legislation to enable and enforce NDC implementation; introducing mechanisms for forecasting and tracking waste generation; introducing legislation for making household level segregation mandatory, and market-based instruments and non-market based instruments to incentivise sustainable consumption; preventing, avoiding or reducing GHG emissions and 10% growth reduction in MSW generation; implementing regulatory framework to control high waste generating products; and, facilitating public-private partnerships for finance the waste sector NDC.

7. Gender concerns in MSWM

LAs engage workers for the highly labour-intensive 'dirty'- jobs, garbage collection, segregation, and composting. Some LAs have outsourced waste collection and women are increasingly hired for waste collection tasks by these private service providers, as they come at cheaper wages.

Generally, both men and women are engaged in collection of waste from households, but transportation to processing yards is mainly done by men. At the waste yards both women and men are engaged as waste workers in composting related manual tasks. Operation of machinery and tools in mechanical composting is done by men. Women also are heavily engaged in resource recovery value chains due to cheaper labour. These jobs also involve working under quite harsh and risky conditions.

MSWM functions and equipment are largely male-oriented. For example, manually operated carts are not suited to women's height and strength, yet women are increasingly recruited for this task. Both men and women face unsafe work environments with poor recognition, inadequate protective gear, and lack of occupational safeguards, but women are disproportionately affected by unsuitable tools and facilities.

Additional concerns include inadequate access to sanitary facilities, water, and safe disposal options for women workers. This forces unsafe menstrual hygiene practices, heightening health risks and contributing to waste burdens. Stigma and limited access to reusable options exacerbate the challenge. Poor WASH services and limited affordability compound risks, particularly for women from low-income backgrounds who often live in cramped housing. The exposure of women in hazardous MSWM jobs also affects their families, given their multiple productive, reproductive, and caregiving roles.

8. Increasing MSW generation due to consumption patters

Collection of MSW in Sri Lanka has significant room for improvement and it is part of the waste sector NDCs. Table 1 in Section I (A) shows MSW collection in Sri Lanka is at 27%. It also shows that collection is different in Municipalities (50%), in Urban Councils (17%) and in Pradeshiya Sabha (33%). The difference in collection at different LA levels is likely to be based on availability of resources, public and political pressure, and land availability.

As a significant portion of MSW collected by LAs is disposed via dumping, distance to dump yards and transport costs feature as major costs in MSWM budgets of LAs. Urban LAs have more challenges in finding suitable land to dump and they generally focus on a location that does not cause a huge outcry by the public and ignore other concerns such as environment and health. The current situation is getting further aggravated as waste generation at all levels is increasing while the LAs are struggling to cater to increase their collection targets, while not having access to the additional resources required for improving MSWM.

9. Segregation and processing for value addition and resource recovery

According to the above-mentioned study conducted by the Sri Lanka Sustainable Authority (SLSEA), nearly 60% of the municipal waste consists of degradable waste which is a resource in MSW management projects if properly segregated.

Waste segregation is minimal in Sri Lanka, at the highest being categorised as degradable and non-

degradable only. In many LAs, no segregation take place, while in some LAs (e.g., Gampola) do not have systems for collecting and processing even when segregation is practiced at household level.

10. Negative public attitude and low public engagement in MSWM

General public, while acknowledging the importance of MSWM, want to have little to do with it. Waste-related jobs are low-paid and stigmatized, largely handled by workers from low-income groups who often face social, and health challenges linked to poverty.

This stigma, combined with lack of awareness, limits public participation in reducing waste generation, adopting sustainable consumption practices, and ensuring effective segregation for recycling and recovery options.

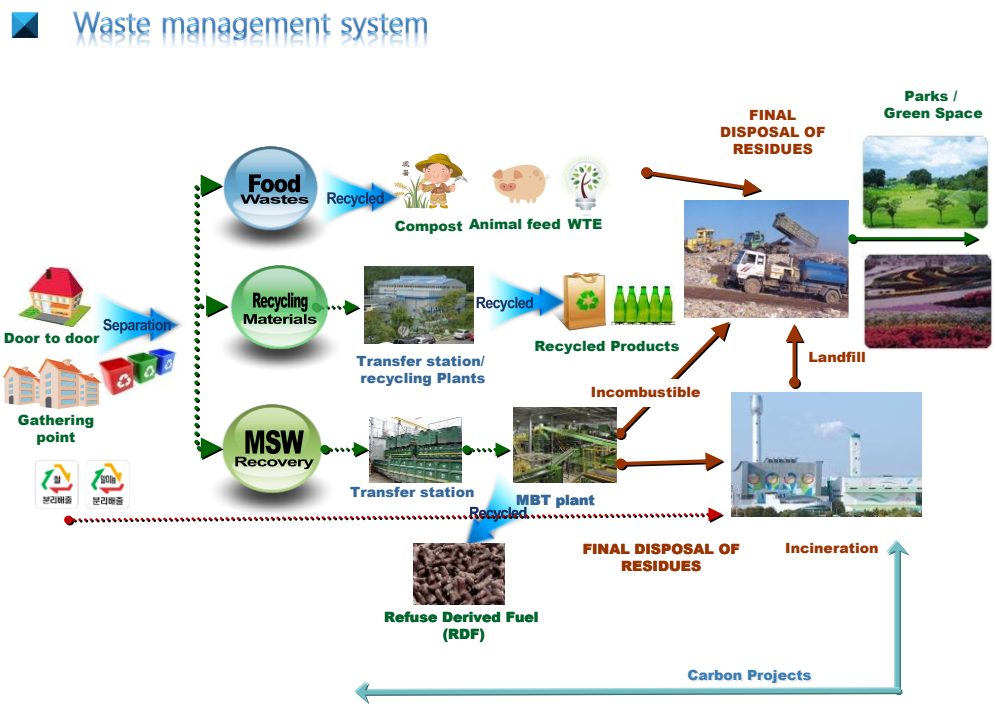
Additional contextual information, including the policy and regulatory framework for waste management, related institutional arrangements, relevance to national priorities such as the Sustainable Development Goals (SDGs), Nationally Determined Contributions (NDCs), Internationally Transferred Mitigation Outcomes (ITMOs), and preliminary details on potential PPP arrangements, is provided in **Annex 1**.

I. STRATEGY

A. Justification for Intervention

The project will assist the Government of Sri Lanka to realise key ambitions set out in the chapter on Holistic Waste Management of the National Environment Action Plan 2022-2030. The Ministry of Provincial Councils and Local Government, responsible for the LAs, as the lead Ministry responsible for MSWM in Sri Lanka (SL) and the cooperating party of this project has prioritised implementing the newly approved National Waste Management Policy through this project. The development of the Provincial MSWM strategies of this project will help to translate the policy into implementation plans. They will build on past ad-hoc and isolated local successes and international Best Available Techniques (BAT) and Best Environmental Practices (BEP), while aligning with national and international policy commitments and targeting at reaching waste sector NDC targets. A systemic waste management approach is proposed by the project to implement the National Waste Management policy, as depicted in Figure 3. It emphasises the importance of starting MSWM at the source by engaging waste generators as active participants of MSWM systems.

Figure 3. Proposed Systematic Waste Management Approach



a. Provincial MSWM Planning:

As the Western Province (WP) generates the bulk of MSW in Sri Lanka, most of the existing (albeit inadequate) solutions for MSWM have been targeting the WP, including the development of a MSWM Master Plan. With the ministry's intervention, four (04) more provinces (Northern, Uva, Eastern & North Central) have either initiated or will soon start provincial MSWM planning assisted by different Development Partners. This includes the Capacity Development for Local Government (CDLG) Project, executed by the Ministry with assistance from UNDP Sri Lanka.

This project prioritises the development of strategic MSWM plans in the remaining 04 provinces (Northwestern, Central, Sabaragamuwa, and Southern Provinces) as key focus to complete the national provincial planning process. The four provincial plans will complete the implementation strategy for the National Waste Management Policy of Sri Lanka ensuring that all provinces on the island are guided by policy-driven implementation.

b. Pilot Demonstrations

The project will also demonstrate sustainable practice of strategic MSWM options suggested by the provincial plans, to trigger eventual wider interest and take-up by other LAs. While Sri Lanka desperately needs to shift to comprehensive and sustainable MSWM, the overall unsuccessful track record of MSWM in Sri Lanka means that LAs in general (and other stakeholders) will not be convinced to opt in and engage, unless these options are practically seen. The proposed demonstrations are crucial for this reason. Having demonstrations in two (02) selected LA areas will increase the visibility of demonstrations and potential replication and scaling up across a larger area.

The following details the vigorous process engaged to select the two LAs for the project's demonstration actions. The use of recommendations from the in-depth investigation on international best practices of technology and approaches on MSWM and matching them with individual local context was completed during the project formulation stage, to ensure planning transformative demonstrations and interventions through the project.

The selection of project locations: The success of UNDP Sri Lanka's Project with the Kaduwela Municipal Council (KMC) on the Waste-to-Energy Plant, generated many inquiries which led to the investigation for potential replication of the KMC experience. Following this, UNDP conducted a preliminary investigation of waste management practices of selected Local Authorities across the island in 2020-2021. This KEITI project development and location selection processes are based on further analysis of this investigation. Twelve (12) LAs were longlisted from this investigation and were subject to pre-feasibility studies. Analysis of the 12 pre-feasibility studies led to short-listing five (05) LAs based on agreed criteria with stakeholder inputs. The selection criteria are:

1. LA that generates daily waste between 10 to 60 t/day was considered for the project. Within this range, low, medium, and high waste-generating LAs were considered as per the request of the Ministry of Provincial Councils and Local Government (MOPC&LG), so that the project can showcase solutions at different scales.
2. The local area which makes important contribution to the national economy and foreign exchange gen eration.
3. The LAs, where both the political authority and officials of the LA have shown a high commitment to im proved waste management.
4. The LAs with significant potential for transformation generating environmental and social benefits.
5. Risk level & sustainability of the existing waste disposal practices. The LAs with low or reasonable levels of risk show some measure of sustainability of the existing waste disposal practices.

Subject to these criteria, and stakeholder consensus, two (02) LAs were selected. Rationale for the LAs selection was further discussed at the Validation Workshop held 5th January 2023 and confirmed.

Listed below are the two (02) LAs selected to demonstrate comprehensive MSWM solutions under this project:

1. Central Province Gampola Urban Council
2. Sabaragamuwa Province Balangoda Urban Council

Strategic guidance for developing MSWM plans in the above-mentioned locations came mainly from:

(a) The recommendations from the in-depth investigation on international best practices of technology and approaches on MSWM carried out during the project formulation stage, and matching them with individual local contexts, to ensure having transformative plans and interventions.

(b) Lessons learnt from the UNDP Sri Lanka's Project completed with the Kaduwela Municipal Council (KMC). The successfully operational Waste-to-Energy Plant generates many inquiries, and some have led to the investigation for potential replication.

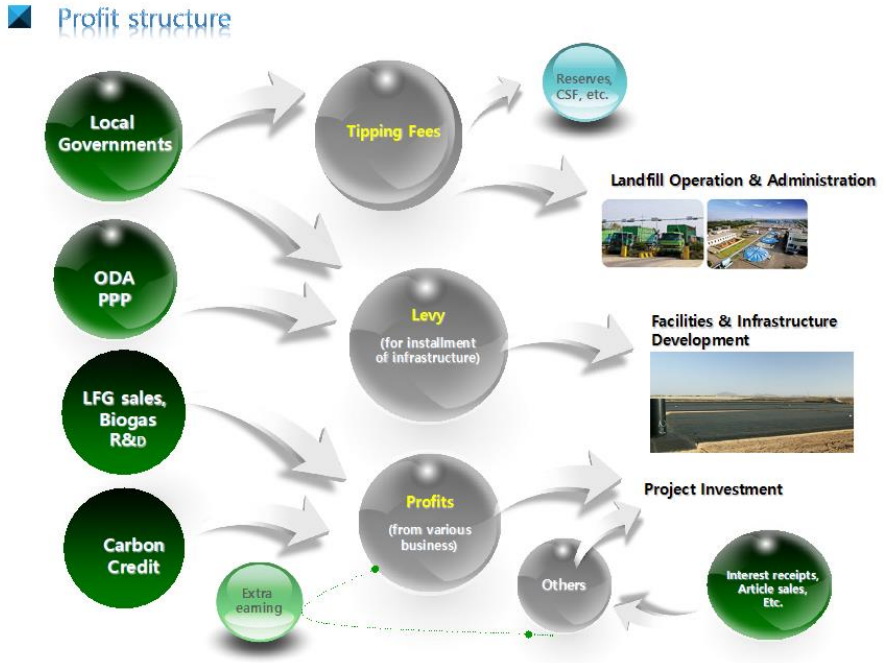
(c) Both good and bad lessons learned from past projects on MSWM conducted by LAs with the help of

donors, development partners and NGOs.

An overarching framework that guides LA level municipal waste management (business) planning to become self-sustaining is given in Figure 4.

Waste management plans of the two (02) selected project locations will be guided by the logic depicted by Figure 4, which emphasizes on the profit-generating potential of MSWM. Having demonstrations in these 02 sites will generate knowledge on comprehensive MSWM and the replication potential of total MSWM in other LAs.

Figure 4: Waste Management and Profit Structure



B. Project Intervention

The project intervention strategy guided by the Government of Sri Lanka is to provide decentralised solutions for managing the waste, within the LA boundary rather than having cluster operations that involve transportation of MSW to a central location crossing boundaries. Clustered operations, while they may increase MSWM efficiency with an increased scale of operation, have caused social issues (i.e., community protests) when transferring waste from one area to the other. It also increases operational costs, including transport costs.

There are 341 LAs in Sri Lanka and their daily waste generation in each LA varies from 10 to 50 tons depending on the population and the economic activities. These capacity variations have been considered when selecting the proposed demonstration sites and site-specific MSWM technology options. Circular economy concepts with economically feasible models have been proposed for the demonstration sites, together with systems for monitoring GHG emission reduction. The success resulting from these interventions, the lessons, and best practices will be shared with all the LAs in Sri Lanka through targeted knowledge products and training programmes. The project will actively promote the replication of the total MSWM solutions at the LA level by encouraging PPP models and by promoting green financing mechanisms. Sri Lanka will engage with appropriate Korean Technology Service Providers through KEITI to further strengthen options of available totals solutions for MSWM during the replication phase by connecting with suitable funding agencies/bilateral donors.

Providing total solutions for MSWM at LA level will forge linkages with MSMEs locally and the private sector at large, engaged in resource recovery and recycling businesses. The project strategy emphasises stakeholder engagement including private sector and MSMEs for engagement in resource recovery operations. In addition, the banking sector too plays an important role in facilitating resources required for

private sector engagement in MSWM, through green financing. The project anticipates engaging with private sector MSMEs and banks from the outset which will lead to strengthening the sustainability of MSWM operations and scaling up the interventions of this project.

Addressing the barriers identified in Section 1.D is the aim of the project. A specific investigation was carried out by an international (Korean) Technical Expert in MSWM in developing countries including best practices from Korea and other countries, mainly in Asia. BAT/BEP identified by this survey showed potential MSWM options that Sri Lanka can consider (please refer to Annex 6). The project proposes to demonstrate comprehensive MSWM solutions in 02 LA areas - for which strategic MSWM plans will be developed.

Republic of Korea (ROK) has introduced Volume-Based Waste Fee (VBWF) system with the objective of minimising generation of degradable waste at the source and enhancing the segregation of non-degradable waste. This VBWF system was introduced in 1995 after trialling out different models and it is being successfully implemented now. However, economically as well as capacity-wise, Sri Lanka and Korea are at two different levels and the adoption of some of the strategies may not be viable for the local context. Some of these technologies and strategies utilised under this VBWF programme are suitable for Sri Lanka and will be adapted to the local context.

The options recommended by the survey were discussed further with local stakeholders and the optimum bundle of BAT/BEP that matches the specific context and requirements of each of the provinces and the two (02) LA areas selected for the demonstration were identified. A summary of the contextual and waste-related information considered in the selection of optimum BAT/BEP for each province and site is given **Annex 2.** Further, technology-based approaches to MSWM and integrated approaches to total MSWM in the proposed pilot sites (LAs) are provided in **Annex 3.**

The lessons learned and best practices generated by successful project interventions will be shared with all the LAs in Sri Lanka through targeted knowledge products and training programmes. The project will also continue to engage with appropriate Korean public sector agencies and technology service providers, (i.e., with Sudokwon Landfill Site Management Corporation and KEITI), suitable investors, funding agencies/bilateral donors will be done during the demonstration and replication phase as appropriate.

Other Considerations

The project will also consider all key milestones in the waste management timeline in Sri Lanka and lessons learned. Project emphasis is on providing decentralised, comprehensive, and sustainable MSWM solutions based on business models. The lead ministry emphasising on decentralised, and locally appropriate/effective BAT/BEP, aims to use proposed provincial strategies to build skills at LA level and augment their capacity by bringing private sector resources and expertise. The pending provincial MSWM planning will also take economic crisis in SL into account and maximise renewable energy considerations aligning with long-term energy plans, objectives of the country.

A pertinent lesson considered in designing this proposed project is past experience LAs have with externally assisted projects, mismatch of technology, approaches, scale and skills with local context and requirements. Recommending and demonstrating provincial and local MSWM options are based on special characteristics of the respective area. While BAT/BEP mapping is based on both local and global technologies including Korean technology, the specific bundle of BAT/BEP recommended is based on a detailed matching exercise that is grounded on the context, status, and requirements of the selected LAs. Introducing decentralised local solutions, where appropriate combined with viable provincially centralised solutions, is anticipated. It will help to address cross-border waste movement issues and the related fuel and transport costs**.**

The project recognises that LAs tasked with the MSWM responsibility have substantial technical, management and resource mobilization capacity gaps and substantial project investment is geared towards bridging them. Capacity development and skills enhancement of staff of LAs, from the political leadership to waste handling staff and workers depending on specific requirements, as well as local MSMEs engaged in

resource recovery or intermediaries of recycling recovery operations are key parts of the project scope. The project will also address issues such as lack of land availability by introducing land-efficient BAT/BEP applicable to smaller spaces, reducing waste generation, increasing the rate of waste collection by reducing inefficiencies in segregation and collection, people's attitude, and engagement by raising public awareness, promoting active public engagement, involving CBOs and peoples' institutions at local level.

Overcoming financial barriers by moving away from the current highly subsidised MSWM strategies adopted by LAs will also be done by the project, by introducing, and emphasising on recycling, resource recovery and value additions to ensure that MSWM at LAs run as viable and sustainable businesses.

Comprehensive MSWM solutions demonstrated in the two selected locations will generate substantial valuable data, information, and lessons. Capturing data/information and lessons learnt will contribute to reducing the data dearth on MSWM and sharing knowledge generated with LAs across all provinces in SL for potential scaling up and strengthening support from the general public, CSOs and private sector.

The project will align with Sri Lanka's SDG ambitions and NDC obligations, delivering multiple benefits. Reduction of waste generation, reusing and resource recovery, recycling and converting waste to energy and bio-fertiliser, contributing to waste sector NDCs. Further outcomes of BAT/BEP initiatives will contribute to sustainable consumption, and resource and environment management while creating green jobs contributing to achieving SDGs. Project contribution to strengthening local economy and in turn national economic recovery of Sri Lanka is also a key consideration.

Mobilising private investment and capabilities towards MSWM will increase the efficiency of MSWM and create a more skilled and motivated waste management workforce at LAs facilitating better environment for local economic activities including creation of green jobs. The focus on reducing waste dumping by the project will help address serious MSWM related environmental concerns identified as the baseline. Overall, the promotion of carefully selected BAT/BEP bundles will result in the reduction of GHG emissions. This project will be actively setting up a suitable MRV systems at the pilot locations to monitor GHG emissions and will actively promote by sharing information and knowledge so that other LAs can also be included in the/setup MRV system. This will be an important step towards monitoring MSW sector GHG emission reductions, to help Sri Lanka to start engaging in the Implementation of Article 6 of the Paris Agreement and ITMOs.

The project will also pave ways for corrective actions for sustainable environmental management initiatives such as landscape management included within waste management spaces, rehabilitation, and conservation of environmentally sensitive dumping areas.

As such the project is formulated with the following three key strategic thrusts in mind:

1. Completing strategic provincial MSWM in Sri Lanka, focusing on sustainable and comprehensive solutions.
2. Demonstrate decentralised, locally appropriate, sustainable, and comprehensive solutions for MSWM based on BAT/BEP at the local level. The BAT/BEP-based MSWM solutions chosen and demonstrated for each LA area will be specific, and individually designed, taking explicit local circumstances into account.
3. Share knowledge and promote scale up to actively contribute to reaching waste sector NDCs and overall emission reduction targets.

II. RESULTS AND PARTNERSHIPS

Expected Results

Project objective: The objectives of this project are to

1. Review, strengthen, policy, regulatory, institutional, financing frameworks to meet the MSWM targets in accordance with the national policy at the Provincial and LA.
2. Demonstrate viable, sustainable options for total MSWM solutions in the selected LAs adapting loc al and international best practices.
3. Introduce viable financial models for developing potential partnerships between the LA and the pri vate sector (PPP) for a collaborative investments and operations on MSWM.
4. Gather and share knowledge, support training, replication, and scalability of project results, manage, monitor, and evaluate the project performance and evaluation.

Expected outcome and outputs of the projects.

Outcome 1: Regulatory and institutional frameworks reviewed and strengthened in line with national and international policies, to create inclusive and enabling environments in the selected provinces to move towards sustainable MSWM systems.

Output 1.1: Strategic provincial waste management frameworks/plans developed aligned with recently published national waste management policy, waste sector NDC and SDGs, and implemented in Northwestern, Central, Sabaragamuwa, and Southern provinces.

Activity 1.1.1 Review policy, regulation, data, information, and institutional aspects of waste management, including gender-targeted concerns in MSWM, to develop MSWM plans in the four (4) provinces.

The project will collect and review all relevant national policies and legislations such as national waste management policy, national environment act, national action plan on plastic waste management, and provincial development plans. Given the increased engagement of women in MSWM and related jobs as well as their potential role in improving MSWM, gender-targeted concerns and related recommendations will be studied and taken into consideration. The review will recommend ways to adapt policies to the provincial level with the support of the national steering committee on solid waste management chaired by the Ministry of Provincial Councils and Local Governments (MoPCLG).

Activity 1.1.2. Compile and adopt provincial waste management framework in the four provinces in close consultation with key stakeholders.

Develop provincial waste management strategies that are inclusive, holistic, and specific for each of the four provinces in close consultation with the provincial planning departments, commissioners of LAs, provincial and local level political authority, technical experts, NGOs, CBOs, women, and youth organisations. Advisory inputs from Western Province Waste Management Authority will be actively sought given their extensive experience in municipal waste management in Sri Lanka.

Output 1.2: Institutional coordination mechanism reviewed and strengthened.

Activity 1.2.1 Strengthen the capacity of provincial and local level institutions and relevant stakeholders.

The project will review institutional frameworks and systems for MSWM at the provincial and local levels, identify gaps and recommend revisions which will be supported by the relevant strategic provincial waste management frameworks. The activity will also build capacity including managerial and technical personnel and waste collectors to improve interactions, coordination, and cooperation on MSWM planning and implementation. Special attention will be given to the engagement of women and youth organizations at the community level for improving waste segregation, collection, and resource recovery. Targeted awareness programme will be designed and delivered to promote effective and gender-responsive waste collection and disposal practices within selected provincial and local authorities.

Outcome 2: Total solid waste management solutions developed in the selected Local Authorities based on/adapting local and international best practices.

Output 2.1: Best fit total MSWM solutions based on BAT/BEP for the two (2) selected LAs developed.

Activity 2.1.1 Conduct a detailed analysis to identify the locally suited combination of BAT/BEP for MSWM for each project location.

A technology compendium and guidelines to select technology and approaches (BAT/BEP) to meet local context, considering characteristics of MSW, gaps/capacities of LA infrastructure, and other considerations will be developed by the project to guide planners of the LAs. The analysis will strongly focus on gender, diversity, and inclusion requirements.

Activity 2.1.2 Conduct feasibility studies at each project location for MSWM demonstrations

Feasibility studies will be conducted for the two (02) planned demonstrations by the project: Gampola, and Balangoda Urban Councils. Most suitable technology combinations and practices (BAT/BEP) for total MSWM solutions for each of the 2 selected LAs will be identified based on feasibility assessments and inputs of technical experts including Korean experts and agencies.

Activity 2.1.3. Develop plans to set up comprehensive MSWM demonstration units at the two sites.

The project will design total MSWM plans specific for each of the 2 LAs based on the recommendation of the feasibility assessments (Activity 2.1.2.), technology compendium, and guidelines (Activity 2.1.3.). The plans will also include potential entry points to engage private sector/MSMEs where possible.

Design a suitable MRV system to capture GHG emission reductions in the transformation towards total and comprehensive MSWM using BAT/BEP approaches. A suitable MRV system will be designed to be implemented at the pilot locations to monitor GHG emissions in consultation with local and international technical experts, Climate Chang Secretariat GOSL, KEITI, and other relevant agencies of ROK, while also planning for capacity building to implement the MRV system at the local level.

Activity 2.1.4 Validation of Comprehensive MSWM plans at the two demonstration sites.

Local stakeholder consultations to validate MSWM and MRV plans will be carried out prior to finalising the plans. The project will proactively engage with local communities to address any public concerns and grievances. Systems for information provision including a grievance addressing mechanism will be established. During the establishment of MSWM facilities, extensive engagement with local stakeholders is required, especially the local community. Having an effective information management system will minimise/prevent delays in the establishment of the facilities due to civil complaints. Including women and youth in these consultations will be prioritised. Depending on the local context, inclusive or special consultations will be carried out.

Output 2.2. Key local stakeholders are capacitated and engaged in MSWM.

*Activity 2.2.*1 Public awareness, promotion, and education activities

The project will proactively facilitate local stakeholder engagement. Actions towards this will include awareness creation and capacity building of women and men, small/micro-entrepreneurs, youth, and other local stakeholders in resource recovery value chains to engage in sustainable MSWM. Specific tools that may need to be used to engage women and youth will be used.

Women and youth are groups who in general have challenges in engaging in open stakeholder engagement and voicing strong opinions and suggestions. This is generally due to prevailing cultural norms. It may also be that they are not interested in engaging as they think they have little or nothing to contribute or little or no exposure to topics of discussion or feel that issues that concern them even if voiced would not be prioritised at societal levels.

Meaningful consultation should aim to capture concerns and obtain suggestions and feedback from all stakeholder groups including women and youth. Some examples of strategies to increase the participation of women and youth may be:

- To have adequate flexibility and resources to meet women specific requirements; choose locations or venues where they feel most comfortable.
- Ensure that consultations and engagement processes are culturally appropriate; consider cultural norms, practices, and values that women themselves would want to adhere to.
- Finding ways to engage women in contexts where their participation may not be accepted. I.e., women-only gatherings in locations that are safe, convenient, and respectful of their work, and childcare, and other responsibilities.
- Make sure information shared with them responds directly to their expectations and interests (not just focus on overall development issues in this case MSWM but specific objectives and activities that would interest them (job opportunities, ease of their daily burden, etc.).
- Contextualize information targeting their interests, capacities and languages before seeking consultations.
- Ensure listening deeply and acknowledging their concerns.
- Summarise common ground and areas of disagreement, and be prepared to negotiate, change plans, and explore alternatives.
- Offer multiple opportunities for consultation and engagement; apart from the usual processes i.e., one-on-one meetings, surveys, workshops, focus groups, participatory events, etc., have special events especially for youth (i.e., sports, entertainment) which will increase their participation and inputs.
- Ensure consultation should be free from coercion, intimidation, or reprisals if contrary viewpoints are expressed. Disillusionment can occur fast if not, preventing any further engagement, especially in the case of youth.
- Synchronizing youth and adult agendas must be proactively and carefully planned and done (i.e., including youth-led community research, encouraging them participating in learning exchanges and sharing good ideas, youth networking and awards).
- Further, youth may be enticed through having opportunities to learn about related topics that interest them (what young people want to know), having targeted training of youth,
- By using youth popular culture as the hook i.e., sports, entertainment, etc.

Output 2.3: Total MSWM System solutions demonstrated in the two (2) selected LAs.

Activity 2.3.1 Obtain the required clearances to establish MSWM.

Before getting the necessary clearances to set up the demonstration units at the selected locations, the project will conduct compliance requirements and related assessments such as EIAs/ESIAs and review plans based on recommendations of the assessments.

Although the LAs are the key partners of the project and the key owners of the local MSWM facilities, the MSWM establishment plan should include the process of getting necessary clearances for transforming existing sites (mostly dump sites) and infrastructure, and constructing new infrastructure as required, as well as acquiring proper access to project sites (i.e., road) and to other facilities (i.e., water, power and sewage)

Activity 2.3.2 Carry out procurement necessary for establishing comprehensive MSWM including a MRV system in the two locations.

The project will procure technologies and assets including ICT based tools for enhancing communication management and improving existing and/or constructing required infrastructure. Assets will ensure having adequate equipment and facilities such as vehicles, collection points, waste sorting facilities (efficient utilisation of hand sorting and machine sorting depending on the local context), and recycling centres, within the local MSWM systems. In addition, based on local requirements, the existing local composting operations and waste-to-resource facilities will be renovated and capacity upgraded or established (where serious gaps exist).

Activity 2.3.3. Establish comprehensive MSWM together with an MRV system in the two locations.

Set up MSWM demonstration units in the two locations and train management personnel, technical staff, and workers.

Activity 2.3.4 Conduct demonstrations of comprehensive MSWM in the two locations.

The MSWM units in established at the two (2) LAs are operationalised by the project in an efficient and cost-effective manner. Set up an effective data and statistics management system in each location.

Outcome 3: Viable financial models for potential partnerships promoted among the LAs and private sectors for collaborative MSWM investments and operations.

Output 3.1: Green investment framework and guidelines for fostering potential partnerships and collaborative investments for MSWM between the LAs and the private sector (PPP) including potential and relevant Korean agencies developed for future up scaling and sustainability.

Activity 3.1.1. Review best practices on MSWM and PPPs

Hold consultations with the banking sector, private sector, LAs as well as national and provincial level stakeholders to learn about past experience on sustainable banking across sectors including waste management. Make recommendations to develop sustainable/green financing for MSWM.

Activity 3.1.2 Formulate investment framework and PPP partnership strategies suitable for MSWM at LA levels.

Identify strategies that effectively promote business models and partnerships with clear contributions to reducing carbon emission from MSWM and inclusive green job creation.

Activity 3.1.3. Capacity building on green financing.

Knowledge and skills development of government, LA, and private sector to engage in partnerships for sustainable and comprehensive MSWM in the selected provinces and Las will be carried out by the project. Developing skills required to adapt green financing to suit local requirements and inclusive local development will be an important aspect of capacity building (i.e., to ensure opportunities are made available for women and youth at the local level).

Output 3.2: Potential for partnerships between private investors and LAs for MSWM investigated and promoted for scaling up.

Activity 3.2.1 Awareness-raising and engagement among private sectors.

Engage the private sector that is already, directly, and indirectly, involved and invite interested private parties in MSWM in project to periodical discussions related to the project including being part of advisory committees. Specific awareness creation and capacity building will be carried out to encourage private sector investment and the potential benefits of ITMOs. Engaging women entrepreneurs and women and youth better in resource recovery options will be a key focus of the awareness programmes.

Activity 3.2.2 Conduct capacity building programs for selected LAs to engage in PPP for MSWM.

Training and capacity-building programmes are key thrust areas of the project. Planners of the two selected LAs as well as others in the four provinces will get a comprehensive exposure to PPP through

the specific training programmes. Training will be inclusive encouraging participation of women working in LAs and special programmes targeting women will be designed and held as required.

Activity 3.2.3 Facilitate linkages for viable and sustainable MSWM.

The project will carry out matchmaking between Local Authorities, the private sector and MSMEs. These links are expected to strengthen MSWM operations and contribute to the sustainability of local comprehensive MSWM operations. Special attention will be paid to women/youth entrepreneurs, and groups engaged in waste management. Further, it is also aimed at facilitating scaling up comprehensive MSWM at more LA areas in Sri Lanka.

Outcome 4: Knowledge, experience, and evidence of operational sustainable total MSWM solutions and framework at LA level made available for inclusive stakeholder adaptation.

Output 4.1: Knowledge, experience, and evidence generated through total MSWM solution frameworks demonstrated at the 02 LAs documented and shared for wider adoption.

Knowledge and experience gained through the demonstration units on total MSWM solutions will be documented and shared with other LAs and relevant stakeholders for replication and scale up, to promote wider adaptation.

Activity 4.1.1 Introduce and operationalise data management systems (including MRV for capturing GHG emissions) at the MSWM demonstration units.

Data management system set up at the 02 demonstration units to facilitate effective management of system operation. Systems will be designed to function in an inclusive manner reflecting requirements and providing opportunities for women workers and staff to actively engage.

Activity 4.1.2 Collect technical, financial, and other relevant data and information arising from the demonstrations.

Gather data for analysis to improve on MSWM and for knowledge sharing to promote wider adaptation of total MSWM solutions.

Activity 4.1.3. Capture best practices and shared information with LAs across the country.

BAT/BEP knowledge and experience gained will be compiled, documented as a study, and shared to assist LAs in achieving efficiency and effectiveness MSWM operation. The study can be used to further scale up interventions at other LAs. Knowledge sharing options will be planned and implemented in an inclusive manner to reach diverse stakeholders such and women and youth.

Output 4.2: Monitoring, evaluation, and adaptive management undertaken to ensure project performance aligns with objectives and global environmental benefits generated.

Activity 4.2.1 Introduce M&E tools to evaluate project progress, risk management, lessons learned and ensure sustainability of project outcomes.

Use of M&E tools to monitor the progress of project activities, results, relevant data, and indicators to facilitate lessons-learnt, knowledge sharing and promote public awareness. In addition, a midterm and terminal evaluation will be conducted to assess the effectiveness of project progress, performance, and results.

Activity 4.2.2. Monitor and record global environmental benefits generated from the project against the baseline and share with neighbouring countries in the region.

Note: Refer **Annex 4** for project's Theory of Change, outlining how identified barriers will be addressed through targeted interventions, leading to outputs and outcomes that contribute to sustainable, low-carbon municipal solid waste management in Sri Lanka.

The project will document evidence of project progress and achievements. The project will also monitor project results that contribute to GEBs and share with neighbouring countries to foster South-South Cooperation as well as North- South Cooperation with South Korea.

Resources Required to Achieve the Expected Results

Project Budget

The total project budget for this three-year project is USD 4,726,516.48, a contribution from the Government of the Republic of Korea. Comprehensive MSWM solutions, including expertise, technology and experience of the Korean industries, institutions, and experts, will be introduced, and demonstrated. The contribution from the Korean Government will support activities to strengthen policy, regulatory and institutional frameworks, build capacities, demonstration total MSWM solutions, share knowledge, raise public awareness for scaling up to ensure institutional, financial and technology sustainability after project completion.

Resource mobilization – Public Private Partnership (PPP)

Through engagement with key stakeholders, in particular LAs, private sector and sustainable banking initiatives, the project will seek potential partners for green financing, resources, and other related support through their respective networks of the key partnerships to actively encourage building PPP for replication of comprehensive MSWM solutions in more local authority areas.

Partnerships

The Project will collaborate with different partners from both the public and private sectors to achieve the above-mentioned results. During the project's preparation, a series of consultations, interviews, telephone review and on-site visits were undertaken with all types of different stakeholders, and they will continue being engaged during project implementation.

A strategy to engage and partner with relevant Korean agencies, particularly on technology inputs and supply will be developed in consultation with experts, KEITI and other relevant agencies and will be implemented. Private sector will be strongly encouraged to participate in project activities through exploring opportunities for PPP mechanism for future scaling up. It will leverage additional resources for MSWM and long term and contribute sustainability of the project outcomes. Private sector participation can also provide inputs to facilitate strengthening policy, regulatory and institutional processes, development of technical guidance and training materials and even take active part to achieve effective MSWM for their respective locations and communities. In addition, internal complementarities and resource optimization will be pursued through close collaboration with the Climate and Environment Team's ongoing initiatives, such as the Coca-Cola Foundation's Plastic Waste Management project and the GEF VII Chemical Waste Management project. The Project will also explore synergies with other donors and key actors' ongoing and planned initiatives for similar objectives.

The roles and responsibilities of various stakeholders directly involved in project implementation are described in the Stakeholder Engagement section below. They include:

- Government of Sri Lanka (GOSL)
- Ministry of Public Administration, Home Affairs, and Provincial Council and Local Government (MoPA)
- Ministry of Environment (MoE)
- Central Environmental Agency (CEA) under the MoE
- National Waste Management Support Centre (NWMSC) under the MoPC&LG
- Federation of Sri Lanka Local Government Authorities (FSLGA)
- Ceylon Chambers of Commerce (CCC), Women Chambers of Commerce (WCC), and Federation of Chambers of Commerce and Industry of Sri Lanka (FCCISL)
- Banks, Sustainable Banking Initiatives (SBI)
- Republic of Korea (ROK)
- The International UN Youth Volunteer based at UNDP Sri Lanka
- Private Sector
- NGOs/CSOs

Risks and Assumptions

The project involves a wide range of stakeholders, and its coordination effectiveness is an important factor for the project to achieve its objectives and expected outcomes and outputs. It is therefore necessary to fully anticipate the potential risks in the implementation of the project. The main potential risks in the project and the subsequent unfavourable impacts that may cause the stakeholders. The following are the major potential risks in the project and the corresponding mitigation measures:

Potential Risks	Mitigation Measures
Insufficient interest and commitments from the selected LAs and community concerns and possible protest on selected locations	Close liaison and consultation with concerned parties of LAs and community to secure interest and commitment
Inappropriate technology or solutions not catering current situations and requirements of selected LAs	Source BAT/BEP technologies appropriate for local situations. Carefully review and evaluate past application experience for best fit
Possible risk of financing from LAs such as inability to meet their own budget targets, resulting in unstable and delayed project implementation	Close consultation with concerned authorities and financial institutions to explore and secure stable financial commitments
With regard to the country's current economic situation, financial and management viability of the LAs and Government counterparts may impact on progress of project implementation	Close consultation and monitoring of financial situation and explore opportunities for secure financial commitments
Change in personnel and institutional structure of core stakeholders may result in unstable working relationships	Close monitoring of situation and frequent contact to understand prevailing situation
Risk of social stigma and retaliation against the gender-responsive approach to effective waste management.	Capacity building, awareness, and advocacy with all relevant stakeholders.

Stakeholder Engagement

Key stakeholders and their roles and responsibilities are:

Government of Sri Lanka (GOSL) will be responsible for policy and regulatory support. Mismanagement of MSW is a socio-political issue faced by the government. Providing sustainable and satisfactory solutions by this project will interest GoSL as it will create public goodwill towards the government. The Departments of National Planning and the External Resources were informed during inception and validations discussions and will be members of project advisory committee during project implementation.

Ministry of Public Administration, Provincial Councils and Local Government is the executing agency of the project and provides policy guidance. The project formulation was carried out under the guidance of the ministry through number of rounds of discussions. As the responsible ministry for provincial and local administration it supports LAs especially including budgetary allocation to LA to carry out its core functions. MSWM is the highest budget allocation in almost all LAs. Reducing MSWM burden of LA will in turn will help manage public funding more effectively, increasing reputation and reducing budget allocation stresses of the ministry.

The main objective of the Ministry is to empower the LAs, targeting a balanced and sustainable development in the Island. The Ministry provides assistance including funds to strengthen many functions assigned to the LAs in their respective local areas. Identifying MSWM as a priority in the LA areas the ministry has been providing resources provided to implement projects designed according to the needs of these LAs aiming to

create a healthier environment at local level. An Additional Secretary of the ministry is assigned the subject of waste management is the focal point for the project. The ministry has 10 divisions including Local Government, admin and training, planning, development, finance and legal which will assist in project implementation.

National Waste Management Coordination & Support Centre (NWMCSC). In addition to above divisions the National Solid Waste Management Coordination Centre (NSWMCC) was established with the objective of management of solid waste administrative areas of LAs, under the ministry is focused on assisting LAs in the 8 provinces other than the western on MSWM. It is tasked with providing LAs with technical advice to select and implement viable MSWM solutions. The NSWMCC is involved in policy and legislation aspects, technical support and knowledge management, coordination with donors and CSOs, awareness, communication, and promotion of environmental considerations in relation to MSWM.

The NWMCSC facilitated engagement of relevant stakeholders at Provincial and LAs level during the project formulation and the project is fully aligned with their functions help them to discharge their responsibilities better. They will play a major role in developing guidelines for partnerships and scaling up project impacts beyond the 2 participating LAs.

Western Province Waste Management Authority

Given that over 50% the waste in SL is generated in WP, a dedicated waste management authority is set up for the province. The WMA-WP was established in 2005, with 25 cadre positions by the Management Service Department. Subsequently, based on the service requirements cadre was increased up to 40. The key responsibility of the WMA-WP is providing technical guidance on waste management to LAs of the Western Province. This is mainly carried out by the technical division consisting of 18 persons most who are based in field.

The WMA-WP assisted project formulation by sharing data and lessons from past experience. The project will work with both these entities (NWMCSC and WMA-WP). While NSWMCC will coordinate with the respective LAs that project will work with the Waste Management Authority Western Province (WMA-WP) has agreed to extend their extensive experience in MSWM in the country and other institutional resources available including use of facilities for training and communication. Both these entities are members of National Waste Management Coordination Committee Convened under the Ministry. This will also be the technical advisory committee of the project.

The Sri Lanka Institute of Local Governance functioning under this Ministry is another resource that the project will tap into. The prime objective of this institute is to improve their organisational systems and management excellence of the provincial councils and local authorities in order to enable them to provide people with an efficient and satisfactory service. They conduct training programmes, seminars, and practical sessions to strengthen management including financial management and technical skills of Local Government and Provincial Council institutions through management, consultancy, research, and training. The project will use this facility to scale up knowledge sharing activities and capacity building programmes to reach all 341 LAs across the country.

Ministry of Environment (MoE) will play a central role in the project as a key stakeholder and a member of the Project Board. It is the line ministry of CEA who is the MSWM regulator and will provide a coordination role required for implementing this project. The project concept was formulated in discussion with the MoE too given its significance to contribution to NDCs and other relevant international environment related commitments.

Central Environmental Authority (CEA) under the MoE: CEA as the regulator and will provide policy and regulatory advice to the project to ensure exemplary level of compliance with the outset. As a regulator CEA has to attend to complaints raised by public and NGOs about social and environmental issues including those related to MSWM. Reduction of social and environmental challenges due to project actions in the two (2) selected locations and potential impacts of scale up will ease CEA's burden. The CEA was extensively consulted during the project formulation to capture lessons from past project such as Pilisaru and landfill initiatives in Sri Lanka as well as understanding overall issues of MSWM.

Federation of Sri Lanka Local Government Authorities (FSLGA) is an important partner and a beneficiary of the project who worked during project formulation and will work closely with UNDP, the MoPA and MoE. The FSLGA helped to select LAs which have potential to engage in the project as partners and play a direct role in capacity building aligning with their routine training. The FSLGA will benefit as they will also be able to learn and include lessons from the project to improve quality of their services provided to LAs including their training programmes.

Sri Lanka Sustainable Energy Authority (SLSEA) is the regulator for energy efficiency (EE) improvement programmes and renewable energy (RE) development projects in Sri Lanka. Waste to energy from MSW is considered as RE system and most of the operations is governed by Sri Lanka Sustainable Energy Authority (SLSEA) Act No.35 of 2007. Th project is aiming to introduce waste to energy projects in two selected demonstration sites and SLSEA will play a key role in this endeavour. The SLSEA was consulted during the project formulation to better understand experience of waste to energy and the future scope and will be consulted during the project implementation depending on the requirements.

Ceylon Chambers of Commerce (CCC), Women Chambers of Commerce (WCC), and Federation of Chambers of Commerce and Industry of Sri Lanka (FCCISL): All these institutions will play an important role in selection of private sector partners and investor who are crucial for project success. Some of their members, private sector, during the project formulation already indicated their interest in engaging MSWM work. Participation in the project will increase their credibility amongst members as they will have a reputation of having linked their members to sound investment opportunities in MSWM.

Banks, Sustainable Banking Initiatives (SBI): Banking and financing sector partners will also be crucial as they need to support channelling financial investment towards MSWM at LA levels. They too indicated keenness to participate in the project and will benefit from the experience to develop new credit/financing products and strengthen existing banking services.

Republic of Korea (ROK): The project will seek collaboration with Sudokwon Landfill Site Management Corporation, Korea Environment Corporation, and potential Korean Private Sector companies through the KEITI guidance with the aim of learning from technology options for MSWM applicable to Sri Lanka and seeking the possibility to link with green investment services.

The International UN Volunteer from the Republic of Korea, based at UNDP Sri Lanka as a Coordination Assistant for Green Development to the Climate and Environment Team will assist the Project Team with necessary communications and networking among the Korean partners.

All key stakeholders have been extensively consulted during project preparation, and they will continue to be actively involved during project implementation, providing valuable guidance and input.

During project implementation, in addition to building sustainable partnerships on green financing with the banking sector, private sector and interested stakeholders interested in PPP for comprehensive MSWM in the selected provinces and LAs as planned under Activity 1.3.3. Under activities of Outcome 3, the project will also foster partnerships with other LAs to scale up the positive results and achievements of the comprehensive MSWM solutions through partnerships for green financing.

During project preparation, a Korean technology and partnership development expert was engaged, and this engagement has provided valuable information and data on the technical options and systems for the Integrated MSWM. The technology options proposed for the two demonstration sites were built in discussions with the Korean experts. Bilateral exchange with the Korean technology experts and experience will continue during the project implementation phase to further gain knowledge.

South-South and Triangular Cooperation (SSC/TrC)

The project seeks to create a working platform for adoption of global BAT/BEP on municipal solid waste management, including the expertise and experience of Korean technology, and will seek services of the international communities, e.g., Korea, under the framework of South-South Cooperation.

Digital Solutions[3]

The project will introduce a digital solution for waste collection, i.e., GPS-based-tracking solutions so that the general public, waste workers and management in the LA will be able to improve efficiency of MSWM operation. Further, digital data management solutions, i.e., Interoperable, and cross-accessible data bases, will be introduced to improve data availability within the provinces selected by the project. In addition, digital data management systems will be extensively used by the project to manage and monitor progress and to monitor and improve performance of demonstrations.

Knowledge

The project aims to adopt global BAT/BEP comprehensive MSWM solutions, including Korean expertise, knowledge, and technology, to be demonstrated in 2 selected LAs to address barriers existed in MSWM. Through Outcome 3 of the project, a systematic and modular approach for its knowledge, production and sharing will be established. Throughout the project, starting from project initiation, the project will actively collect, record and feed knowledge materials to the knowledge database. Main knowledge outputs will include, but not limited to:

- Knowledge database. The project will build a database that will include printed and multimedia materials on project structure, interventions, financial, technology transfer and performance information.
- Periodic and annual progress reports, meeting reports, training workshop reports, technical workshop reports, monitoring, and evaluation reports.
- Comprehensive MSWM solutions implementation: All technical, managerial, financial, and monitoring reports relating to the demonstrations, including activities of the data management system.
- Communications and Visibility: The project will develop a comprehensive project communications and visibility plan, in alignment with donor and implementing partner visibility requirements. The project communications and visibility plan will be in alignment to project outputs and milestones and will consist of public awareness activities and campaigns, printed or online publications and websites, video and knowledge products that will be disseminated across identified channels and media. A project logo guideline will also be developed for consistent usage of branding across the project cycle.

Sustainability and Scaling Up

The project will use partnerships forged with the private sector, banking sector and small and microscale enterprises to strengthen long-term viability and sustainability outcomes of the demonstration sites. The Project will also actively encourage building PPP for replication of comprehensive MSWM in more Local Authority areas primarily within the selected provinces and in other provinces in Sri Lanka through sharing of knowledge and experience gained.

Capacity building will have a wider scope to include all LAs in the four provinces. As such some of the training activities will target wider LAs and stakeholders. Similarly, awareness creation and communication activities conducted by the project will also be done keeping replication and scaling up in mind.

[3] *Please see the Guideline "Embedding Digital in Project Design".*

III. PROJECT MANAGEMENT

Cost Efficiency and Effectiveness

The project is designed to maximise the adoption of comprehensive NSWM solutions, taking into account of, but being complementary and comprehensive to the existing national provincial plans and activities that are currently carried out at the LA level. It has therefore made use of the combined resources, both in terms of human resources and financial inputs, for an efficient and effective implementation. The comprehensive MSWM solutions designed and that will be demonstrated to present an optimal solution, starting from the aspects of waste minimisation, segregation, collection, transport, and disposal. Thus, cost-efficient, and cost-effective options are being proposed.

Project Management

The project will be implemented by UNDP Sri Lanka Country Office ("Implementing Partner") under the Direct Implementation Modality (DIM), with technical assistance from the UNDP Nature, Climate and Energy (NCE) hub at the UNDP Regional Bureau, and in collaboration with the Ministry of Public Administration, Provincial Councils and Local Government.

The following government entities may be engaged in project implementation, as required:

- Ministry of Environment/CEA will coordinate amongst government responsible parties and support compliance with environmental regulations at LA level.
- Ministry of Provincial Councils and Local Government (MOPC&LG) and NWMSC/WPWMC will help to iron out policy regulatory challenges faced by LAs in setting up MSWM units.
- Federation of Sri Lanka Government Authorities (FSLGA) will facilitate partnerships and capacity building of LAs.
- Sri Lanka Sustainable Energy Authority (SLSEA) will work on policy and regulatory concerns related to the utilization of the energy generated by waste processing.
- Agriculture Department – will work on bio-fertiliser development to suit the demands of the market.
- Ceylon Chambers of Commerce (CCC), Women Chambers of Commerce (WCC) and Federation of Chambers of Commerce and Industry of Sri Lanka (FCCISL) will facilitate private sector participation by mobilising their membership.
- Central Environmental Authority (CEA) registered network will represent and mobilise small entrepreneurs and women in their network.

UNDP Sri Lanka CO will house the Project Management Unit (PMU). A Project Manager will head the PMU and be delegated the authority to carry out the project activities on a day-to-day basis on behalf of the Implementing Partner and the Project Board, within the constraints laid down by the thy IP and the Board. A Project Associate will support the Project Manager in technical coordination, research inputs, and preparation of analytical and progress reports. A Project Assistant will provide operational and administrative support to ensure smooth implementation and documentation of project activities. A Field Coordinator will facilitate coordination with local authorities and oversee field-level implementation, particularly pilot project applications. All these positions will be established on a cost-sharing basis with other relevant projects to ensure efficiency and resource optimization.

UNDP Sri Lanka CO will provide the essential services required for the effective implementation of the project. These services include procurement and contract management, finance and budgeting, Human Resource (HR) services, M&E and results management, communications, IT, internal financial audits/ HACT requirements, and administrative support; the costs of which will be recovered from the project, based on the staff time directly attributable to the project (in line with UNDP's policy on Delivery Enabling Services/ Direct Project Costs). Additionally, the PMU will have access to extended support from the Climate and Environment Team in areas such as, programme-level budget, finance and procurement actions, project quality assurance functions, policy advisory, and technical expertise, as needed.

The costs of project personnel will be shared with other projects, creating economies of scale through cost-sharing with other initiatives. The project will be implemented as part of CET's broader waste management portfolio, including the Coca-Cola Foundation (TCCF)-funded plastic waste circularity project, which is also under the Ministry of Public Affairs. This will enable UNDP to take advantage of cost efficiencies between projects, enhancing cross-learning opportunities and resource sharing, while further synergies with projects such as the GEF VII Chemical Waste Management initiative.

IV. RESULTS FRAMEWORK

Intended Outcome as stated in the UNSDCF/Country Programme Results and Resource Framework: UNSDCF OUTCOME 3/UNDP OUTCOME 2: By 2027, more people and communities in Sri Lanka, especially the vulnerable and marginalised, are more resilient to climate change and disaster risks, have enhanced water and food security, and equitably benefit from ambitious climate action and increasingly sustainable management and protection of the environment and natural resources.

Outcome indicators as stated in the Country Programme Results and Resources Framework, including baseline and targets:

Indicator: 2.5 Total GHG emission reduction per year

Baseline: 1.02 tonnes per year per person (2010)

Target: At least % reduction relative to business-as-usual scenario.

Applicable Output(s) from the UNDP Strategic Plan:

1.1 The 2030 Agenda, Paris Agreement and other intergovernmentally-agreed frameworks integrated in national and local development plans, measures to accelerate progress put in place, and budgets and progress assessed using data-driven solutions.
2.3 Responsive governance systems and local governance strengthened for socio economic opportunity, inclusive basic service delivery, community security, and peacebuilding.
4.2 Public and private investment mechanisms mobilized for biodiversity, water, oceans, and climate solutions.

Project title and Project Number: Scale-up and Sustain the Low-carbon Municipal Soil Waste Management and Resource Recovery in Sri Lanka

EXPECTED OUTPUTS	OUTPUT INDICATORS[2]	DATA SOURCE	BASELINE					DATA COLLECTION METHOD & RISKS
			Value	Year	Year 1	Year 2	Year 3	
Output 1.1: Strategic provincial waste management frameworks/plans developed aligned with recently published national waste management policy, waste sector NDC and SDGs, and implemented in selected provinces.	**1.1:** Number of strategic provincial waste management plans developed that align with the national waste management policy, waste sector NDCs, SDGs, gender equality, diversity and socially inclusive initiatives.	Completed strategic provincial plans (Northwestern, Central, Sabaragamuwa, and Southern provinces) & Gender equality. diversity and social inclusivity	0	2022	4			Data for verification to be collected from published approved plan, consultants' report or public announcement, project progress and annual reports. Risks: appropriateness of plans may need to adopt to unforeseen changes, and subject to, for example, changes in political context.

		assessment chapter in provincial plans						
Output 1.2: Institutional coordination mechanism reviewed and strengthened.	**1.2:** Number of provincial institutional coordination mechanisms that are reviewed and strengthened/ operationalized to support integrated waste management.	Project Board/Progress Meeting minutes documenting the key summary of Analysis Reports / Recommendations.	0	2022		4		Data for verification to be collected from consultants' reports; meeting and workshop minutes, project progress and annual project reports. Risks: data insufficient to generate appropriate recommendation; stakeholders may not accept recommendations or put into implementation.
Output 2.1: Best fit total MSWM solutions based on BAT/BEP for the two (2) selected LAs developed.	**2.1:** Number of best-fit gender sensitive and socially inclusive municipal solid waste management (MSWM) solution packages developed for selected Local Authorities	Finalized, and validated BAT/BEP-based solutions through feasibility and other supportive analysis	0	2022	2			Data for verification to be collected from consultants' reports, completed, and validated plans. Project progress and annual reports Risks: Plans not fully address local characteristics; plans require high investment
Output 2.2. Key local stakeholders are capacitated and engaged in MSWM.	**2.2**: Number of key local stakeholder groups (including women-led, disability inclusive and youth-led organizations, small/micro-entrepreneurs, etc), participated in targeted cap. development programmes in waste management planning process.	Capacity development programme and workshop/consultation reports and attendance sheets	0	2022			2	Data for verification to be collected from meeting, workshop, or training reports. Potential partnerships to be verified with draft or signed green investment plans. Risks: Unfavourable socio-economic situation may limit options and opportunities to foster engagement.

Output 2.3: MSWM System solutions demonstrated in the two (2) selected LAs.	**2.3:** Number of gender sensitive and socially inclusive MSWM system solutions developed, demonstrated, and operationalized in the selected Local Authorities, including integrated waste collection, sorting, recycling, and resource recovery components.	Project implementation, project monitoring reports summarizing BAT/BEP-based solutions & equipment handover documents	0	2022			2	Data for verification to be collected from progress reports of the 2 LAs, consultants reports, project monitoring reports, project progress and annual reports. Risks: Capacity gaps of LAs (financial and managerial) and/or unforeseen situations (political or economy) may hinder progress of demonstration.
Output 3.1: Green investment framework and guidelines for fostering potential partnerships and collaborative investments for MSWM between the LAs and the private sector (PPP for future up scaling and sustainability.	**3.1:** Green investment and private sector engagement plans developed for the MSWM demonstration solutions in the two selected Local Authorities, including identification of potential PPPs, financing mechanisms, and partner companies/banks.	Completed green investment plans, and project implementation, & monitoring reports outlining the progress of the activity	0	2022		2		Data for verification to be collected from published reports; consultants reports; signed green investment plans, project progress and annual reports. Risks: Economic condition not conductive for investment; Unable to attractive PPP partnerships.
Output 3.2: Potential for partnerships between private investors and LAs for MSWM investigated and promoted for scaling up.	**3.2:** Number of potential public-private sector partnerships facilitated by the project.	Investment proposal, MoU or communication between private sector and LAs	0	2022		2		Data for verification to be collected from consultants' reports; Investment plans /proposal or MOUs, project progress and annual reports. Risks: Economic condition not conductive for investment; Unable to attractive PPP partnerships.
Output 4.1: Knowledge, experience and evidence generated through total MSWM solution frameworks demonstrated at the 02 LAs documented and shared for wider adoption.	**4.1.1:** Number of knowledge products (case studies, technical briefs, training materials, or reports) on MSWM solutions documented and disseminated to other Local Authorities and stakeholder groups, including	Project Implementation, project monitoring Reports	0	2022	0	2	5	Data for verification to be collected from meeting, training, awareness, workshop reports. Project progress and annual reports. Risks: Low participation in training, public awareness,

	women, persons with disabilities and youth for their use.							and advocacy activities; Capacity gap (financial, managerial, and technical) of other LAs; low interest of other LAs.
Output 4.2: Monitoring, evaluation and adaptive management undertaken to ensure project performance aligns with objectives and global environmental benefits generated.	**4.1.2:** Number of data management systems established/ improved and operationalised.	Project Implementation, project monitoring Reports	0	2022			2	Data for verification to be collected from meeting, training, awareness, workshop reports. Project progress and annual reports. Risks: Low participation in training, public awareness, and advocacy activities; Capacity gap (financial, managerial, and technical) of other LAs; low interest of other LAs.

V. MONITORING AND EVALUATION

In accordance with UNDP's programming policies and procedures, the project will be monitored through the following monitoring and evaluation plans: *[Note: monitoring and evaluation plans should be adapted to project context, as needed]*

Monitoring Plan

Monitoring Activity	Purpose	Frequency	Expected Action	Partners (if joint)	Cost (if any)
Track results progress	Progress data against the results indicators in the RRF will be collected and analysed to assess the progress of the project in achieving the agreed outputs.	Quarterly, or in the frequency required for each indicator.	Slower than expected progress will be addressed by project management.	PMU, UNDP	No additional budget required
Monitor and Manage Risk	Identify specific risks that may threaten achievement of intended results. Identify and monitor risk management actions using a risk log. This includes monitoring measures and plans that may have been required as per UNDP's Social and Environmental Standards. Audits will be conducted in accordance with UNDP's audit/ HACT policy to manage financial risk.	Quarterly	Risks are identified by project management and actions are taken to manage risk. The risk log is actively maintained to keep track of identified risks and actions taken.	Project Monitoring and Evaluation Officer and Safeguards Expert	Costs of developing a comprehensive SES, and implementation of SES management actions including monitoring visits and travels
Learn	Knowledge, good practices, and lessons will be captured regularly, as well as actively sourced from other projects and partners and integrated back into the project.	According to requirements of each Project Indicator, but at least annually	Relevant lessons are captured by the project team and used to inform management decisions.	PMU, UNDP	Included in Outcome 3
Annual Project Quality Assurance	The quality of the project will be assessed against UNDP's quality standards to identify project strengths and weaknesses and to inform management decision making to improve the project.	Annually	Areas of strength and weakness will be reviewed by project management and used to inform decisions to improve project performance.	Programme Analyst	No additional costs

Monitoring Activity	Purpose	Frequency	Expected Action	Partners (if joint)	Cost (if any)
Review and Make Course Corrections	Internal review of data and evidence from all monitoring actions to inform decision making.	According to requirements of each Project Indicator, but at least annually	Performance data, risks, lessons, and quality will be discussed by the project board and used to make course corrections.	PMU, UNDP, Project Board	No additional costs
Project Report	A progress report will be presented to the Project Board and key stakeholders, consisting of progress data showing the results achieved against pre-defined annual targets at the output level, the annual project quality rating summary, an updated risk long with mitigation measures, and any evaluation or review reports prepared over the period.	According to the requirements of partners and final report on project completion		PMU, UNDP	No additional costs
Project Review (Project Board)	The project's governance mechanism (i.e., project board) will hold regular project reviews to assess the performance of the project and review the Multi-Year Work Plan to ensure realistic budgeting over the life of the project. In the project's final year, the Project Board shall hold an end-of project review to capture lessons learned and discuss opportunities for scaling up and to socialize project results and lessons learned with relevant audiences.	At least annually)	Any quality concerns or slower than expected progress should be discussed by the project board and management actions agreed to address the issues identified.	PMU, UNDP	No additional costs

Evaluation Plan[4]

Evaluation Title	Partners (if joint)	Related Strategic Plan Output	UNSDCF/CPD Outcome	Planned Completion Date	Key Evaluation Stakeholders	Cost and Source of Funding
Terminal Evaluation	UNDP, KEITI		UNSDCF Outcome 3/UNDP CPD Outputs 2.1 and 2.3	October 2027	Two (2) demonstration LAs and other related beneficiary LAs	$40,000 for Independent International consultant and $20,000 for Independent national consultant

[4] Optional, if needed

VI. MULTI-YEAR WORK PLAN

All anticipated programmatic and operational costs to support the project, including development effectiveness and implementation support arrangements, have been identified, estimated, and fully costed in the project budget below under the relevant Project Outcomes. This includes activities that directly support the project, such as communication, human resources, procurement, finance, audit, policy advisory, quality assurance, reporting, and management.

EXPECTED OUTPUTS	PLANNED ACTIVITIES	Planned Budget by Year			RESPO. NSIBLE PARTY	PLANNED BUDGET			
		Year 1 (2026)	Year 2 (2027)	Year 3 (2028)		Funding Source	Budget Description	Budgetary Account Code	Amount
Output 1.1: Strategic provincial waste management frameworks/plans developed aligned with recently published national waste management policy, waste sector NDC and SDGs, and implemented in selected provinces.	Activity 1.1.1 Review policy, regulation, data, information, and institutional aspects on waste management, including gender-targeted concerns in MSWM with intention of developing MSWM plans at the four (4) provinces	35,000	55,000		UNDP	ROK	International Consultants	71200	90,000
	Activity 1.1.2 Compile and adopt provincial waste management framework in the four provinces in close consultation with key stakeholders	60,000	25,000				Contractual Services - Companies	72100	85,000
		10,000	20,000				Travel	71600	30,000
Output 1.2: Institutional coordination mechanism reviewed and strengthened.	Activity 1.2.1 Strengthen capacity across provincial and local level stakeholders	20,000	35,000				Contractual Services - Companies	72100	55,000
		15,000	20,000				Contractual Services - Individual	71400	35,000
		10,000	12,000				Training Workshops	75700	22,000
	Total Outcome 1	150,00	167,000						317,000
Output 2.1: Best fit total MSWM solutions based on BAT/BEP for the two (2) selected LAs developed.	Activity 2.1.1 Conduct a detailed analysis to identify the locally suited combination of BAT/BEP for MSWM for each project location.	25,000	20,000		UNDP	ROK	International Consultants	71200	45,000
	Activity 2.1.2 Conduct feasibility studies at each project location for MSWM demonstrations	250,000	100,000				Contractual Services – Companies	72100	350,000
		25,000	10,000				Training Workshops	75700	37,500

	Activity 2.1.3 Develop plans to set up comprehensive MSWM demonstration units at the two sites.	40,000	65,000				Local Consultants	71300	105,000
	Activity 2.1.4 Validation of Comprehensive MSWM plans at the two demonstration sites	0	40,000				Supplies	72500	40,000
		25,000	10,000				Travel	71600	35,000
Output 2.2. Key local stakeholders are capacitated and engaged in MSWM.	Activity 2.2.1 Public awareness, promotion, and education activities	40,000	70,000				Contractual Services – Companies	72100	110,000
		5,000	17,500				Travel	71600	22,500
		20,000	65,000				Local Consultants	71300	85,000
		10,000	2,500				Supplies	72500	12,500
Output 2.3: Total MSWM System solutions demonstrated in the two (2) selected LAs.	Activity 2.3.1 Obtain the required clearances to establish MSWM.	0	25,000				International Consultants	71200	25,000
	Activity 2.3.2 Carry out procurement necessary for establishing comprehensive MSWM in the two locations	41,325	20,000				Travel	71600	61,325.00
	Activity 2.3.3 Establish comprehensive MSWM in the two locations	0	5,000				Supplies	72500	5,000
	Activity 2.3.4 Conduct demonstration of comprehensive MSWM in the two locations.	0	1,929,660.49				Contractual Services – Companies	72100	1,929,660.49
		24,000	34,000				Contractual Services - Individual	71400	58,000
	Total Outcome 2	490,325	2,431,160.49						2,921,485.49
Output 3.1: Green investment framework and guidelines for fostering potential partnerships and collaborative investments for MSWM between the LAs and the private sector (PPP) for future up scaling and sustainability.	Activity 3.1.1 Review best practices on MSWM and PPPs	15,000	20,000		UNDP	ROK	International Consultants	71200	35,000
	Activity 3.1.2 Formulate investment framework and PPP partnership strategies suitable for MSWM at LA levels.	25,000	45,000				Local Consultants	71300	70,000
		0	5,000				Travel	71600	5,000
	Activity 3.1.3. Capacity building on green financing.	12,000	33,500				Training Workshops and Confer	75700	45,500
		6,000	52,500				Travel	71600	58,500

Output 3.2: Potential for partnerships between private investors and LAs for MSWM investigated and promoted for scaling up.	Activity 3.2.1 Awareness-raising and engagement among private sectors.	10,000	15,000				Training Workshops	75700	25,000
	Activity 3.2.2. Capacity building of the selected LAs to engage in PPP.	80,000	35,000				Contractual Services – Companies	72100	115,000
	Activity 3.2.3. Facilitating linkages for viable and sustainable MSWM.	4,000	35,000				Supplies	72500	39,000
		58,675	95,000				Services to projects - CO staff	64397	153,675
	Total Outcome 3	210,675	336,000						546,675
Output 4.1: Knowledge, experience and evidence generated through total MSWM solution frameworks demonstrated at the 02 LAs documented and shared for wider adoption	Activity 4.1.1 Introduce and operationalize data management systems at the MSWM demonstration units.	26,235.82	40,000		UNDP	ROK	Local Consultants	71300	66,235.82
	Activity 4.1.2 Collect technical, financial, and other relevant data and information arising from the demonstrations.	0	31,750				Audio Visual and Printing Production Costs	74200	31,750
	Activity 4.1.3. Capture best practices and shared information with LAs across the country.	0	20,000				Information Technology Equipment	72800	20,000
		10,000	15,000				Contractual Services – Companies	72100	25,000
		4,500	20,000				Training workshop	75700	24,500
Output 4.2: Monitoring and evaluation and adaptive management undertaken to ensure project performance aligns with objectives and global environmental benefits generated.	Activity 4.2.1 Introduce M&E tools to evaluate project progress, risk management, lessons learned and ensure sustainability of project outcomes.	1,679.00	7,544.41				Supplies	72500	9,223,41
		0	85,000				Services to projects - CO staff	64397	85,000
	Activity 4.2.2. Monitor and record global environmental benefits generated from the project against the baseline and share with neighbouring countries in the region.	75,000[5]					Expert Advisory - Staff cost	64399	75,000
	Total Outcome 4	117,414.82	219,294.41						336,709.23
Project Management									

5 Cost recovery for regional technical support

Project Management Costs	Project implementation, monitoring and reporting		47,000		UNDP	ROK	International Consultants	71200	47,000
		43,400	71,600				Contractual Services - Individual	71400	115,000
		2,500	16,000				Travel	71600	18,500
		0	7,000				Local Consultant	71300	7,000
		5,000	10,000				Training Workshops and Confer	75700	15,000
		5,000	3,703.71				IT Equi.	72800	8,703.71
Total for Project Management Costs		55,900	155,303.71						211,203.71
Total Direct Project Costs		1,024,314.82	3,308,758.61						4,333,073.42
General Management Services (GMS) 8%		81,945.19	264,700.69						346,645.87
PROJECT TOTAL		1,106,260.00	3,573,459.29						4,679,719.29
Coordination Levy (1%)									46,797.19
GRAND TOTAL									4,726,516.48

VII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

General roles and responsibilities in the projects' governance mechanism

Implementing Partner

The Implementing Partner for this project is UNDP, which will assume full programmatic and financial responsibility and accountability for the project's execution. UNDP Sri Lanka is responsible for the entire project lifecycle, accountable for delivering outputs as defined in the project document, including ensuring prudent and proper use of financial resources. UNDP Sri Lanka must comply with UNDP's internal policies and procedures for operations, financial management, procurement and human resources. It is responsible for implementing the project's M&E plan, conducting field visits, spot checks and evaluations, and closely monitoring risks and issues and taking corrective actions, as needed.

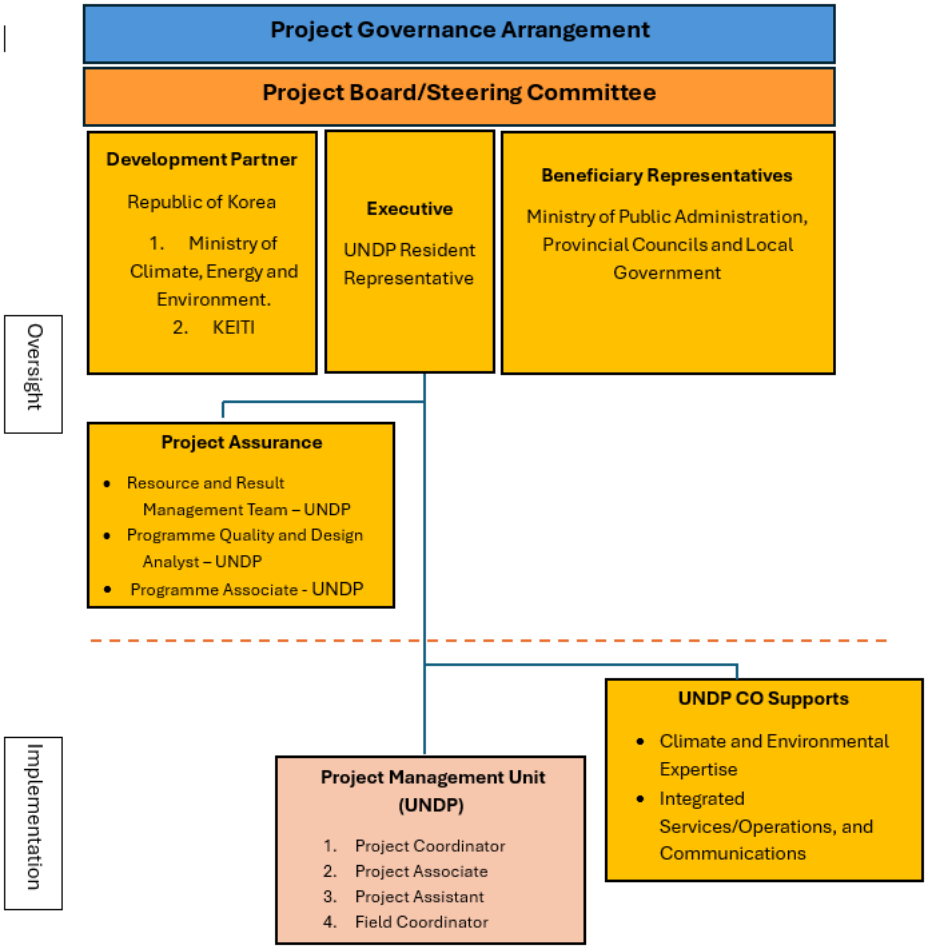
The Implementing Partner is responsible for executing this project.

Specific tasks include:

- Project planning, coordination, management, monitoring, evaluation, and reporting. This includes providing all required information and data necessary for timely, comprehensive, and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes and is aligned with national systems so that the data used and generated by the project supports national systems.
- Overseeing the management of project risks as included in this project document and new risks that may emerge during project implementation.
- Procurement of goods and services, including human resources.
- Financial management, including overseeing financial expenditures against project budgets.
- Approving and signing the multiyear workplan.
- Approving and signing the combined delivery report at the end of the year; and,
- Signing the financial report or the funding authorization and certificate of expenditures.

Project Governance Structure

The Project Steering Committee/ Board has the function to oversee the performance of the project, ensuring transparency, accountability, and efficiency of operations as well as to assess opportunities, risks and political challenges and link to other relevant Government and development partners' initiatives. The Steering Committee shall include representatives of the senior beneficiaries of key government organizations. It will be chaired by UNDP Resident Representative (Executive) and comprise of relevant government institutions, other key stakeholders, and the contributing donor. The Steering Committee will be tasked with providing overall guidance and direction to the project and assessing risks and agreeing on appropriate management actions.



Project Assurance

Project assurance is the responsibility of each project board member; however, UNDP has a distinct assurance role for all UNDP projects in carrying out objective and independent quality assurance and monitoring functions. UNDP performs quality assurance and supports the Project Board (and Project Management Unit) by carrying out objective and independent project oversight and monitoring functions, including compliance with the risk management and social and environmental standards of UNDP. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. Project assurance is totally independent of project execution.

The Resident Representative and the Deputy Resident Representative of UNDP Sri Lanka are ultimately responsible for oversight and compliance with UNDP Rules and Regulations.

Oversight support towards this project will be provided by Programme Quality Analyst of CET with the Results and Resource Management Team (RRMT) will provide cooperate guidance for oversight and will ensure that the project implementation is strategic, results-driven, and managed efficiently.

In keeping with the Project's quality assurance requirements and UNDP's Policies and Procedures outlined in the UNDP POPP, supervision missions will be conducted to ensure compliance with quality assurance (QA), risk management and evaluation requirements.

VIII. LEGAL CONTEXT

This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of the Democratic Socialist Republic of Sri Lanka and UNDP, signed on 20th March 1990. All references in the SBAA to "Executing Agency" shall be deemed to refer to "Implementing Partner."

This project will be implemented by United Nations Development Programme Sri Lanka Country Office ("Implementing Partner") in accordance with its financial regulations, rules, practices, and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.

IX. RISK MANAGEMENT

1. UNDP as the Implementing Partner will comply with the policies, procedures, and practices of the United Nations Security Management System (UNSMS.)
2. UNDP as the Implementing Partner will undertake all reasonable efforts to ensure that none of the [project funds][6] [UNDP funds received pursuant to the Project Document][7] are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.
3. Social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (http://www.undp.org/ses) and related Accountability Mechanism (http://www.undp.org/secu-srm).
4. UNDP as the Implementing Partner will: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c) engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.
5. In the implementation of the activities under this Project Document, UNDP as the Implementing Partner will handle any sexual exploitation and abuse ("SEA") and sexual harassment ("SH") allegations in accordance with its regulations, rules, policies, and procedures.
6. All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.
7. UNDP as the Implementing Partner will ensure that the following obligations are binding on each responsible party, subcontractor, and sub-recipient:

[6] To be used where UNDP is the Implementing Partner
[7] To be used where the UN, a UN fund/programme or a specialized agency is the Implementing Partner

a. Consistent with the Article III of the SBAA *[or the Supplemental Provisions to the Project Document]*, the responsibility for the safety and security of each responsible party, subcontractor and sub-recipient and its personnel and property, and of UNDP's property in such responsible parties, subcontractor's and sub-recipient's custody, rests with such responsible party, subcontractor, and sub-recipient. To this end, each responsible party, subcontractor, and sub-recipient shall:

   i. put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried.

   ii. assume all risks and liabilities related to such responsible parties, subcontractor's and sub-recipient's security, and the full implementation of the security plan.

b. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the responsible parties, subcontractors, and sub-recipient's obligations under this Project Document.

c. In the performance of the activities under this Project, UNDP as the Implementing Partner shall ensure, with respect to the activities of any of its responsible parties, sub-recipients and other entities engaged under the Project, either as contractors or subcontractors, their personnel and any individuals performing services for them, that those entities have in place adequate and proper procedures, processes, and policies to prevent and/or address SEA and SH.

d. Each responsible party, subcontractor and sub-recipient will take appropriate steps to prevent misuse of funds, fraud, or corruption, by its officials, consultants, subcontractors, and sub-recipients in implementing the project or programme or using the UNDP funds. It will ensure that its financial management, anti-corruption, and anti-fraud policies are in place and enforced for all funding received from or through UNDP.

e. The requirements of the following documents, then in force at the time of signature of the Project Document, apply to each responsible party, subcontractor, and sub-recipient: (a) UNDP Policy on Fraud and other Corrupt Practices and (b) UNDP Office of Audit and Investigations Investigation Guidelines. Each responsible party, subcontractor and sub-recipient agrees to the requirements of the above documents, which are an integral part of this Project Document and are available online at www.undp.org.

f. In the event that an investigation is required, UNDP will conduct investigations relating to any aspect of UNDP programmes and projects. Each responsible party, subcontractor and sub-recipient will provide its full cooperation, including making available personnel, relevant documentation, and granting access to its (and its consultants', subcontractors', and sub-recipients') premises, for such purposes at reasonable times and on reasonable conditions as may be required for the purpose of an investigation. Should there be a limitation in meeting this obligation, UNDP shall consult with it to find a solution.

g. Each responsible party, subcontractor and sub-recipient will promptly inform UNDP as the Implementing Partner in case of any incidence of inappropriate use of funds, or credible allegation of fraud or corruption with due confidentiality.

   Where it becomes aware that a UNDP project or activity, in whole or in part, is the focus of investigation for alleged fraud/corruption, each responsible party, subcontractor and sub-recipient will inform the UNDP Resident Representative/Head of Office, who will promptly inform UNDP's Office of Audit and Investigations (OAI). It will provide regular updates to the head of UNDP in the country and OAI of the status of, and actions relating to, such investigation.

h. UNDP will be entitled to a refund from the responsible party, subcontractor, or sub-recipient of any funds provided that have been used inappropriately, including through fraud or corruption, or otherwise paid other than in accordance with the terms and conditions of this Project Document. Such amount may be deducted by UNDP from any payment due to the responsible party, subcontractor or sub-recipient under this or any other agreement. Recovery of such amount by UNDP shall not diminish or curtail any responsible parties, subcontractors, or sub-recipient's obligations under this Project Document.

   Where such funds have not been refunded to UNDP, the responsible party, subcontractor or sub-recipient agrees that donors to UNDP (including the Government) whose funding is the source, in whole or in part, of the funds for the activities under this Project Document, may seek recourse to such responsible party, subcontractor or sub-recipient for the recovery of any funds determined by UNDP to have been used inappropriately, including through fraud or corruption, or otherwise paid other than in accordance with the terms and conditions of the Project Document.

   Note: The term "Project Document" as used in this clause shall be deemed to include any relevant subsidiary agreement further to the Project Document, including those with responsible parties, subcontractors, and sub-recipients.

i. Each contract issued by the responsible party, subcontractor or sub-recipient in connection with this Project Document shall include a provision representing that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the proposal, have been given, received, or promised in connection with the selection process or in contract execution, and that the recipient of funds from it shall cooperate with any and all investigations and post-payment audits.

j. Should UNDP refer to the relevant national authorities for appropriate legal action any alleged wrongdoing relating to the project or programme, the Government will ensure that the relevant national authorities shall actively investigate the same and take appropriate legal action against all individuals found to have participated in the wrongdoing, recover, and return any recovered funds to UNDP.

k. Each responsible party, subcontractor and sub-recipient shall ensure that all of its obligations set forth under this section entitled "Risk Management" are passed on to its subcontractors and sub-recipients and that all the clauses under this section entitled "Risk Management Standard Clauses" are adequately reflected, *mutatis mutandis*, in all its sub-contracts or sub-agreements entered into further to this Project Document.

l. Each contract issued by the responsible party, subcontractor or sub-recipient in connection with this Project Document shall include a provision representing that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the proposal, have been given, received, or promised in connection with the selection process or in contract execution, and that the recipient of funds from it shall cooperate with any and all investigations and post-payment audits.

m. Should UNDP refer to the relevant national authorities for appropriate legal action any alleged wrongdoing relating to the project or programme, the Government will ensure that the relevant national authorities shall actively investigate the same and take appropriate legal action against all individuals found to have participated in the wrongdoing, recover, and return any recovered funds to UNDP.

n. Each responsible party, subcontractor and sub-recipient shall ensure that all of its obligations set forth under this section entitled "Risk Management" are passed on to its subcontractors and sub-recipients and that all the clauses under this section entitled "Risk Management

Standard Clauses" are adequately reflected, mutatis mutandis, in all its sub-contracts or sub-agreements entered into further to this Project Document.

ANNEXES

1. **Additional Contextual Information on Waste Management**
2. **Summary of the Contextual and Waste-related Information Considered in the Selection of Optimum BAT/BEP**
3. **Intervention Strategy and the Proposed Integrated Solutions Outline**
4. **Project' Theory of Change**
5. **Workplan and Timetable**
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8. **Project Quality Assurance Report (Link)**
9. **Social and Environmental Screening Document (Link)**

Annex 1: Additional Contextual Information on Waste Management

A. Policy and Regulatory Framework for Waste Management

The National Policy on Waste Management provides a specific and comprehensive policy framework for the sector. This policy provides a vision, a mission, a goal, eight objectives, eight guiding principles and a series of policy statements for each category of waste and each area of intervention. Further, it details stakeholder responsibilities and relationships to waste management. In addition, policy directions for the waste sector are also provided by several other sectoral policies and strategies including the draft National Environmental Policy (NEP); the National Policy on Sustainable Consumption and Production for Sri Lanka; and the National Climate Change Policy. In particular, the National Environment Policy (NEP), includes a policy statement on sustainable management of solid waste that refers directly to a holistic approach. The main legal and institutional framework for waste management is the National Environmental Act No. 47 of 1980 (NEA) and subsequent amendments, and the establishment of CEA to implement the provisions of the NEA. A series of regulations related to waste management have been gazetted by CEA, including National Environmental (Municipal Solid Waste) Regulations, No. 1 of 2009; National Environmental (Protection and Quality) Regulations, No. 1 of 2008 (on license for discharge, emission, or disposal of waste/scheduled waste management); and Regulations on Polythene and Plastic Management 2017. In addition, there are regulations and legislations of Provincial Council and Las – including the Municipal Councils Ordinance (1980), the Urban Councils Ordinance, Pradeshiya Sabhas Act No 15 of 1987 – that relate to waste management. According to 167 National Environmental Action Plan 2022-2030: Pathway to sustainable development these legislations, all MSW generated within the boundary of Las is their property, and the Las are mandated to remove and dispose of such waste materials, without causing any nuisance to the public.

The National Solid Waste Management Support Centre (NSWMSC), established by the Ministry of Provincial Councils and Local Government in 2007, assists Las to improve MSWM in their administrative areas through technical, legal, and financial assistance. The Waste Management Authority of the Western Province (WMAWP) is responsible for providing technical and financial assistance to all Las of the province to build their capacities, collecting waste data in WP, developing common final disposal sites to LAs and also assisting LAs to publicize and inculcate better methods of waste management discipline in the public.

B. <u>Institutional arrangement</u>

Institution	Role	Legal provision	Key Responsibilities
Central Environmental Authority (CEA)	Regulator	National Environmental Act (No. 47 of 1980) National Policy on Waste Management of 2019	Implementing Environmental Protection Licencing System including prescribing standards, management and coordination of complaints, environmental education
Ministry of Public Administration, Home Affairs, Provincial Councils and Local Government	Policy maker	Sri Lanka Constitution Article 27	Formulation of administrative provisions and regulations

The Western Province Waste Management Authority (WMA-WP) established under the Western Provincial Council	Provincial level Coordination	Established in 2005 under the Western Province Waste Management Statute no 09 of 1999. Strengthening of the act was done in 2007 and currently, WMA-WP operates under the amended statute.	oversees the MSWM of the province, which amounts to over 50% of the total MSW generated in the country.
Provincial Councils	Oversight	Provincial Council Act no 47 of 1987	Provincial waste management strategy development guided by the Ministry of Public Administration, Home Affairs and Provincial Councils & Local governments
Local Authorities	Implementor	Municipal Council Ordinance – No. 29 of 1947 and No. 57 of 1979 Urban Council Ordinance/Act – No. 61 of 1939 and No. 22 of 1959 Pradeshiya Sabha Act – No. 15 of 1988 and No. 14 of 1999 Guided by national environment act and national policy on waste management	Local government is responsible for the provision of waste management services, which includes waste removal, waste storage and waste disposal services (as per Schedule 5b of the Constitution). It is their duty to arrange for the collection of household waste and, if requested, of commercial and industrial waste. Local governments must also see that solid wastes are processed and disposed of safely.

C. **Consistency with National Priorities**

Contribution to SDGs

Effective waste management is linked to achieving targets set by Sri Lanka to contribute to achieve UN Sustainable Development Goals (SDGs). Specifically:

- Target 3.9. (By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination) of Goal 3 (Ensure healthy lives and promote well-being for all at all ages),
- Target 6.3. (By 2030, improve water quality by reducing pollution, eliminating dumping, and minimizing the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally) of Goal 6 (Ensure availability and sustainable management of water and sanitation for all),
- Target 11.6. (By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management) of Goal 11 (Make cities and human settlements inclusive, safe, resilient, and sustainable), Goal 12 (Ensure sustainable consumption and production patterns),
- Target 14.1 (By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution) of Goal 14 (Conserve and sustainably use the oceans, seas, and marine resources for sustainable development),
- Target 15.9 (By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies, and accounts) of Goal 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss) and
- Target 8.4. (Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead), and target 8.8 (Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment) of Goal 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all).

Contribution to NDC Targets:

Strengthened waste management also facilitates the implementation of nationally determined contributions (NDC). The waste sector is amongst the mitigation sectors of the updated NDCs compiled by Sri Lanka in July 2021 and has 05 waste sector NDC targets. The prioritised objective for the waste sector includes waste avoidance and waste reduction while recommending management measures such as recycling, environmentally sound disposal, reuse of unavoidable waste as much as possible, generating low levels of hazardous waste and using environmentally sound residual waste treatment, and changing culture from high to minimum waste generation by reduction of consumption and reuse.

The concept directly contributes to all 5 NDCs. NDC 1: Improve circular economic practices in all MSW sources, NDC 2: Manage Bio-degradable waste components through biological treatments, NDC 3: Introducing energy recovery using non-recyclables and waste which cannot be managed by other

means, NDC 4: Use of sanitary landfills for the disposal of residual waste will be increased from current 5% to 100% on weight basis, and NDC 5 Generic enabling activities (introducing mechanisms for waste generation forecasting, tracking, and monitoring, mandatory waste segregation at source, implementing 'polluter pays principle' for mixed waste generation, conduct capacity building, and awareness and facilitate PPP for waste management). While the estimated GHG emissions reduction by implementing NDCs is expected to be 2,549,000 t of CO_2e, the project will contribute to the reduction of 269,470 tCO_2e over 10 years.

Potential for Engaging with ITMOs (International Transferred Mitigation Outcomes)

The project consists of multiple strategies and actions that reduce GHG emissions making them attractive for ITMOs (i.e., waste to energy (biogas-electricity generation), waste minimisation and segregation use of circular economic models for recycling and composting, use of IT solutions and digital platforms to improve waste management efficiency). However,

1. Engaging in ITMOs involves quantifying and documenting emissions reductions achieved through these waste management practices and trading or selling these mitigation outcomes in the international carbon markets. It requires developing robust monitoring, reporting, and verification mechanisms to assure the transparency and credibility of emissions reductions, which is yet to happen in general in Sri Lanka.
2. Currently, the government of Sri Lanka is developing a position paper to guide ITMO negotiations to identify sectors, areas, and actions that may be used for ITMOs negotiations.

D. Potential for PPP development

Section 36 (e), of the Urban Council Ordinance, provides powers to the Urban Councils (local Authorities selected under the project) to engage private organisations and conduct business. There are some examples of such PPP in MSWM in operation in Sri Lanka. Details of one, Western Power Pvt. Ltd, is given above, under section (B) 1) 3.

In addition, as mentioned above, facilitating PPP for waste management is a key generic enabling activity committed by the country, under the waste sector NDC 5. The project aims to build on existing PPP experiences in MSWM in Sri Lanka and work on the development of viable financial models that trigger PPP; partnerships between the LA and the private sector, for collaborative investments and operations on MSWM.

Annex 2: Summary of the Contextual and Waste-related Information Considered in the Selection of Optimum BAT/BEP

(A) Development of Provincial Level Municipal Solid Waste Management Plans (PMSWMP) in the prioritized provinces

The project will develop PMSWMP in the Northwestern, Central, Sabaragamuwa, and Southern Provinces aligning with national MSWM plans. Considering baseline status of each province briefly given below, PMSWMPs for each province will be specific to their requirements. Planning will be done through a consultative process with all stakeholders at the provincial and local levels and key stakeholders at the national level.

1.Northwestern Province:

There are 33 LAs in Northwestern Province which collect 135 tons of degradable waste per day. Around 25% of the collected degradable waste is converted into compost and the balance is open dumped. Bulk of the non-degradable waste is contaminated. Only the smaller non-contaminated fraction is supplied to the only cement factory in the country, which is located in the province for incineration. No tipping fee is paid by the cement factory for the supply, but the transport costs for the combustible waste is borne by the cement factory.

Keeping in line with international standards, a sanitary landfill was being constructed at a cost of US$120 million at Aruwakkalu in Puttalam district. The project was to complete the work by September 2021 but delayed due to the COVID 19 pandemic and the economic downturn. It was proposed as a long-term solution to MSWM challenges of the Western Province, which generate the bulk of the country's MSW, although located 170 km north of Colombo. The plan was to rail transport the collected MSW from the Meetotamulla dump in the Western Province to Aruwakkalu. The recent fuel prices and transport cost hike has prevented the landfill from completing/operating and plans are being revisited at present. MSW collected by LAs closer to the Aruwakkalu landfill can use this facility once it starts operating.

2.Central Province:

Around 10% of degradable waste collected is converted into compost by the 43 LAs in the province. Non-degradable waste is open dumped by most LAs with only a minimal quantity sent to the cement factory in Puttalam.

A sanitary landfill was established in 2004 in the Nuwara Eliya Municipal Council (MC) area in Moon Plains at a total investment of Rs.17 million (equivalent approx. USD 170,000). In July 2015, a plastic and polythene recycling centre were established at this site. The landfill is operating satisfactorily at present.

Waste dumping site of Kandy MC is situated at Gohagoda (7.313985411249407, 80.62127271497033) and all types of municipal waste have been accumulated into heaps of

garbage over the last five decades. The site is bounded by the longest river of the country, Mahaweli to the east, which is the major water source for downstream communities for drinking, agricultural and sanitary requirements. This unprotected dumpsite with no leachate treatment facilities and no proper lining to prevent leachate flux into the river, poses a major threat to the environment and to the end users of this fresh water source. In addition, there is no cover material at the top of the dump for avoiding odorous emissions and light materials such as polythene debris flying to the surroundings. The Kandy MC has received a number of proposals to convert Gohagoda waste dump site to generate electricity or fertilizer, but none has materialised yet.

A mechanised composting system is available in Dambulla Urban Council area (DUC) with the daily feeding capacity of 50 tons. This absorbs the daily generated degradable waste in the Dambulla UC area and within nearby LA areas.

3.Sabaragamuwa Province:

The Ratnapura Municipal Council (RMC) in collaboration with Central Environmental Authority (CEA) during 2017 to 2019 prepared and implemented MSWM plans. The 3R promotion programs encouraged source separation at households and subsequent separate collection by local authorities was introduced. Composting facilities in a few LAs in Sabaragamuwa Province were funded by the Pilisaru National Waste Management Programme in 2009. Waste collected by the rest of the LAs is open dumped, creating many environmental issues.

The total waste collection in Sabaragamuwa Province is 185 tons per day and this is 5% of the total national collection and 21% of the total waste generation in the province.

4.Southern Province:

The Solid Waste Management Centre at Monroviawatta, Rajgama (6.1143072319765635, 80.16335511817891) has been established in 2012 for MSWM of seven (7) LAs in Galle District. It was established combining resources from the above mentioned Pilisaru Programme of the CEA and the Southern Provincial Council. The administration of the Centre has been entrusted to the Local Government Department of the Southern Province. At present only five (5) LAs use the Centre for MSWM. Waste, sorted as degradable and non-degradable, is brought to the Centre by the LAs. The degradable portion is directed to the composting site for manufacturing organic fertiliser and non-degradable waste is directed to the landfill site.

Biogas based power generation system is under construction in Kotawila, Matara with the capacity of 400 kW. The project plans to get degradable waste from Matara MC and Weligama UC. It is jointly implemented by the Matara Municipal Council and the CEA.

Apart from the above described MSWM initiatives, no waste processing takes place in the province. Waste collected within the rest of the LA areas is open dumped. The total waste collection in Southern Province is 300 tons per day and this is 8% of the total national collection and 23% of the total waste generation in the province.

(B) Municipal Solid Waste Management (MSWM) demonstrations in the prioritised LA areas

1.Gampola Urban Council

Table 2: Scenario of existing waste collection

Total Waste generation – ton/day	Total waste collection – ton/day	Waste Composition – ton/day		Waste disposal – ton/day			
				Compost production	Recycling / Incineration	Open Dump	
		Organic	Non-Organic			Organic	Non-Organic contaminated waste

20	7	7	0	0	0	7	0

The existing daily average waste generation in the local area is around 20,000 kg (20 tons) and out of this only 7,000 kg (7 tons) of degradable waste is collected. Waste generated at suburbs is not collected due to the absence of a proper waste collection and management system at the Gampola Urban Council. Potential exists to enhance the present capacity further by around 50%. Only degradable waste is collected. Of the total waste collected, around 3,000 kg is food waste, and the balance is waste generated from the fruits and vegetable market. Paper, plastics, and glasses are not collected presently but the LA is planning to collect those in the near future. Facilities are being developed at the waste management yard for segregation of these non-degradable solid waste, for the purpose of selling to recyclers.

The collected degradable waste is sent in bulk to the waste management center at Digampathaha, Dambulla (7.962015357924374, 80.70228854224642) which is 100 km away from Gampola Urban Council. The Gampola Urban Council-owned dump truck is used for transporting waste from Gampola to Dambulla and Rs. 1.00 per kg (USD 2.70 per ton) is paid as a tipping fee to Dambulla Municipal Council. Considering all the costs including fuel, salary, electricity and vehicle repair, Gampola Urban Council is spending Rs. 5.45 per kg (USD 15.20 per ton) for safe disposal of bio-degradable waste.

2. Balangoda Urban Council

Table 3: Scenario of existing waste collection

Total Waste generation – ton/day	Total waste collection – ton/day	Waste Composition – ton/day		Waste disposal – ton/day			
				Compost production	Recycling / Incineration	Open Dump	
		Organic	Non-Organic			Organic	Non-Organic contaminated waste
15	10	7.5	2.5	5	1.5	2.5	1

The existing daily average waste collection in Balangoda Urban Council area is 10,000 kg (10 tons). Out of this around 2.5 tons are non-degradable waste, and the balance 7.5 tons are degradable. In the town area all types of waste are collected twice per day. In other areas, only degradable waste is collected on a daily basis. Non-degradable waste is collected once a week. Rubber tyres, shoes and plain glasses are not collected due to non-availability of a proper disposal mechanism. There is an increasing trend in waste generation in the Balangoda UC area continuously over the last decade.

At the household level, waste is segregated into two main categories: degradable and non-degradable waste. The second stage segregation is carried out, up to a certain extent, at the collecting tractors which segregate polythene and plastics. Waste collection tractor trailers are divided into two compartments for segregating, storing & transporting degradable and non-degradable waste. Further segregation (cardboard, glass, pet bottle, aluminium cans, and polythene/plastics) is done at the waste management site, manually.

Out of the total waste collection, about 5 tons of organic waste are used in the existing compost making unit and 1.5 tons of non-organic waste is sold to recyclers. Open pile compost production mechanism is practiced and most of the environmental issues including leaking of leachate into the ground and spreading bad odour exist in the present composting system. The rest of the waste are dumped openly.

Waste disposal bin system for degradable waste has been introduced in collaboration with the Merchant Association of Balangoda town and 15 bins have been distributed in selected areas as a pilot project. One bin is provided for ten houses and the waste collected to these bins can be easily unloaded to the tractors, minimising door-to-door collection.

Since there are many issues in the existing compost production process, the total organic waste collection is considered to be treated under this project.

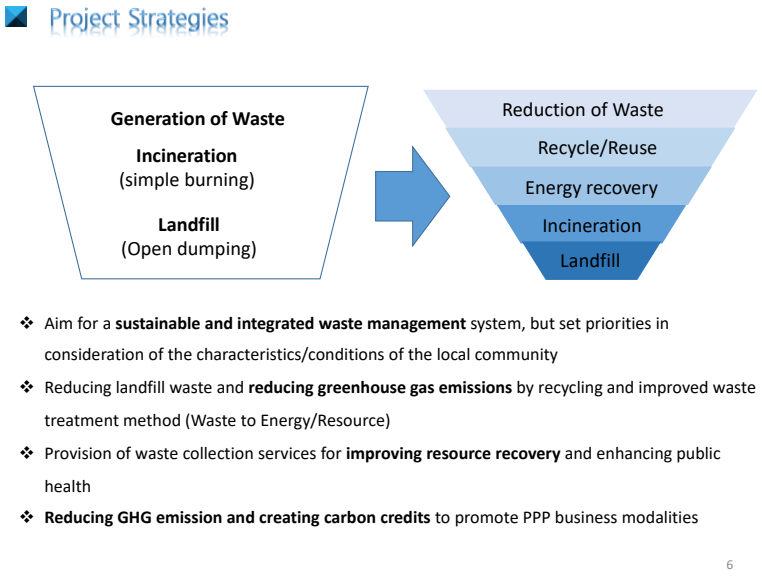
Annex 3: Intervention Strategy and the Proposed Integrated Solutions Outline

(A) Intervention Strategy

The proposed interventions entail comprehensive approach to MSWM, encompassing streamlining of operation from source to final disposal. The approach consists of indicative BAT/BEP options to strengthen post collection waste processing operations at a central location in the local area, to maximise resource recovery, final disposal using viable business models.

The proposed interventions will emphasise on engaging local community by creating awareness and capacity as well as sharing benefits to improve waste management at the source; introducing/implementing concepts such as refuse, reduce, and circular economic approaches that include reuse, recycle, MBT, energy recovery, as well as incineration and landfilling. Improved collection and transport operations will be central to the sustainable and integrated waste management system as shown by Figure 1.

Figure 1: Sustainable and Integrated Waste Management System Approach



1.Waste Minimization

There is a high scope to promote practice of waste minimisation in the selected provinces and the LAs, through introducing incentives and disincentives. Practices used in countries like the Republic of Korea or Bangladesh can be considered to adapt to local situations.

As shown in Figure 4, both refusing and reducing are essential strategies in waste management at the source that aim to prevent waste generation and promote more sustainable lifestyles. Refusing means consciously choosing to not generate waste in the first place. It involves avoiding or rejecting unnecessary or excessive consumption of goods and materials. By refusing the things we do not need, we can significantly reduce the amount of waste produced i.e., refusing include saying no to single-use plastic items and opting for reusable alternatives instead. Reducing on the other hand refers to minimising the amount of waste generated by using fewer resources, products, and packaging. It also involves making conscious choices to consume less and be more mindful of our consumption patterns. By doing so, demand for resources can be decreased and minimizing the overall waste generated. i.e., buying products with less packaging, and reusing items instead of buying new ones.

2. Sustainable Waste Disposal at Source

In LA areas, there are some locations which are either difficult to access (i.e., accessible only by footpaths) or too costly to access (i.e., too remote). Introducing alternative disposal solutions closer to the source will be considered for including such locations with the comprehensive MSWM planning in the local area. For example, the domestic level biogas systems are utilised by some households in Sri Lanka to supplement to LPG gas mainly used for cooking. Apart from biogas for cooking, the slurry which is the byproduct of biogas generation can be used as an organic fertiliser/soil conditioner for crop cultivation which is the main form of livelihood in rural areas. This may be a viable and practical option to introduce to such remote areas. This is a potential practical and viable approach/technology for such remote locations.

3. Waste Segregation

While waste segregation is currently promoted and practiced in MSWM by LAs, but there are many gaps (i.e., incomplete segregation and inadequate categories of segregation). This is another area that needs improvement as efficiency of all subsequent waste processing operations depends on the quality of segregation.

- Awareness campaigns will be conducted to sensitise all communities and decision makers in the local areas on sustainable waste management, and to promote sustainable day-to-day practices that, help waste minimisation and proper segregation at the source. Awareness campaigns aim at fostering behavioural changes at community level.
- Introduction of incentive/dis-incentive schemes linked to rate and taxes and services charges from commercial sectors. They will be based on a ranking system that takes the level and quality of waste segregation at source, into account.
- Introduction of community bins for collecting segregated waste at selected places, and special arrangements for sources that generate large amounts of waste.

4. Waste Collection

Introduce a smart collection and delivery system (IoT system) with two-way mobile communication application between the LAs, micro, small and medium scale enterprises (MSMEs) engaged in resource recovery and recycling and the households (HHs). The objective of the application is to streamline collection mechanisms through improved communication such as time of waste collection and type of material collected from LA to household and the quantity and the types of waste available from HHs to MSMEs and LA.

5. Waste Transport

Highest share of operational cost of current MSWM by LAs goes to transportation. While this is an area of many concerns (cost and GHG emissions), the current economic/fuel crisis in the country, has further aggravated them. Alternatives for rationalising transportation and costs associated with it, should be a priority within comprehensive MSWM solutions.

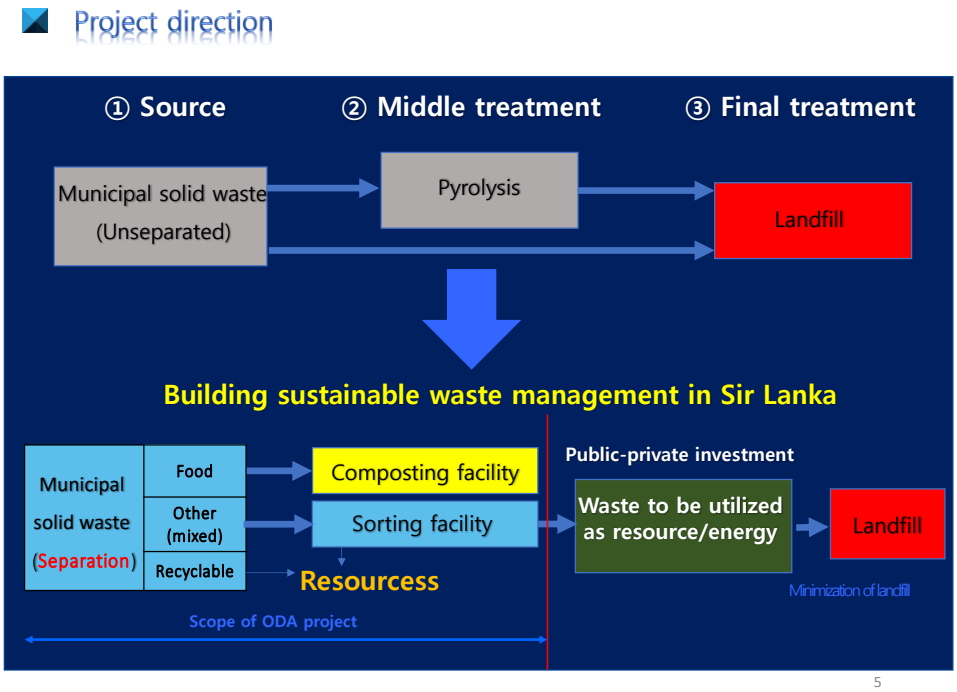
Renewable energy-based transport options will be considered for waste collection within the proposed plans (i.e., battery-operated mini trucks, vehicles with solar energy charging units for short distance use).

6-Waste Disposal

Two different models are proposed in the two selected LAs based-on waste types and amounts, to demonstrate viable and sustainable waste processing and disposal options (i.e., as channelling for incineration is expensive, locally appropriate pyrolysis technology which is used successfully at different scale for MSWM in Korea will be introduced as the main final disposal solution for non-degradable waste that cannot be reused and recycled). This will ensure that only a very small part of

the MSW that remains can be channelled to landfill in a cost-effective manner moving away from dumping.

Figure 2: Project Technology Application Approach



(B) Integrated Municipal Soil Waste Management Options

The integrated and comprehensive approach proposed by the project to transform culture and build sustainable waste management systems is depicted by Figure 2. Considering the existing waste collection practice (i.e., partial segregation or non-segregation at source), tropical climate, labour cost, and various resources in MSW in Sri Lanka, a comprehensive MSWM scheme was established (Please refer to scenario 3, given in Figure 03 **Annex 6**)

The technical concept is adapted, according to the amount of collected waste and the capacity of existing treatment facilities in the two selected LAs. Biodegradable waste segregated at source [8] is diverted into animal feed and fertiliser through composting/vermicomposting, and anaerobic digestion. Non-degradable waste will be converted to solid fuel (refuse derived fuel RDF) through Mechanical Biological Treatment (MBT) or recycled through simple manual sorting depending on the quantity and quality of the waste. In addition, non-degradable, non-recyclable (contaminated) waste is used as sources to produce liquid fuel through pyrolysis.

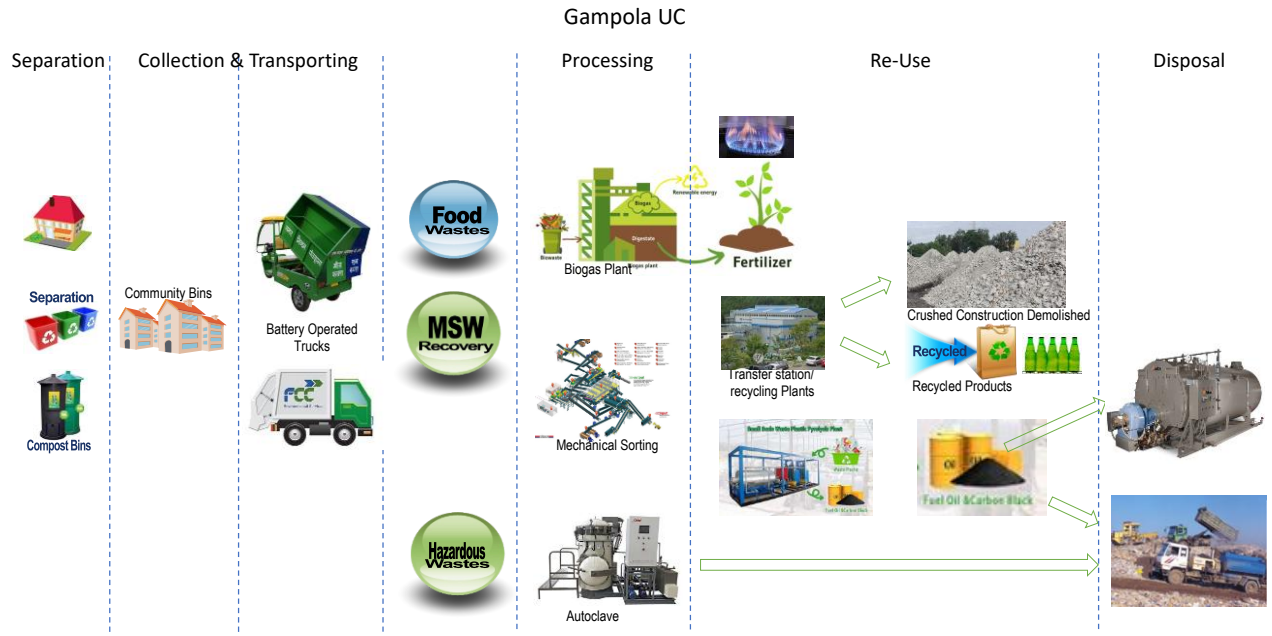
The recommended BAT/BEP mixes for the two selected LAs are shown in Figures 3-4 and Table 1-2 below.

[8] All five local authorities are implementing or plan to implement segregation at source to sort out organics (biodegradables) and non-organics (non-biodegradable organics and inorganics). In the case of Kurunegala MC and Batticaloa MC / Eraur Pattu PS, biodegradable organics are currently being collected separately. In Kurunegala MC, the entire amount of collected biodegradable organics (49.4 tons/day) is processed by mechanical composting machine, and in Batticaloa MC / Eraur Pattu PS, only 10 tons/day out of the collected biodegradable organics (22.9 tons/day) are processed by conventional composting.

Table 1: Proposed BAT/BEP mix for Gampola UC

Waste characteristics		Source to Waste Management Centre					Operations at Waste Management Centre		
Category	**Composition**	**Waste minimization**	**Segregation at source**	**Waste Collection**	**Waste transport**	**Waste collection - t/day**	**Applied Technology**	**Daily input - tons**	**Daily outputs**
Biodegradables	Food	Small scale aneorobic digesstion/composting units for local areas non practicle for collection	1. Awareness campaign 2. Incentive/dis-incentive scheme 3. Bins for community places, on public roads and for bulk generators	Waste collection app	1. Battery operated light commercial vehicles (mini trucks) with hydraulic tipping containers 2. Battery operated four-wheeled mini trucks with international standard garbage collection bins	13.00	Aneorobic digeston	14.20	Biogass 900 m^3 and liquid fertilizer 9000 L
	Garden Waste & Wood					1.20			
Non-Biodegradables (Combustibles)	Plastics					2.00	Pyrolysis	2.00	Liquid 1400 L
	Paper					2.20	Mechanical Sorting	2.87	
	Textile					0.15			Recyclable 2.5 tons
	Rubber & Leather					0.30			Residuse 0.4 ton
Non-degradable (Non-Combustibles)	Metal					0.12			
	Glass					0.10			
Hazardous and others	Disposal Nappies					0.05	Autoclave	0.13	Handing over toclinical waste treatement unit near by
	Hazardous waste					0.08			
	Construction demolish					0.80	Crushing	0.80	Recycling 0.8
Total						**20.00**		**20.00**	

Figure 3: Proposed Comprehensive MSWM at Gampola UC



Gampola UC: Considering the land availability and the biodegradable waste collection, an anaerobic digestion plant with 15-ton daily feeding capacity has been considered for the Gampola Urban Council. The daily water requirement for a similar capacity plant would be 9,000 litres per day and the Project proposes constructing a tube well to meet this requirement.

Pyrolysis technology with a 2-ton daily capacity is proposed for soft and hard plastics/polyethene and other non-biodegradables that are sent to the recycling centres subject sorting in mechanical segregator.

Limited quantities of hazardous and disposal nappies are collected in the Gampola UC area and as such the project proposes sending these quantities to the clinical waste disposal centres nearby.

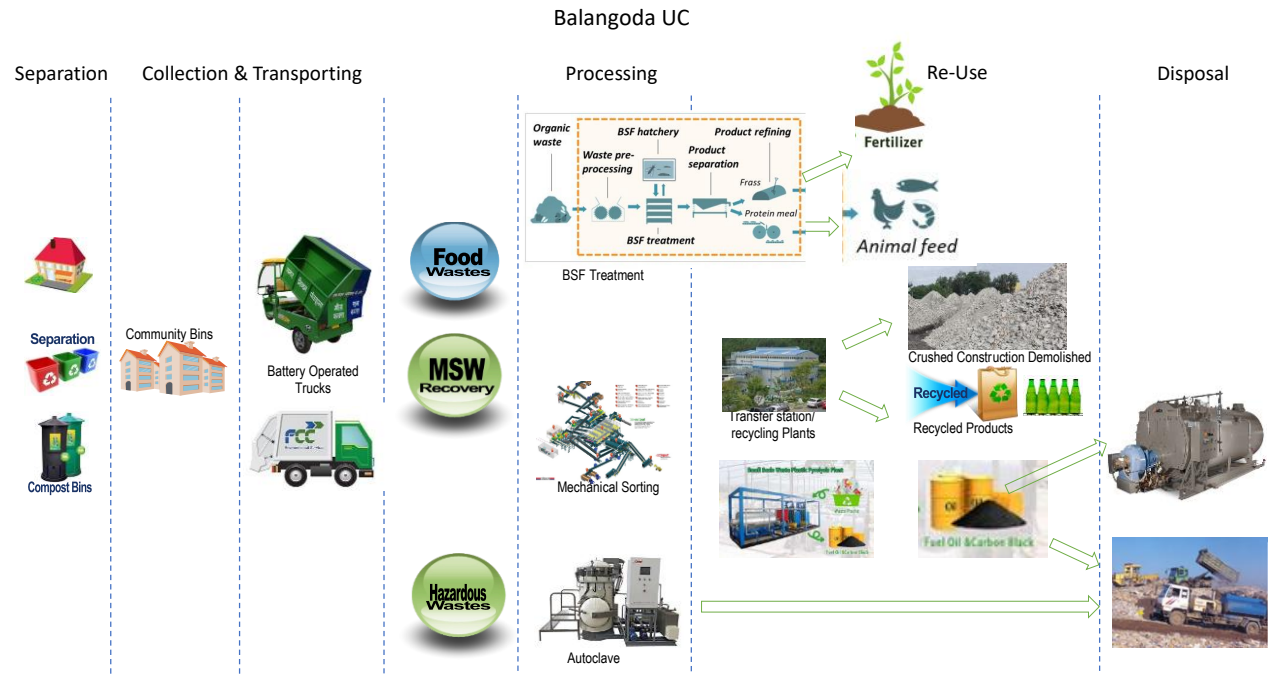
The estimated GHG emission reduction due to pilot intervention at Gampola UC is 168,630 MT based on the IPCC2006(pg 5-18) methodology for Landfills.

	Baseline Scenario				**After Implementing the Project**			
	$CO_{2\,Eq}$ – kg			Total	$CO_{2\,Eq}$ - kg			Total
	CO_2	CH_4	NO_2		CO_2	CH_4	NO_2	
Composting		588	520.8	1108.8				0
Open Dumping		3356		3356		635.25		635.25
Burning	3342.8	546	186	4074.8				0
Incineration								0
Recycling								0
Anarobic Digession						1176	1041.6	2217.6
Pyrolisis					706.26			706.26
Avoided CO_2 due to use of liquid fuel from pyrolisis process				3421.3				
Total $CO_{2\,Eq}$ - kg				11960.9				3559.11
Reduction of $CO_{2\,Eq}$ due to implementation of the project							8401.79	kg per day
							3067	MT/year
Reduction of $CO_{2\,Eq}$ in ten years period							**168630**	**MT**

Table 8: Proposed BAT/BEP mix for Balangoda UC

Waste characteristics		**Source to Waste Management Centre**					**Operations at Waste Management Centre**		
Category	**Composition**	**Waste minimization**	**Segregation at source**	**Waste Collection**	**Waste transport**	**Waste collection - t/day**	**Applied Technology**	**Daily input - tons**	**Daily outputs**
Biodegradables	Food	Small scale aneorobic digesstion/composting units for local areas non practicle for collection	1. Awareness campaign 2. Incentive/dis-incentive scheme 3. Bins for community places, on public roads and for bulk generators	Waste collection app	1. Battery operated light commercial vehicles vehicles (mini trucks) with hydraulic tipping containers 2. Battery operated four-wheeled mini trucks with international standard garbage collection bins	10.00	Vermi Composting (BSF Processing)	10.50	1. Animal feed 1.3 tons 2. Compost 3.2 tons
	Garden Waste & Wood					0.50			
Non-Biodegradables (Combustibles)	Plastics					3.00	Pyrolysis	3.00	Liquid 2100 L
	Paper					0.40	Manual Sorting	1.43	
	Textile					0.00			Recyclable 1.3 tons
	Rubber & Leather					0.63			Residuse 0.13 ton
Non-degradable (Non-Combustibles)	Metal					0.00			
	Glass					0.40			
Hazardous and others	Disposal Nappies					0.02	Autoclave	0.04	Handing over toclinical waste treatement unit near by
	Hazardous waste					0.02			
	Construction demolish					0.63	Crushing	0.63	Recycling 0.63
Total						**15.60**		**15.60**	

Figure 4: Proposed Comprehensive MSWM Demonstration at Balangoda UC



Balangoda UC: Adequate spaces are available at the waste management centre of Balangoda UC and wormy composting along with pyrolysis technology is proposing for disposing the waste. The quality of the compost produce from the wormy composting system is substantially higher than the other systems. Wormy composting is a novel technology for Sri Lanka and this technology is proposed since agriculture is one of the major income sources in Balangoda area.

The estimated GHG emission reduction due to pilot intervention at Balangoda UC is 100,740 MT based on the IPCC2006 (pg 5-18) methodology for Landfills.

	Baseline Scenario				After Implementing the Project			
	$CO_{2\,Eq}$ - kg			Total	$CO_{2\,Eq}$ - kg			Total
	CO_2	CH_4	NO_2		CO_2	CH_4	NO_2	
Composting		420	372	792		840	744	1584
Open Dumping		2923.3		2723.28				
Burning								
Incineration								
Recycling								
Anarobic Digession								
Pyrolisis					1059.39			1059.39
Avoided CO_2 due to use of liquid fuel from pyrolisis process				5132				
Total $CO_{2\,Eq}$ - kg				8647.28				2643.39
Reduction of $CO_{2\,Eq}$ due to implementation of the project							6003.89	kg per day
							2192	MT/ year
Reduction of $CO_{2\,Eq}$ in ten years period							**100740**	**MT**

Annex 4: Project's Theory of Change



Theory of Change in Practice Leading to Lasting Impact

The project strategy tackles technical, financial, institutional, and behavioural barriers in an integrated manner. This reduces the risk of fragmented efforts and creates the foundation for systemic change. Demonstration sites provide visible proof of integrated solutions, motivating local authorities and communities to replicate successful models. Private sector engagement and PPP mechanisms ensure financial sustainability, reduce reliance on public funds, and foster innovation. Digital tools and MRV systems enhance efficiency, transparency, and accountability while supporting progress tracking against national and international commitments. Active involvement of women, youth, and informal workers promotes inclusive participation and generates wider socio-economic benefits. These measures increase the likelihood of establishing a sustainable, low-carbon, and resilient waste management system in Sri Lanka.

Annex 5: Work Plan and Timetable

Outcomes	Outputs	Year 1				Year 2				Year 3			
		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Outcome 1: Regulatory, institutional, and institutional frameworks reviewed and strengthened in line with national and international policies, to create enabling environments in the selected provinces to move towards sustainable MSWM systems.	**Output 1.1:** Strategic provincial waste management frameworks/plans developed aligned with recently published national waste management policy, waste sector NDC, SDGs, and implemented in Northwestern, Central Sabaragamuwa, and Southern provinces.												
	Output 1.2: Institutional coordination mechanism reviewed and strengthened.												
Outcome 2: Total solid waste management solutions developed in the selected Local Authorities based on/adapting local and international best practices.	**Output 2.1:** Best fit total MSWM solutions based on BAT/BEP for the two (2) selected LAs developed.												
	Output 2.2: Potential for partnerships between private investors and LAs for MSWM investigated and promoted for scaling up.												
	Output 2.3: Total MSWM System solutions demonstrated in two (2) selected LAs.												
Outcome 3: Viable financial models for potential partnerships promoted among the LAs and private sectors for	**Output 3.1:** Green investment framework and guidelines for fostering potential partnerships and collaborative investment												

collaborative MSWM investments and operations.	for MSWM between the LAs and the private sector (PPP) developed for future up scaling and sustainability.												
	Output 3.2: Potential for partnerships between private investors and LAs for MSWM investigated and promoted for scaling up.												
Outcome 4: Knowledge, experience, and evidence of operational sustainable total MSWM solutions and framework at LA level made available for wider stakeholder adaptation.	**Output 4.1:** Knowledge, experience, and evidence generated through total MSWM solution frameworks demonstrated at the two (2) LAs documented and shared for wider adoption												
	Output 4.2: Monitoring and evaluation and Adaptive Management undertaken to assess project performance and impact on global environmental benefits generated												
Project Management	Project's overall management and QA including reporting.												

Annex 6: Different Waste Management Schemes

DEVELOPMENT OF INTEGRATED MSWM SCENARIOS

Considering the waste collection system (segregation or non-segregation at source), the tropical climate, labour cost, availability of public funds for waste management, and composition of municipal waste and its resource recovery potential in Sri Lanka, three scenarios of integrated MSW management scheme were developed. For each scenario, the value chain from the source of waste to the final product was schematized, and the mass balance and approximate investment cost were calculated by applying the MSW collection amount of 30 - 35 ton/day as an assumption.

Scenario 1 is developed on the basis that all waste collected are segregated at source, and hence only identifies appropriate disposal mechanisms. Scenario 2 approaches interjecting at the waste management centre, and Scenario 3 contains a holistic approach, outlining a comprehensive, total solution to all possible categories of waste.

Scenario-1. Segregation at Source (Organics and Non-Organics)

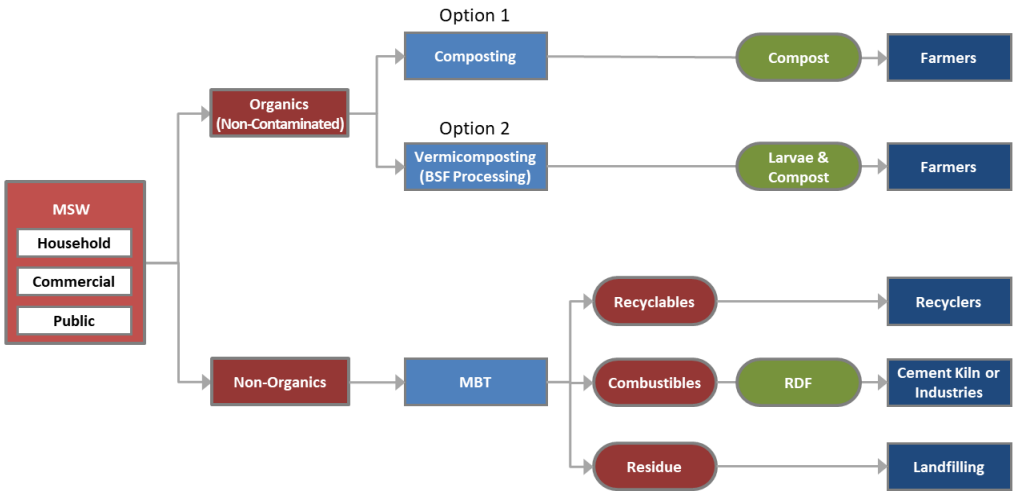


Figure 1:Value Chain of Integrated MSW Management Scenario-1

Input Waste [ton/day]		Applied Technology	Output [ton/day]		Investment Cost Estimation [USD] *
Organics	20.0	[Option-1] Composting	Compost (including bulking agent)	10.0	600,000
		[Option-2] Vermicomposting (BSF Processing)	Animal Feed (Larvae)	2.4	1,200,000
			Compost (Frass)	6.0	
Non-Organics	10.0	MBT (manual sorting, shredding)	Recyclables	2.0	None (transport to recyclers)
			RDF	6.8	500,000
			Residues	0.5	None (transport to existing landfill)
Total	30.0				[Option-1] 1,100,000
					[Option-2] 1,700,000

Note * Investment cost is roughly estimated by excluding the cost for land, advisory/engineering and initial operation

Note MBT: Mechanical Biological Treatment & RDF: Refuse Derived Fuel*

Table 1: Basic Mass Balance and Rough Estimation of Investment Cost of Comprehensive MSW Management

Scenario-2. Non-Segregation at Source (Mixed MSW)

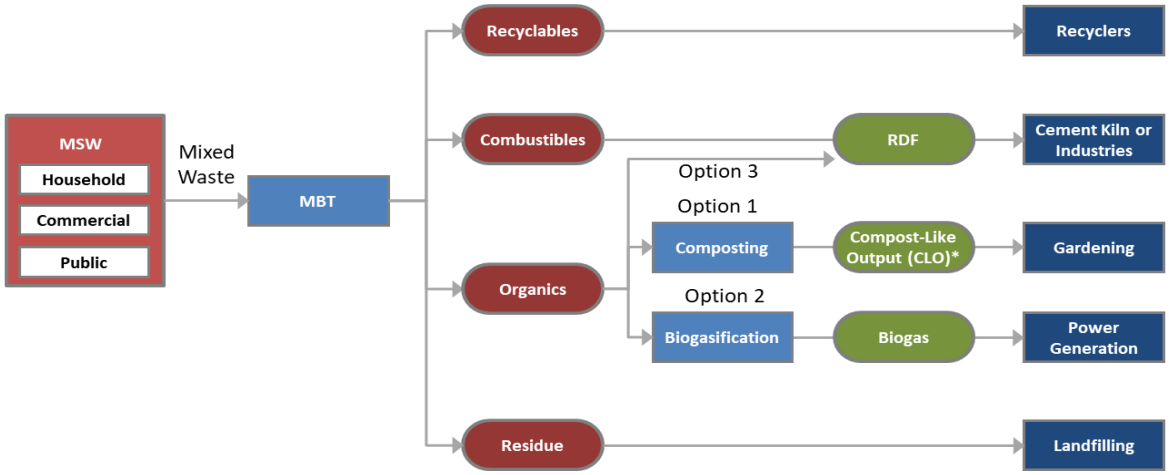


Figure 2: Value Chain of Integrated MSW Management Scenario-2

Input Waste [ton/day]	Pre-Sorted Waste [ton/day] *	Applied Technology	Output [ton/day]		Investment Cost Estimation [USD] **
Mixed MSW 30.0	Organics 16.0	[Option-1] Composting	CLO (including bulking agent)	8.0	500,000
		[Option-2] Biogasification	Biogas (electricity)	3.5MWh	2,500,000
			Digestate (including washwater)	16.0	
		[Option-3] MBT (biodrying)	RDF (lower calorific value)	4.0	300,000
	Non-Organics 14.0	MBT (mechanical&manual sorting, shredding)	RDF (higher calorific value)	6.3	1,200,000
			Recyclables	2.8	None (transport to recyclers)
			Residues	0.7	None (transport to existing landfill)
Total 30.0					**[Option-1] 1,700,000**
					[Option-2] 3,700,000
					[Option-3] 1,500,000

Note * Waste amount after sorting out the organics from mixed MSW through the pre-treatment of MBT Process

** Investment cost is roughly estimated by excluding the cost for land, advisory/engineering and initial operation

Table **1**: Basic Mass Balance and Rough Estimation of Investment Cost of Integrated MSW Management Scenario-2 (Assuming 30 ton/day of MSW Collected

Scenario-3. MSW Segregation at Source combined with Non-Valuable Plastic Waste, Medical Waste, and e-Waste Management.

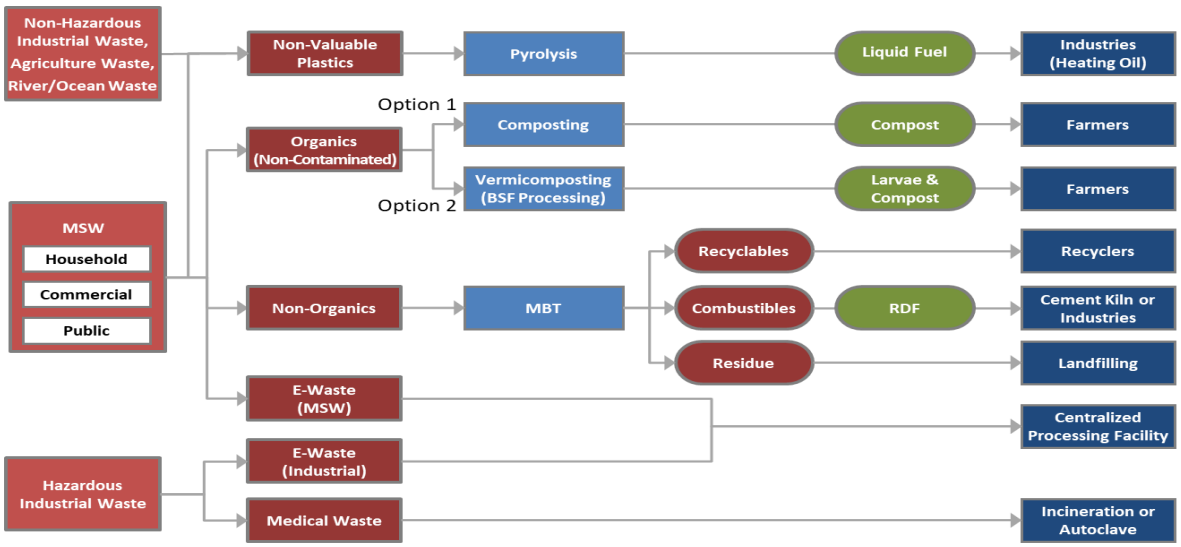


Figure 3: Value Chain of Integrated MSW Management Scenario-3

Input Waste [ton/day]		Applied Technology	Output [ton/day]		Investment Cost Estimation [USD] *
Organics (MSW)	20.0	[Option-1] Composting	Compost (including bulking agent)	10.0	600,000
		[Option-2] Vermicomposting (BSF Processing)	Animal Feed (Larvae)	2.4	1,200,000
			Compost (Frass)	6.0	
Non-Organics (MSW)	10.0	MBT (manual sorting, shredding)	Recyclables	2.0	None (transport to recyclers)
			RDF	6.8	500,000
			Residues	0.5	None (transport to existing landfill)
Medical Waste	4.0	Thermal Treatment			1,000,000
Non-Valuable Plastic Waste	1.0	Pyrolysis	Pyrolysis oil	700L	500,000
Total	**35.0**				**[Option-1] 2,600,000**
					[Option-2] 3,200,000

Note * Investment cost is roughly estimated by excluding the cost for land, advisory/engineering and initial operation

Table 3: Basic Mass Balance and Rough Estimation of Investment Cost of Integrated MSW Management Scenario-3 (Assuming 30 ton/day of MSW, 4 ton/day of Medical Waste, and 1 ton/day of Non-Valuable Plastic Waste Collected)

Key Technical Components of Integrated MSW Management System

The key technical components of the integrated MSW management scheme include MBT, Pyrolysis, Vermicomposting (BSF Processing), and Bio gasification (Anaerobic Digestion), and a brief introduction to these technologies is as follows.

Mechanical-Biological Treatment (MBT)

MBT process is used to separate mixed waste streams, typically from MSW, into a range of dry products (typically ferrous and non-ferrous metals and glass), high calorific value refuses derived fuels (RDF) suitable for incineration, and wet biodegradable slurries suitable for either composting or anaerobic digestion (AD). MBT means the combination of mechanical crushing and sorting processes and biological treatment (e.g., aerobic, and anaerobic decomposition, bio drying).

1. Waste Preparation

Initial waste preparation may take the form of the simple removal of unsuitable objects, such as mattresses, carpets, or other bulky wastes, which may cause problems with processing equipment downstream. Additional mechanical waste preparation techniques may be used to prepare the materials for subsequent separation stages. The objective of these techniques may be to split open refuse bags, thereby liberating the materials inside, to shred and homogenize the waste into smaller particle sizes suitable for a variety of separation processes, or to perform subsequent biological treatment depending on the MBT process employed.

2. Waste Separation

Separation technologies exploit the varying properties of different materials in the waste. This includes the size and shape of different objects, density, weight, magnetism, and electrical properties. Sorting the waste allows the MBT process to separate different materials that are suitable for different end uses and sequential processes, including material recycling, biological treatment, energy recovery through the production of RDF, and landfilling.

3. Biological Treatment

The biological processes used in MBT include aerobic decomposition, aerobic bio-drying, and anaerobic digestion. The aerobic decomposition process is similar to composting though the product quality is not always comparable. This process aims to maximize the decomposition of degradable organic matter in MSW.

Anaerobic digestion is a familiar process used in the management of livestock manure or septage. The isolated use of anaerobic digestion often fails due to the low rate of production of biogas because of a lack of organic matter for anaerobic microbes. It is recommended that the anaerobic digestion process in MBT be linked with other organic sources to produce a feasible amount of biogas. In some processes, all the residual MSW is biologically treated to produce stabilized output for disposal to landfills where no sorting is required.

Pyrolysis

Pyrolysis is a common technique used to convert plastic waste into energy, in the form of solid, liquid, and gaseous fuels. Plastic pyrolysis or plastic to liquids (PTL) is a procedure in which heat, and pressure are applied to plastic waste in the absence of oxygen. The output generated from the pyrolysis of plastic waste, regardless of technique or use of catalysts, requires at least some purification before it is possible to use its components as fuels or raw materials. Without purification, only direct energy use in heaters is possible. However, with the subsequent upgrading steps, the spectrum of possible products that can be made from pyrolysis oils derived from plastic waste is large, varying from diesel and petrol fuels to food-grade plastics.

The application of effective and selective catalysts in the thermochemical conversion of plastics can significantly lower the operating temperature requirement as well as enhance carbon conversion and process efficiency. In addition, the use of catalysts in pyrolysis can significantly improve the quality of the process output by increasing selectivity for desired components.

Vermicomposting (BSF Processing)

Vermicompost is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast.

Among the various types of vermicomposting, utilizing the black soldier fly (BSF) larvae (Hermetia illucens) as a bioreactor has been commonly adopted to treat a variety of organic materials, including animal manure, food waste, distillers' grains, and municipal slurry. The harvested larvae biomass is commonly regarded as a value-added feed for livestock or fish. BSF vermicomposting has strong adaptability and is a robust option for value-added bioconversion of organic matter.

Biogasification (Anaerobic Digestion)

Anaerobic digestion (AD) is a process through which bacteria break down organic matter, such as animal manure, wastewater biosolids, and food wastes, in the absence of oxygen. Anaerobic digestion produces two valuable outputs: biogas and digestate. Anaerobic digestion process uses complex microbial communities that break down (or digest) the waste and produce biogas and digestate (the solid and liquid material end-products of the AD process). Multiple organic materials can be combined in one digester, a practice called co-digestion. Co-digested materials include manure; food waste (i.e., processing, distribution, and consumer-generated materials); energy crops; crop residues; and fats, oils, and greases (FOG) from restaurant grease traps, and many other sources. Co-digestion can increase biogas production from low-yielding or difficult-to-digest organic waste.

Anaerobic digestion produces two valuable outputs: biogas and digestate. The energy in biogas can be used like natural gas to provide heat, generate electricity, and power cooling systems. Biogas can also be purified by removing inert or low-value constituents (CO2, water, H2S, etc.) to generate renewable natural gas (RNG). This can be sold and injected into the natural gas distribution system, or processed further to generate alternative transportation fuel, energy products, or other advanced biochemicals and bioproducts. Digestate is the residual material left after the digestion process. It is composed of liquid and solid portions. These are often separated and handled independently, as each has a value that can be realized with varying degrees of post-processing. With appropriate treatment, both the solid and liquid portions of digestate can be used in many beneficial applications, such as animal bedding (solids), nutrient-rich fertilizer (liquids and solids), a foundation material for bio-based products (e.g., bioplastics), organic-rich compost (solids), and/or simply as a soil amendment (solids), the latter of which may include the farm spreading the digestate on the field as fertilizer. Digestate products can be a source of revenue or cost savings and are often pursued to increase the financial and net-environmental benefit of an AD/biogas project.

Annex 7: Project Board Composition and Requirements to Serve on the Board

Composition of the Project Board: The composition of the Project Board must include individuals assigned to the following three roles:

1. **Project Executive:** This is an individual who represents ownership of the project and chairs (or co-chairs) the Project Board. The Executive usually is the senior national counterpart for nationally implemented projects (typically from the same entity as the Implementing Partner), and it must be UNDP for projects that are direct implementation (DIM). In exceptional cases, two individuals from different entities can co-share this role and/or co-chair the Project Board. If the project executive co-chairs the project board with representatives of another category, it typically does so with a development partner representative. The Project Executive is the UNDP Resident Representative.
2. **Beneficiary Representative(s):** Individuals or groups representing the interests of those groups of stakeholders who will ultimately benefit from the project. Their primary function within the board is to ensure the realisation of project results from the perspective of project beneficiaries. Often representatives from civil society, industry associations, or other government entities benefiting from the project can fulfil this role. There can be multiple beneficiary representatives in a Project Board. The Beneficiary representative is the Ministry of Provincial Council and Local Government (MOPC&LG)
3. **Development Partner(s):** Individuals or groups representing the interests of the parties concerned that provide funding, strategic guidance, and/or technical expertise to the project. The Development Partner is the Resident Representative of UNDP.

Requirements to serve on the Project Board:

- ✓ Agree to the Terms of Reference of the Board and the rules on protocols, quorum, and minuting.
- ✓ Meet annually; at least once.
- ✓ Disclose any conflict of interest in performing the functions of a Project Board member and take all measures to avoid any real or perceived conflicts of interest. This disclosure must be documented and kept on record by UNDP.
- ✓ Discharge the functions of the Project Board in accordance with UNDP policies and procedures.
- ✓ Ensure highest levels of transparency and ensure Project Board meeting minutes are recorded and shared with project stakeholders.