



Money4PlasticWaste: Advancing Waste Collection in Bangladesh Implementation Guide

SCIP
plastics

Sustainable Capacity
building to reduce
Irreversible Pollution
by Plastics

Money4PlasticWaste: Advancing Waste Collection in Bangladesh Implementation Guide



Sustainable Capacity
building to reduce
Irreversible Pollution
by Plastics

SUMMARY

In many cities across Bangladesh, waste collection systems are underdeveloped and often ineffective. As a result, plastic waste – particularly items with little to no economic value – accumulates in urban environments, contributing to environmental degradation, blocked (storm) drainage systems, and public health risks.

Money4PlasticWaste offers a rapid-response solution to address the challenge of mismanaged plastic waste and is designed to enhance the existing formal or informal waste management system. It works by offering financial incentives for the collection of low-value plastic waste, helping to reduce pollution while supporting the transition toward more sustainable waste management practices. It can complement and enhance measures such as waste-to-energy solutions (e.g., pyrolysis) and community composting initiatives.

Beyond its environmental impact, *Money4PlasticWaste* creates meaningful social impact by generating income opportunities for informal waste collectors and vulnerable community members. This dual-focus approach is a powerful tool for both alleviating poverty and improving environmental sustainability.

The *Private Sector Model* was successfully piloted in Khulna City, Bangladesh, for six months under the German-Bangladeshi SCIP Plastics Research Project. Through the *Money4PlasticWaste* collection approach, the pilot prevented more than 50 tons of mismanaged plastic waste from leaking into the environment. A total of 20 waste workers collected and delivered the material to four recycling shops, operating under formal agreements with the Khulna City Corporation (KCC). The pilot was fully financed by the SCIP Plastics Project at a total cost of 20 lakh BDT. This manual is based on the insights from the pilot study, see Rohrbach et al. (in preparation) for more details on the pilot implementation.

This manual presents two options for the *Money4PlasticWaste* approach:

- the *Private Sector Model* – a partnership between private actors and municipal authorities and
- the *Public Sector Model* – fully managed and operated by the municipality.

Five steps are suggested to implement the *Money4PlasticWaste* approach:

Step 1: Feasibility check

- Assess political and institutional support for improving waste management.
- Evaluate the availability of funding (local, national, and international programs).
- Confirm the existence of or potential for suitable plastic waste disposal infrastructure (e.g., landfill, recovery facilities).

Step 2: Stakeholder involvement and model selection

- Identify stakeholders across the entire waste management chain (e.g., residents, informal waste workers, NGOs, private businesses).
- Involve key actors, especially the city administration, to lead or actively support the process.
- Appoint a dedicated city contact person for coordination.

Step 3: Preparation of a written agreement

- Develop contracts (*Private Sector Model*) or standard operating procedures (*Public Sector Model*).
- Address key operational elements.

Step 4: Municipal reserves and funding

- Highlight direct and indirect cost savings.
- Ensure economic viability by aligning benefits with municipal cost savings.
- Engage financial experts to assess budget impacts and identify funding sources.
- Explore additional sources of income.

Step 5: Pilot area and roll-out

- Pilot Phase: Test your selected model in a small area or with limited partners (e.g., one ward) over a fixed period.
- Phased Roll-Out: Expand gradually across the city, incorporating feedback and improvements.

TABLE OF CONTENTS

1	Rationale and Introduction to the Money4PlasticWaste Approach	8
2	From Context to Concept: Preconditions and Options	10
2.1	Preconditions for developing <i>Money4PlasticWaste</i> in Khulna City	10
3	Step-by-step guide for implementing the Money4PlasticWaste approach	14
4	Lessons learned and recommendations from implementing a pilot study of the Private Sector Model in Khulna City	18
4.1	Type and quality of targeted material	19
4.2	Working conditions and safety gear	21
4.3	Pricing and volume	21
4.4	Payment scheme and contact person	22
4.5	Documentation and monitoring	22
4.6	Pick-up, logistics and final disposal	22
5	Addressing Knowledge Gaps in the Context of the Money4PlasticWaste Approach	24
5.1	Environmental impact assessment	24
5.2	System integration and institutional readiness	24
5.3	Data gaps and monitoring systems	24
5.4	Economic sustainability	24
5.5	Socioeconomic, behavioral dynamics and cultural sensitivity	25
	Acknowledgements	26
	References	26
	Imprint	27
	Appendix A: Documentation and monitoring forms	28
	Appendix B: Process flow – private sector model (operational detail)	31
	Appendix C: Targeted material guidelines	32
	Appendix D: Material storage and handling at recycling shops	33
	Appendix E: Personal protective equipment (PPE) for waste collectors	34

1 RATIONALE AND INTRODUCTION TO THE MONEY4PLASTICWASTE APPROACH

Efficient solid waste management remains a critical challenge in many cities of the Global South, particularly when it comes to financing and accessibility (Akther et al. 2024). Collecting fees for door-to-door waste collection often proves difficult due to several interrelated factors (Apio et al 2024). The rapid expansion of informal settlements, the limited financial capacity of residents, and, in some cases, a general unwillingness to pay for such services can all obstruct successful fee collection (Kasala et al. 2024). Moreover, inadequate road infrastructure and seasonal flooding frequently render certain neighborhoods inaccessible to collection vehicles, further complicating service delivery (Akinkuolie et al. 2025). In this context, plastic waste creates considerable problems, particularly by obstructing drainage systems as a result of its persistent, non-biodegradable nature and tendency to build up over time. In addition, public waste infrastructure – such as waste bins – is often inadequate or poorly maintained. This likely contributes to increased littering, i.e., the careless and improper disposal of waste in public spaces.

Plastic waste can generally be divided into two main categories (Saju et al. 2024):

(I) the recyclable fraction with economic value – such as polypropylene (PP), polyethylene terephthalate (PET), and polyethylene (PE) – which is typically collected and directed to the recycling sector and

(II) the low-value fraction. This includes materials such as polythene shopping bags, composite packaging (e.g., food wrappers), and expanded polystyrene (e.g., Styrofoam). Due to their limited or no market value, these types of plastic are not targeted for the purpose of recycling or income generation.

While recyclable plastic often finds its way to become input for the plastic industry, plastic of low economic value creates many problems. If not properly disposed of and collected, it often remains in streets and accumulates in channels where it creates blockages. This results in decreased drainage, leading to unhygienic conditions and an increase in mosquito breeding. If not disposed of in sanitary landfills, it finally ends up in waterways and ultimately as marine debris (Jambeck et al 2025). Even though plastic waste only represents a relatively small fraction of municipal waste, its persistence and lack of biological degradation leads to the everlasting contamination of water bodies.

Money4PlasticWaste offers a rapid-response strategy to reduce mismanaged plastic waste in cities on their path to sustainable waste management. It also aims to provide income opportunities for informal waste collectors and vulnerable community members. One of the key advantages of *Money4PlasticWaste* is its flexibility: It can be implemented as a standalone measure, alongside existing systems – complementing rather than competing with them – or as part of a larger, comprehensive waste management strategy. Above all, this approach can help improve both environmental and social outcomes by creating income opportunities for informal waste workers and other economically disadvantaged groups, particularly when implemented as a social business model.

This manual presents the *Money4PlasticWaste* approach, specifically developed for Khulna City, where the *Private Sector Model* was studied based on an extensive pilot study (see Rohrbach et al. in preparation for more details). Independently, a form of the *Public Sector Model* has been implemented in Moulvibazar in 2023 and was analyzed by means of a case study (Hasan et al. in preparation). Drawing on experiences from the Khulna pilot and insights from the case study in Moulvibazar, this manual provides a step-by-step guide for implementing the *Money4PlasticWaste* approach. It covers key areas, such as feasibility assessments, stakeholder engagement, funding strategies, pilot testing, and monitoring systems.

The manual is primarily intended for municipalities, international aid agencies, and non-governmental organizations (NGOs) seeking strategies to improve waste collection systems for low-value plastic waste. However, it may also be of interest to private sector actors or organized community groups interested in initiating or leading such initiatives.

The manual is organized as follows:

- Chapter 2 introduces the *Money4PlasticWaste* approach, focusing on its development in Khulna City.
- Chapter 3 provides a step-by-step guide for implementing the *Money4PlasticWaste* approach based on the practical experiences gained during the Khulna pilot.
- Chapter 4 presents the lessons learned and key recommendations from the pilot study directly linked to the individual implementation steps.
- Chapter 5 outlines key topics for further development, adaptation, and testing to optimize and scale the approach.
- The appendices provide data sheets to support the implementation of the *Money4PlasticWaste* approach.

2 FROM CONTEXT TO CONCEPT: PRECONDITIONS AND OPTIONS

This chapter introduces preconditions and outlines two *Money4PlasticWaste* approaches, developed under the SCIP Plastics Project in collaboration with the Khulna City Corporation. Both approaches aim to incentivize the collection of low-value plastics, but differ in their operational structures. Their development was mainly informed by implementing a pilot study, supported by desk research and empirical social studies, including expert interviews and workshops with key stakeholders.

2.1 Preconditions for developing *Money4PlasticWaste* in Khulna City

Khulna City is the third biggest city in Bangladesh, located in the south of the country. Due to the effects of climate change on coastal Bangladesh, Khulna City expanded with vast growing informal settlements. This and other challenges make it difficult to implement municipal services such as door-to-door waste collection.



Figure 1:
Drainage system
clogged by plastic
waste.
Tanvir Ahmed, 2024.



Figure 2:
Illegal dumpsite for
plastic waste.
Florian Wehking,
2024.

The primary collection of waste in Khulna City is currently organized via collection points - mainly community bins and different types of secondary transfer stations. Residents are obliged to drop off their waste at these dedicated points from where the waste is transported to landfill by KCC trucks. In better-off neighborhoods, NGOs and Community-based Organizations (CBOs) run door-to-door collection systems for a small fee, which is directly charged at the door each month. Moreover, informal waste collectors collect valuable waste fractions, including recyclable plastic, and sell them to recycling waste traders or recycling shops. This collection system is suitable for dealing with vast growing communities where it is difficult to collect fees to finance the primary collection. However, this collection system is facing problems and waste is disposed of on streets and in public spaces or drainage canals and the Rupsa River, creating severe problems.

The waste collection system in Khulna City involves a range of actors, including the KCC, Community-Based Organizations (CBOs), NGOs, informal waste collectors (Tokai), door-to-door recycling buyers (Feriwala), recycling waste traders (Vangari shops), and recycling shops. These recycling shops primarily produce clean plastic flakes, sorted by color and material, which serve as raw materials for the plastics industry. Residents also play a vital role in the system, as they are responsible for bringing their household waste to designated collection points. Building on this context, the *Money4PlasticWaste* approach was suggested as an inclusive approach aimed at encouraging resident participation – the *Public Sector Model* - or supporting the livelihood of informal waste workers – the *Private Sector Model*.

The Private Sector Model

In the *Private Sector Model*, private companies become partners of KCC to handle the collection of mismanaged plastic waste. These contractors offer the service of collecting mismanaged plastic waste from streets and public spaces. Similar to recyclables, a price and collection system is established for the mismanaged plastic waste. In this way, informal waste workers can easily get involved by collecting mismanaged plastic waste alongside recyclables. After drop-off and payment, the material is stored at the site of the private company, ready to be picked up by KCC trucks for transportation to the final disposal site (landfill) or as waste-to-energy facilities (e.g. pyrolysis). In addition to providing collec-

tion and storage, the private company can add value to the material and turn it into feedstock for pyrolysis by sorting, washing, and shredding the material for plastic flake production.

In Khulna City, we have identified recycling shops as suitable partners for implementing the *Private Sector Model*. They already have established business contacts and partners from the informal sector (Tokai, Feriwalla, and Vangari Shops), which they can involve in the collection of mismanaged plastic waste. Recycling shops can easily add value to plastic materials for pyrolysis, as they already possess the necessary equipment and established processing routines.

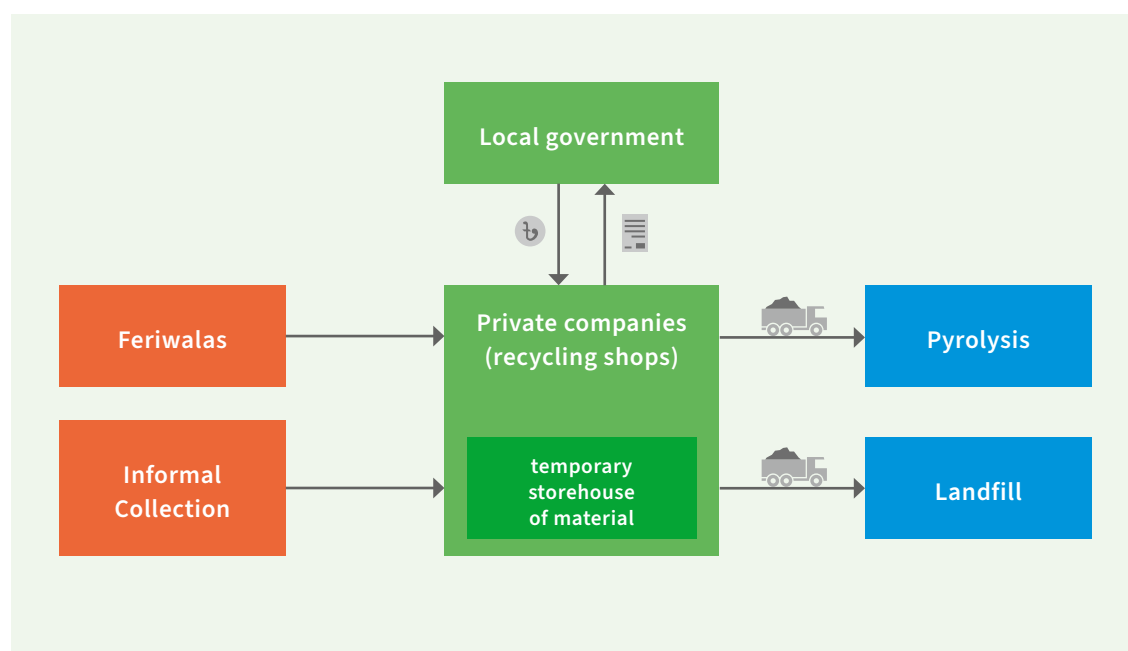


Figure 3: Visualization of the Private Sector Model. Actors of primary collection (red), actors of secondary collection or pre-treatment (green) and final disposal or recovery (blue).

The Public Sector Model

In the *Public Sector Model*, municipalities establish designated drop-off points – either fixed or temporary – where mismanaged plastic waste can be exchanged for a financial incentives. There are no exclusive collection partners; instead, the system is open to everybody, including individual residents and informal waste workers. The collection points may be located in public spaces, operated weekly, or connected

to ward councilor offices. Municipal trucks are then responsible for transporting the collected plastic to landfill or energy recovery facilities.

Such a model was implemented in Moulvibazar in 2023, a detailed description of the case study is available in Hasan et al., in preparation.

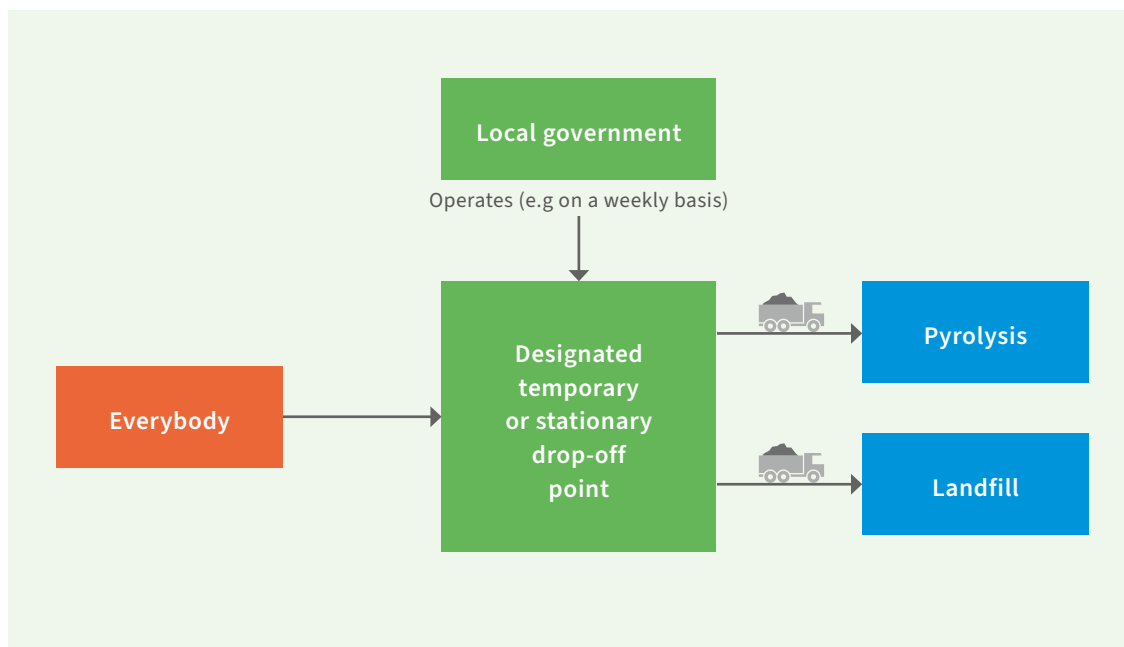


Figure 4: Visualization of the Public Sector Model. Actors of primary collection (red), actors of secondary collection (green), final disposal or recovery (blue).

3 STEP-BY-STEP GUIDE FOR IMPLEMENTING THE MONEY4PLASTICWASTE APPROACH

This step-by-step guide is designed to support the implementation of the *Money4PlasticWaste* approach by outlining the key phases necessary to assess its feasibility and prepare for its execution, both for a given context. While the steps are presented in a sequential manner, their order may vary and some phases may be developed concurrently. There are two options for implementing *Money4PlasticWaste*: the *Public Sector Model* and the *Private Sector Model* (see Chapter 2). For both models, the following topics need to be clarified.

STEP 1: FEASIBILITY CHECK

The first step is to assess whether the *Money4PlasticWaste* approach is appropriate for your city or municipality.



- **Political support and funding:** To what extent is there political will or institutional support from the relevant authorities for enhancing municipal waste management practices? Additionally, an assessment of external funding opportunities should be considered: Are there existing programs or initiatives that could provide financial support to implement the proposed *Money4PlasticWaste* approach?



- **Final disposal:** Are there adequate facilities or options available for the final disposal of plastic waste? If such options are currently unavailable, is there potential to improve the local waste management infrastructure to ensure the safe disposal of collected plastic waste at sanitary landfill sites or through treatment systems, such as waste recovery facilities?

STEP 2: STAKEHOLDER INVOLVEMENT AND MODEL SELECTION



- **Identify stakeholders:** All relevant stakeholders should be identified, covering the entire waste management chain – from the source (e.g., households and residents) to the final disposal site (e.g., informal waste workers at landfill sites or companies operating treatment facilities). In addition, it is important to consider private companies (e.g., recycling shops), private sector business associations, organized interest groups and NGOs.



- **Involve key stakeholders:** The municipality or city administration plays a central role in both models and should either lead or be actively involved in selecting and prioritizing the appropriate collection model. In both cases, the city administration is crucial for providing guidance, monitoring activities, and managing financial processes to support the system. Regardless of which option is chosen, appointing a dedicated contact person within the city administration is highly beneficial for ensuring smooth operations and long-term success.



- **Prioritize one *Money4PlasticWaste* option:** Both models can be implemented by leveraging existing organizations and infrastructure. For the *Private Sector Model*, this would involve partnering with established companies in the waste management sector; for the *Public Sector Model*, utilizing ward-level organizations offers a practical way of adopting a resource-based approach. Additionally, there is potential to integrate new structures, fostering opportunities for collaboration and innovation, which could lead to the development of novel partnerships or the establishment of new organizational levels to further enhance system efficiency and community engagement.



- **Involve key stakeholders:** The municipality or city administration plays a central role in both models and should either lead or be actively involved in selecting and prioritizing the appropriate collection model. In both cases, the city administration is crucial for providing guidance, monitoring activities, and managing financial processes to support the system.

Other potential key stakeholders: International aid agencies and even actors from the private sector might take over the lead in model implementation, especially if there is external funding. However, consultation with and outreach to the municipal or city administration should always be maintained to avoid contradictory ideas and developments.

Resource-based approach emphasizes leveraging an organization's unique internal resources – such as expertise, capabilities, and assets – to build sustainable competitive advantages and create long-term value in the marketplace.

Co-creation refers to the collaborative process where multiple stakeholders, such as customers, partners, or employees, actively contribute to the development or innovation of a product, service, or solution, fostering shared value creation.

Value added refers to the enhancement of a product or service by incorporating additional features, functionalities, or benefits, thereby broadening its capacity to fulfil a wider range of customer needs and elevating its overall market appeal.

STEP 3: PREPARATION OF A WRITTEN AGREEMENT

The *Private Sector Model* can be formalized through contracts, while the *Public Sector Model* can be supported by a standard operating procedure for operational guidance. A list of important topics is presented below. In Chapter 4 more details are presented on each topic based on our experiences from the pilot study:

- 1. Type and quality of targeted material:**
Which types of plastic are being targeted and what should be the condition of the material?
(See chapter 4.1.)
- 2. Working conditions and safety gear:**
What challenges do collectors face in their work and what measures can be taken to mitigate these issues?
(See chapter 4.2.)
- 3. Pricing and volume:** What is an appropriate price per kilogram for both collectors and operators? Is there a maximum purchase volume allowed within a specific time frame?
(See chapter 4.3.)
- 4. Payment scheme and contact person:**
What payment scheme would be most suitable?
(See chapter 4.4.)
- 5. Documentation and monitoring:**
What information is required and what procedures are appropriate for evaluation and monitoring?
(See chapter 4.5.)
- 6. Pick up, logistics, and final disposal:**
What factors need to be considered?
(See chapter 4.6.)

STEP 4: MUNICIPAL RESERVES AND FUNDING

The sustainability and success of implementing the model is significantly dependent on its economic feasibility. It must be both cost-effective for the municipality and provide sufficient motivation and fair compensation for the work performed.

Both models can have positive effects by reducing expenses linked to municipal solid waste management. These savings can be redirected to finance the *Money4PlasticWaste* approach. To get an idea of the costs that can be allocated, the financial experts and stakeholders responsible for the municipality's budgets must be involved. Together the effects of the model on the shift of the municipal cost should be discussed and assessed.

Here are some examples of cost saving through the collection models:

- Less plastic pollution leads to cleaner canals and drains, reducing the risk of flooding: Lower operational (e.g. fuel costs for lifting waste, wages) and maintenance costs (e.g. river bed dredging, repair costs for pipelines and pumps);
- Cleaner canals and drains decrease waterlogging, mosquito breeding, and dengue fever outbreaks: Lower costs for mosquito control programs and lower costs related to dengue fever (e.g. healthcare costs, economic impacts); and
- Additionally, there are indirect cost savings from a macroeconomic point of view, e.g. a reduction in healthcare costs due to fewer health issues (e.g., respiratory problems from burning waste, waterborne diseases from drains and canals).

Also, the following resources might be used to cover the cost of *Money4PlasticWaste*:

- Additional external financial resources - grant funds on regional, national, and international levels - might be available on program level and can be used to increase the amounts of mismanaged plastic collected;
- Pyrolysis: A fair share of the mismanaged plastic waste found on streets is suitable for conversion to oil by pyrolysis. Pyrolysis requires pretreating the material, such as sorting, shredding, and washing. The economic viability, however, must be assessed, as pyrolysis is a very energy intensive process and is, therefore, not necessarily very cost-effective. The proper and safe operation of such waste-to-energy attempts, including emission control, is mandatory. See also Chapter 5.4. for additional funding opportunities that can be considered.

STEP 5: PILOT AREA AND ROLL-OUT OF THE MODEL



- **Pilot Implementation:** A small-scale pilot should be conducted to test the model in a controlled environment, such as one city ward (for the *Public Sector Model*) or through collaboration with a limited number of private sector partners (e.g., 3–6 recycling shops for the *Private Sector Model*). Running the pilot over a defined period (e.g., six weeks) allows for the identification of strengths, weaknesses, and areas for improvement before scaling up, thereby minimizing potential issues and reducing costs during full implementation.



- **Phased Roll-out:** Following the pilot, the model can be gradually expanded, for example by shifting from one ward to another to achieve city-wide coverage. A phased approach supports continuous learning and adaptation.

Implementation efforts should be accompanied by a professional communication strategy to raise public awareness and encourage behavior change among residents, creating positive side effects that further support the model's success. Further recommendations on how to address knowledge gaps are presented in Chapter 5.

4 LESSONS LEARNED AND RECOMMENDATIONS FROM IMPLEMENTING A PILOT STUDY OF THE PRIVATE SECTOR MODEL IN KHULNA CITY

This chapter presents the key lessons from the six-month pilot study of the *Private Sector Model* in Khulna City at four different recycling shops. During the pilot study, special attention was given to determining a suitable price, ensuring material quality, establishing documentation and monitoring systems, improving working conditions for collection, exploring municipal funding through cost avoidance and possible negative effects, such as feedback loops of mis-managed plastic waste. A detailed description of the development and pilot implementation is presented in Rohrbach et al. (in preparation).

Table 1:
Pilot implementation – key facts and figures

Category	Details
Money4PlasticWaste option	Private Sector Model
Duration of pilot	6 months, September 2024 to February 2025
Number of recycling shops involved	4
Cooperation form	Written agreement with municipality
Number of waste collectors involved	20
Type of plastics collected	Common consumer plastics, e.g. food wrappers, polythene bags
Total amount of waste collected	51 tons
Price paid to recycling shops	30 BDT/kg
Fixed payment rate for collectors	25 BDT/kg
Funding scheme	Monthly disbursements to recycling shops by SCIP Plastics Project
Total amount spent	20 lakh BDT
Frequency of pick up at recycling shops	Weekly

4.1 Type and quality of targeted material

Types of plastic waste

The pilot focused on mismanaged plastic on streets and in public spaces, such as food wrappers and polythene bags. Additionally, process waste from recycling shops was accepted, mainly PET bottle labels. Commercial and industrial waste was excluded, as companies are responsible for managing their own waste. This type of waste can be identified because it is typically found in big homogeneous batches and is usually 10-20% heavier than street waste.

Effective quality control can be achieved by:

- Verifying that the dropped-off waste does not consist of homogeneous batches.
- Monitoring weight, as commercial and industrial waste is generally 10-20% heavier than typical street waste due to its uniformity and density.



Figure 5, 6: Examples of collected mismanaged plastic waste. Tanvir Ahmed, 2024.

Figure 7:
Examples of commercial and industrial waste excluded from the collection. Abdullah al Hasan, 2024.



Figure 8:
Roofed storage area at a local recycling shop. Tanvir Ahmed, 2025.



Moisture content

Open storage of the material can result in increased moisture content during the rainy season, which distorts the weight measurements. The price per kilogram is based on the dry weight of the collected material. To address this, measures should be taken:

- Encourage recycling shops to store plastics under their roofs or coverings to minimize moisture absorption.
- If dry storage is not feasible, a moisture deduction rate of 15-30% can be applied based on visual inspection and field conditions.

4.2 Working conditions and safety gear

Providing personal protective equipment (PPE), such as gloves, boots, and masks, as well as visible identification (e.g. ID badges or colored vests), is essential to ensure the safety and recognition of waste collectors during collection activities. Collectors reported that wearing ID gear is suitable to reduce incidents of harassment, improve their acceptance within the community, and facilitate smoother day-to-day operations. Visible work attire also helps prevent assaults and false accusations. Both Khulna City Corporation and recycling shop owners are committed to supply PPE and ID gear to support and protect waste collectors.



4.3 Pricing and volume

The initial purchase price was established as 40 BDT per kilogram, with each recycling shop allowed to submit up to 400 kilograms of mismanaged plastic waste per week. A single truckload was adequate for transporting the weekly collection to landfill. In addition to street-collected plastic waste, internal process waste from the recycling shops – mainly non-recyclable PET bottle labels – was also accepted.

After four months of operation, an evaluation was conducted through interviews with waste collectors and a workshop with recycling shop owners. Based on the evaluation findings, adjustments were made for the second phase of the pilot study. Recycling shop owners agreed to a revised buying price of 30 BDT per kilogram to enhance the model's long-term financial viability for KCC.

Under the new agreement, waste collectors receive a fixed payment of 25 BDT per kilogram, allowing recycling shops to retain 5 BDT per kilogram to cover operational costs. Under the new agreement, waste collectors receive a fixed payment of 25 BDT per kilogram, allowing recycling shops to retain 5 BDT per kilogram to cover operational costs for sorting, washing, and shredding if pyrolysis is intended. Simultaneously, the weekly maximum volume per shop was increased from 400 to 800 kilograms to scale up impact and income.



Figure 9, 10: Treatment machinery at a local recycling shop. Florian Wehking, 2024.

4.4 Payment scheme and contact person

During the pilot study, payment was organized by the SCIP Plastics Project administration, with monthly disbursements to recycling shops. KCC expressed interest in continuing the model and managing future payments and documentation through their existing municipal systems. To support smooth operations, particularly during the early stages of implementation, regular coordination meetings between the designated municipal contact person and private sector stakeholders are recommended. These meetings can help address operational issues promptly and foster trust among all parties involved.



Figure 11:
Weighing of the
collected material
at a recycling shop
before pick-up and
transportation.
Mir Noman Farsi,
2024.

4.5 Documentation and monitoring

Proper documentation and monitoring are essential to ensure the integrity and success of the *Money4PlasticWaste* approach. Municipalities should require all participating partners – whether at the ward level or from the private sector – to maintain clear and verifiable

records of material flows. To support that, this manual provides standardized data sheets for recording plastic waste volumes and quality.

These forms, completed by project staff during the pilot phase, served as the basis for calculating payments. Participating recycling shop owners were responsible for supplying appropriate weighing equipment, such as floor or crane scales, and ensuring that the equipment was properly calibrated.

Project staff conducted quality control on a weekly basis during the collection rounds. If municipal truck drivers are tasked with overseeing collections in future operations, it is recommended that they receive basic training in quality control procedures to maintain consistent standards.

In addition, robust monitoring mechanisms must be established to prevent malpractice, unfair competition, and fraud. As long as public funds are being used to finance the system, the local authority must take responsibility for maintaining proper documentation and overseeing compliance.

4.6 Pick-up, logistics and final disposal

Recycling shops received mismanaged plastic in loose form or bags from informal collectors. Depending on their facilities, the recycling shop owners stored the material covered or uncovered. A local collection vehicle (e.g., 7.5-ton truck) operated once a week to collect the mismanaged plastic waste from the participating shops.

Collection sites

Low-value plastic waste can also be collected from other locations, such as secondary transfer stations or, if located nearby, directly from the respective landfill site. However, collecting from these sites creates undesirable feedback loops, where waste that is already well disposed of, is deliberately returned to gain financial incentives. To mitigate this, improvements to the management and supervision of transfer stations should be implemented alongside

the *Money4PlasticWaste* model. Such improvements have been implemented at some transfer stations in Khulna already due to positive effects on the waste collection in general.

Impact of weather conditions

During dry seasons, the volume of mismanaged plastic waste tends to increase due to lower moisture content and the lighter, bulkier nature of the waste. This must be taken into account when planning for transportation capacity and scheduling pick-ups.

Landfill management

The accumulation of plastic waste at landfills can lead to negative impacts, including illegal open burning and destabilization of landfill structures. The latter is particularly problematic during the rainy season, when landfill conditions deteriorate. To address this, measures to improve landfill functionality and safety should be prioritized. Alternatively, the temporary suspension of plastic waste collection during periods of heavy rainfall may be considered to prevent additional risks.



Figure 12: Poor access conditions at local disposal site especially during rainy season. Senta Berner, 2022.



Figure 13: Weekly collection of low-value plastic waste by local trucks. Mir Noman Farsi, 2024.

5 ADDRESSING KNOWLEDGE GAPS IN THE CONTEXT OF THE MONEY4PLASTICWASTE APPROACH

While *Money4PlasticWaste* presents a promising approach for incentivizing plastic waste collection and promoting sustainable waste management practices, its effective implementation requires a deeper understanding of several issues. Addressing the wider consequences of the implementation is essential to ensure the approach is contextually appropriate, socially inclusive, environmentally sound, and economically viable.

5.1 Environmental impact assessment

The long-term environmental impacts of this collection scheme, as well as its potential to improve local municipal waste management, need to be further analyzed to avoid maladaptation. Comprehensive assessments are suitable to evaluate the environmental benefits of the *Money4PlasticWaste* approach, particularly in terms of emissions reduction, improved waste containment, and reduced plastic leakage into ecosystems.

5.2 System integration and institutional readiness

Further research, practical implementation, and evaluation are needed to assess how the *Money4PlasticWaste* approach can be effectively integrated into existing waste management systems. This also includes understanding the readiness of local institutions, regulatory frameworks, and infrastructure to support and scale the collection scheme. Further investigation into public-private partnership models and governance mechanisms would support informed, sustainable implementation.

5.3 Data gaps and monitoring systems

Reliable data on plastic waste generation, composition, and flows is often lacking, particularly in regions with weak formal waste management systems. Addressing this data gap is critical to set realistic targets, monitor progress, and ensure accountability. It is, therefore, important to focus on developing innovative, low-cost data collection and monitoring tools that can function in low-resource settings.

5.4 Economic sustainability

The long-term financial viability of the *Money4PlasticWaste* approach relies heavily on the establishment of stable market linkages. It is therefore crucial to explore opportunities for adding value, particularly through local recycling industries, social enterprises, and by assessing the material composition's suitability for processes like recycling and pyrolysis. In parallel, Extended Producer Responsibility (EPR) mechanisms can play a critical role in ensuring sustainable financing. EPR policies, which require producers to assume financial and/or operational responsibility for post-consumer plastic waste, could provide consistent funding for payment schemes, infrastructure improvements, and the development of inclusive value chains. Further research is needed to investigate how EPR frameworks can be effectively adapted to local contexts and enforced to support the long-term success of the approach.

5.5 Socioeconomic, behavioral dynamics and cultural sensitivity

Understanding the motivations, barriers, and behavioral patterns of individuals and communities involved in informal waste collection is crucial for designing effective incentive mechanisms that are fair, attractive, and adaptable to local realities. There is limited knowledge about these dynamics, making it essential to research how cultural norms, gender dynamics, and social hierarchies influence participation in the *Money4PlasticWaste* approach. Additionally, exploring the impact of these factors on benefit distribution can help ensure the approach is both inclusive and equitable.

Moreover, it is important to investigate the potential unintended consequences of monetary incentives, such as dependency on the scheme, exclusion of vulnerable groups, or even an increased tendency for littering, as collectors are compensated for cleaning up waste. Ensuring the program accounts for these variables will be vital in maintaining its effectiveness and fostering positive, long-term outcomes for local communities.

As the *Money4PlasticWaste* approach is piloted and potentially scaled, addressing these gaps should be viewed not as a secondary task, but as an integral part of the implementation process. In addition to the recommendations for further consideration, embedding the implementation into adaptive learning, participatory formats, and knowledge co-production into the project design will not only enhance effectiveness, but also strengthen local ownership and the long-term impact by addressing these topics.

ACKNOWLEDGEMENTS

We thank Mr. Jobaer Ahmed Saju for his early coordination efforts, the SCIP Plastics Awareness Centre Team for their dedicated support, and all interview partners for sharing their insights. Special thanks to the recycling shop owners at the pilot sites, whose collaboration and fruitful exchange were key to the success of the pilot study. We also acknowledge the support of the KCC throughout the process and sincerely thank the senior advisors of the SCIP Plastics Board of Directors, especially Heide Kerber and Professor Dr. Quazi Hamidul Bari, for their consultation.

REFERENCES

Akinkuolie, T. A., Ogunbode, T. O., & Adekiya, A. O. (2025). Assessing rainfall trends and its implications on sustainable waste management in south-western Nigeria. *Discover Applied Sciences*, 7(4), 231. <https://doi.org/10.1007/s42452-025-06678-y>

Akther, S., Evans, J., & Millington, N. (2024). Why do cities in the global South pursue waste incineration rather than source segregation and recycling? Insights from Bangladesh. *Frontiers in Sustainability*, 5. <https://doi.org/10.3389/frsus.2024.1496075>

Apio, E., Opio, B., Acanga, A., & Akello, A. R. (2024). Factors influencing willingness to pay for improved solid waste collection services among households in urban cities in Uganda: Empirical evidence from Lira City. *BMC Public Health*, 24(1), 2150. <https://doi.org/10.1186/s12889-024-19568-6>

Hasan, A. A., Ahmed, T., Bari, Q. H., Lorber, P., Noman, M., Rohrbach, M. (in preparation). Municipal Action Against Plastic Waste: A Case Study of the Moulvibazar Polythene Purchasing Initiative.

Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., ... & Law, K. L. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768–771. <https://doi.org/10.1126/science.1260352>

Kasala, S. E. (2014). Critical Analysis of the Challenges of Solid Waste Management Initiatives in Keko Machungwa Informal Settlement, Dar es Salaam. *Journal of Environmental Protection*, 5(12), Article 12. <https://doi.org/10.4236/jep.2014.512105>

Rohrbach, M., Ahmed, T., Bari, Q. H., Hasan, A. A., Lorber, A. Lück, P., Noman, M., Saju, J. A., (in preparation): Driving innovation in waste management by blending public private partnership and social enterprise: A pilot study in Khulna City, Bangladesh.

Saju, J. A., Bari, Q. H., Rafizul, I. M., Alamgir, M., Kraft, E., & Lorber, P. (2024). Observation of non-recyclable plastic in recycling shops: Present practice and potential usage. *Journal of Material Cycles and Waste Management*, 26(2), 800–815. <https://doi.org/10.1007/s10163-023-01880-9>

IMPRINT

Title:

Money4PlasticWaste: Advancing Waste Collection in Bangladesh Implementation Guide

Authors:

Michaela Rohrbach, Tanvir Ahmed, Abdul Aziz, Prof. Dr. Quazi Hamidul Bari, Mir Mohammad Noman Farsi, Abdullah Al Hasan, Abir Ul Jabar, Philipp Lorber

Khulna Pilot Study - Project partners:



Suggested citation:

Michaela Rohrbach, Tanvir Ahmed, Abdul Aziz, Prof. Dr. Quazi Hamidul Bari, Mir Mohammad Noman Farsi, Abdullah Al Hasan, Abir Ul Jabar, Philipp Lorber (2025). Money4PlasticWaste: Advancing Waste Collection in Bangladesh Implementation Guide. May 2025. Frankfurt, Germany: DOI: 10.5281/zenodo.15364638, SCIP Plastics Project. Available at: www.scip-plastics.com.

DOI:

10.5281/zenodo.15364638

Khulna Pilot Study - Implementing partners:

Ma Babar Doya Plastic, Md Moshiur Rahman. Bismillah Plastic, Md Didar Hossain Iraj. Messrs Diya Enterprise, Devdas Roy. Messrs J.N. PET Flakes, M.N. Islam Rony.

Project coordinator:

Philipp Lorber
Bauhaus-Universität Weimar, Germany
Faculty of Civil and Environmental Engineering
Chair of Resource Management
philipp.lorber@uni-weimar.de
waste@bauing.uni-weimar.de

www.scip-plastics.com

Corresponding author:

Michaela Rohrbach
ISOE – Institute for Social-Ecological Research
Hamburger Allee 45
60486 Frankfurt am Main, Germany
michaela.rohrbach@isoe.de

Layout and graphic design:

parzelle34, Weimar

based on the layout of
Waldmann - Büro für Gestaltung

supported by
Huseyn Huseynbayli

License:

This work is licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0), allowing sharing, copying, distribution, and adaptation for any purpose, provided proper attribution is given to the original authors. For more details, please visit <https://creativecommons.org/licenses/by/4.0/>.



Funding information:

The project on which this publication is based was funded by the Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety under Grant No. 67MM0004. Responsibility for the content of this publication lies with the editors and authors. The Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN) supports this initiative based on a decision adopted by the German Bundestag.

Supported by:



Federal Ministry
for the Environment, Climate Action,
Nature Conservation and Nuclear Safety

based on a decision of
the German Bundestag

APPENDIX A: DOCUMENTATION AND MONITORING FORMS

A.1 Sample log sheet for waste received at recycling shop

Nº	Date	Waste collector (Name or ID)	Amount [KG]	Buying Price [BDT]	Signatures: shop staff and waste collector
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
Total:			Kg	BDT	

A.2 Sample log sheet for internal process waste from recycling shop

Nº	Date	Amount [KG]
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
		Kg

A.3 Summary and payment reconciliation sheet

Date: _____

Data Collector Name: _____

Shop Name: _____

Section 1: Amount of material received since last recording

Categories	Weight [KG]
External waste: Non-valuable plastic waste and compound material	
Internal waste: Process Waste	
Total:	

Section 2: Monetary Incentives

Categories	BDT/Kg	Total preliminary Amount (BDT)
External waste:		
Internal waste:		
Total:		

The total amount of will be transferred via bank cheque on a monthly basis.

Section 3: Additional comments

Section 4: Signatures

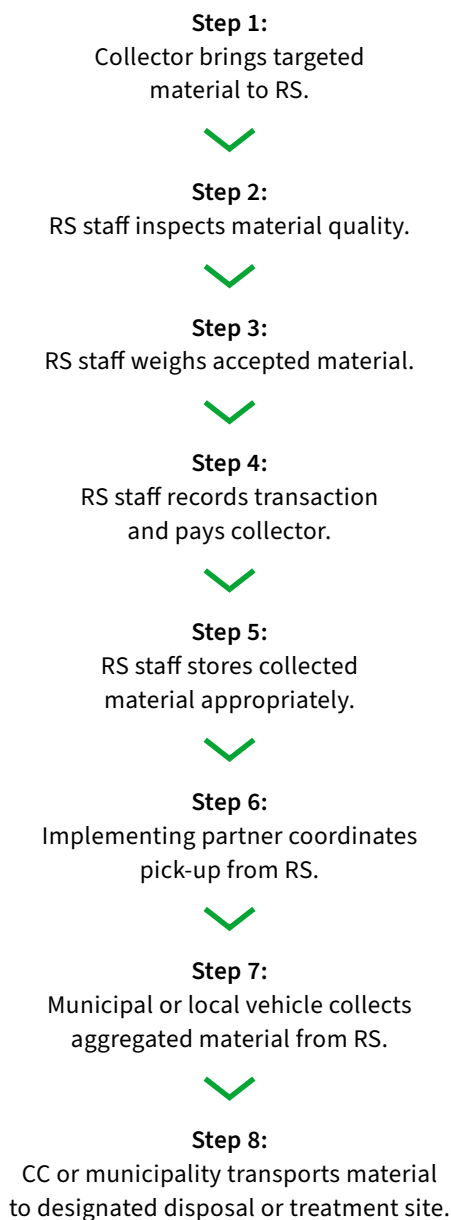
Signature *Implementing body*

Signature *Recycling shop owner*

Both parties should keep one copy for own documentation purpose.

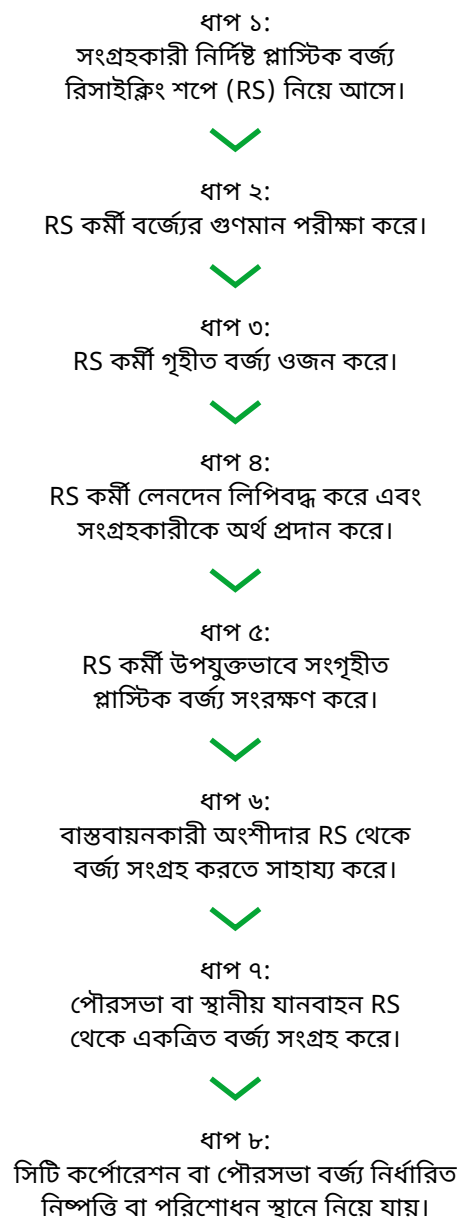
APPENDIX B: PROCESS FLOW – PRIVATE SECTOR MODEL (OPERATIONAL DETAIL)

Visual Flowchart: From collector
to final pick-up for treatment or disposal



RS: Recycling shop
CC: City Corporation

দৃশ্যমান প্রবাহচিত্র: সংগ্রহকারীর কাছ থেকে চূড়ান্ত
পিক-আপ পর্যন্ত পরিশোধন বা নিষ্পত্তির জন্য



RS: রিসাইক্লিং শপ
CC: সিটি কর্পোরেশন

APPENDIX C: TARGETED MATERIAL GUIDELINES

ACCEPTABLE material (street waste and process waste) Focus: low or non-valuable, post-consumer plastic waste typically found mismanaged in streets and public spaces.

Examples: Food wrappers (e.g., chips bags, biscuit wrappers), single-use polythene bags, PET-bottle labels

Reasoning: These items have little to no existing informal collection value, thus contributing most to environmental pollution and blockage of drains.



NOT ACCEPTABLE material

- Industrial and commercial waste (e.g. large, homogenous bales of specific plastic types from factories, off-cuts). Reasoning: Businesses are responsible for their own waste; this material is not “mismanaged street waste.”
- Highly contaminated waste (e.g. heavily mixed with organic waste, medical waste, hazardous materials). Reasoning: Poses health risks and is unsuitable for intended downstream processes.
- Recyclable plastics with existing market value (e.g., clean PET bottles, HDPE containers – unless specifically included after careful consideration of market dynamics). Reasoning: Already collected by informal sector, avoid disrupting existing value chains.



গ্রহণযোগ্য বর্জ্য (রাস্তার আবর্জনা এবং প্রক্রিয়াজাত বর্জ্য) সমূহ: ভোক্তার ব্যবহৃত নিম্ন মূল্যের অথবা মূল্যহীন প্লাস্টিক বর্জ্য যা সাধারণত রাস্তাঘাট ও সর্বোজনীন স্থানে অব্যবস্থাপনা অবস্থায় পাওয়া যায়।

উদাহরণ: খাবারের মোড়ক (যেমন: চিপসের প্যাকেট, বিস্কুটের মোড়ক), একবার ব্যবহারযোগ্য পলিথিন ব্যাগ, PET বোতলের লেবেল।

কারণ: এই বর্জ্যগুলোর তেমন সংগ্রহমূল্য নেই, ফলে এগুলো পরিবেশ দূষণ এবং ড্রেনের ব্লকেজের প্রধান কারণ।

অগ্রহণযোগ্য বর্জ্য

- শিল্প ও বাণিজ্যিক বর্জ্য (যেমন: কারখানার একজাতীয় প্লাস্টিকের গুচ্ছ, কাটিং বর্জ্য)। কারণ: ব্যবসা প্রতিষ্ঠান তাদের নিজস্ব বর্জ্যের দায়ভার বহন করে এজন্য এটি “অব্যবস্থাপিত রাস্তার বর্জ্য” নয়।
- অত্যন্ত দূষিত বর্জ্য (যেমন: জৈব বর্জ্য, চিকিৎসা বর্জ্য ও বিপজ্জনক পদার্থের সংমিশ্রণ)। কারণ: স্বাস্থ্যের জন্য অতিমাত্রায় ঝুঁকিপূর্ণ এবং রিসাইক্লিং প্রক্রিয়ার জন্য অনুপযোগী।
- পুনর্ব্যবহারযোগ্য প্লাস্টিক যার বাজারমূল্য আছে (যেমন: পরিষ্কার PET বোতল, HDPE কনটেইনার – বাজারের অবস্থা বিবেচনা করে যদি না বিশেষভাবে অন্তর্ভুক্ত করা হয়)। কারণ: এগুলো আগে থেকেই অনানুষ্ঠানিক খাতে সংগ্রহ হয়, তাই বিদ্যমান ভ্যালু চেইন ব্যাহত না করাই শ্রেয়।

APPENDIX D: MATERIAL STORAGE AND HANDLING AT RECYCLING SHOPS

Recommendations for storing collected plastic

- Store under cover: Protect from direct rain and excessive sun. Use tarpaulins if a permanent roofed area is unavailable.
- Reasoning: Prevents material from becoming waterlogged (which distorts weight and payment accuracy) and degrades slower.
- Keep relatively clean: Store away from excessive dirt, mud, or other contaminants (which distorts weight and payment accuracy).
- Reasoning: Maintains material quality for potential downstream uses and keeps pick-up vehicles cleaner.
- Ensure good ventilation if stored in large quantities.

Required tools and equipment for recycling shop operation

- Calibrated weighing scales: (e.g. platform scale, hanging spring balance) capable of accurately measuring kilograms. Regular calibration checks advised.
- Logbooks/Record Sheets: As per Appendix A.
- Storage Bags/Sacks (if needed for consolidating material before pick-up).

সংগৃহীত প্লাস্টিক বর্জ্য সংরক্ষণের জন্য সুপারিশসমূহ

- ঢেকে সংরক্ষণ করুন: সরাসরি বৃষ্টি এবং অতিরিক্ত সূর্য থেকে সুরক্ষা দিন। যদি স্থায়ী ছাদ না থাকে তবে ত্রিপল ব্যবহার করুন।
- কারণ: বর্জ্যগুলি ভিজে ভারী হওয়া ও দ্রুত নষ্ট হওয়া থেকে রক্ষা পায় (ওজন এবং অর্থ প্রদানের নির্ভুলতা বজায় রাখে)।
- যথাসম্ভব পরিষ্কার রাখুন: অতিরিক্ত ময়লা, কাদা বা দূষণ থেকে দূরে রাখুন (যা ওজন এবং অর্থ প্রদানের নির্ভুলতা বজায় রাখে)।
- কারণ: সম্ভাব্য রিসাইক্লিংয়ের এর জন্য বর্জ্যের মান বজায় থাকে এবং কেসিসির বর্জ্য সংগ্রহকারী পরিবহন পরিষ্কার থাকে।
- যদি অনেক বেশি পরিমাণে বর্জ্য সংরক্ষণ করা হয় তবে যথেষ্ট বায়ু চলাচল নিশ্চিত করুন।

রিসাইক্লিং শপ পরিচালনার জন্য প্রয়োজনীয় সরঞ্জাম ও উপকরণ

- ক্যালিব্রেটেড ওজন যন্ত্র: (যেমন: প্ল্যাটফর্ম স্কেল, হুলন্ত স্প্রিং স্কেল) যা কেজিতে সঠিক পরিমাপ দিতে সক্ষম। নিয়মিত ক্যালিব্রেশন প্রয়োজন।
- লগবুক/রেকর্ড শিট: পরিশিষ্ট A অনুযায়ী।
- সংরক্ষণ ব্যাগ/বস্তা (সিটি কর্পোরেশন কর্তৃক সংগ্রহের পূর্বে বর্জ্য একত্রীকরণের জন্য)।

APPENDIX E: PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR WASTE COLLECTORS

Recommended PPE Items

- Heavy-duty gloves: Protect hands from cuts, sharp objects, dirt, and contaminants.
- Sturdy boots: Protect feet from sharp objects, unhygienic conditions, and potential injury.
- Masks (e.g., reusable cloth masks or disposable surgical masks): Reduce inhalation of dust and airborne particles.
- Visible identification (e.g., ID badges or simple colored vests provided by City Corporation/Project):

Rationale for Provision and Use

- Safety & Health: Reduces risk of injury and illness associated with handling waste.
- Recognition & Legitimacy: ID/vests help collectors be recognized as part of an official program, potentially reducing harassment and improving community acceptance.
- Professionalism: Contributes to a more organized and professional image of the waste collection effort.

Responsibility for Provision

- As stated in the main document, the City Corporation and/or partner recycling shops should commit to supplying PPE to registered/participating collectors.

সুপারিশকৃত PPE উপকরণসমূহ

- হেভি-ডিউটি গ্লাভস: হাত'কে কাটাছেঁড়া, ধারালো বস্তু, ময়লা ও দূষণ থেকে রক্ষা করে।
- মজবুত বুট: পা'কে ধারালো বস্তু, অস্বাস্থ্যকর পরিবেশ এবং আঘাত থেকে রক্ষা করে।
- মাস্ক (যেমন: পুনঃব্যবহারযোগ্য কাপড়ের মাস্ক বা ডিসপোজেবল সার্জিক্যাল মাস্ক): বাতাসে থাকা ধূলিকণা শ্বাস প্রশ্বাসে প্রবেশ কমায়।
- দৃশ্যমান পরিচয় (যেমন: আইডি কার্ড বা রঙিন ভেস্ট যা সিটি কর্পোরেশন/প্রজেক্ট থেকে প্রদান করা হয়)।

সরবরাহ এবং ব্যবহারের কারণ

- নিরাপত্তা ও স্বাস্থ্য: বর্জ্য সংগ্রহের সঙ্গে সংশ্লিষ্ট আঘাত ও রোগের ঝুঁকি হ্রাস করে।
- স্বীকৃতি ও গ্রহণযোগ্যতা: ID/ভেস্ট সংগ্রাহকদের আনুষ্ঠানিক কমসূচির অংশ হিসেবে স্বীকৃতি দেয়, হয়রানি কমায় এবং জনগণের কাছে গ্রহণযোগ্যতা বাড়ায়।
- পেশাদারিত্ব: বর্জ্য সংগ্রহ প্রচেষ্টাকে আরও সংগঠিত ও পেশাদার ভাবমূর্তি প্রদান করে।

সরবরাহের দায়িত্ব

- মূল নথি অনুযায়ী, সিটি কর্পোরেশন এবং/অথবা অংশীদার রিসাইক্লিং শপগুলো নিবন্ধিত/অংশগ্রহণকারী সংগ্রাহকদের PPE সরবরাহের জন্য প্রতিশ্রুতিবদ্ধ থাকবে।

