PLEASE Project
Plastic Free Rivers and Seas for South Asia

South Asia Co-operative Environment Programme (SACEP) Plastic free Rivers and Seas for South Asia (P171269)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR MATERIAL RECOVERY FACILITY

GRANTEE: DOKO RECYCLERS PRIVATE LIMITED - NEPAL

Implemented by: SACEP
Supported by: UNOPS
Supported by: WORLD BANK GROUP

Environmental and Social Management Plan (ESMP)

1. Subproject Information

Subproject Title:	**Reclaiming the Value of Plastic Waste through a Plastic Recovery Facility (PRF) By Doko Recyclers**
Estimated Cost:	**$119,745**
Start/Completion Date:	**1 July 2024/ 31 Jan 2025**

2. Site/Location Description

The proposed Plastic Recovery Facility (PRF) aims to enhance plastic waste identification, segregation, and recovery in Bhaktapur Municipality and Lalitpur Metropolitan City, which share a common boundary. While the facility itself is located in Bhaktapur Municipality, its strategic placement near rural wards provides access to leased land and is in proximity to both municipalities.

Lalitpur, a historic district, and Bhaktapur, one of the oldest cities in Kathmandu Valley, are renowned for their rich cultural heritage, particularly in metal and woodwork craftsmanship. Over the years, both municipalities have evolved, maintaining their artistic traditions while facing the modern challenge of waste management, particularly plastic waste.

The proposed PRF lies in the Ittapaka Planning area, ward 2, Bhaktapur Municipality (Fig 1). The PRF benefits from accessible infrastructure, with a 20-foot road leading directly to the

facility, ensuring ease of transportation for waste collection vehicles. The facility is situated about 300 meters from Bhaktapur- Nagarkot highway. The facility is surrounded by Byasi in the East, Sallaghari in the South, Changunarayan in the North, and Nikoshera in the West. Additionally, the site is connected to a reliable water supply pipeline, ensuring adequate resources for operations. The panoramic picture across different directions of the site is shown in Annex 1

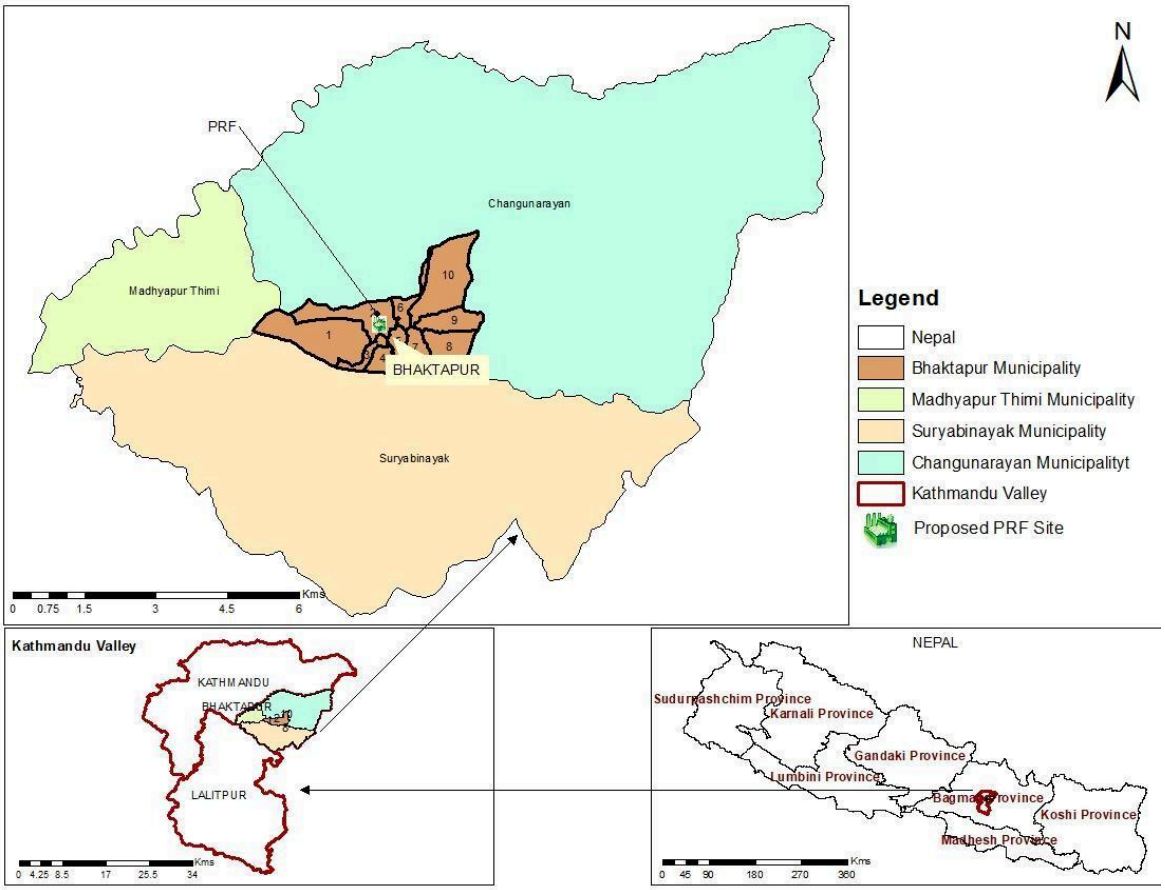


Fig. 1. Location map

Bhaktapur Municipality:

Bhaktapur, located in Province No. 3 of Nepal, spans 6.88 square kilometers and consists of 10 wards with a population of 79,136, distributed among 18,987 households. The municipality is celebrated for its cultural landmarks, including the World Heritage Site-listed Durbar Square and the 55-Window Temple.

The municipality generates 24.29 tons of municipal solid waste (MSW) daily, of which 3.13 tons is plastic waste, constituting 18% of total waste. The remaining 77% consists of degradable waste, often used for composting. With plastic waste becoming a significant portion of the waste stream, effective plastic waste management, especially near the heavily polluted Hanumante River, is crucial. The river, which flows through Bhaktapur before joining the Manohara River, is severely affected by human encroachment and waste disposal, including plastic waste, leading to water contamination.

The municipality has a total population of 79,136, with a male-to-female ratio of 39,755 to 39,381. The next two charts depict the population distribution by age group and population distribution by profession.

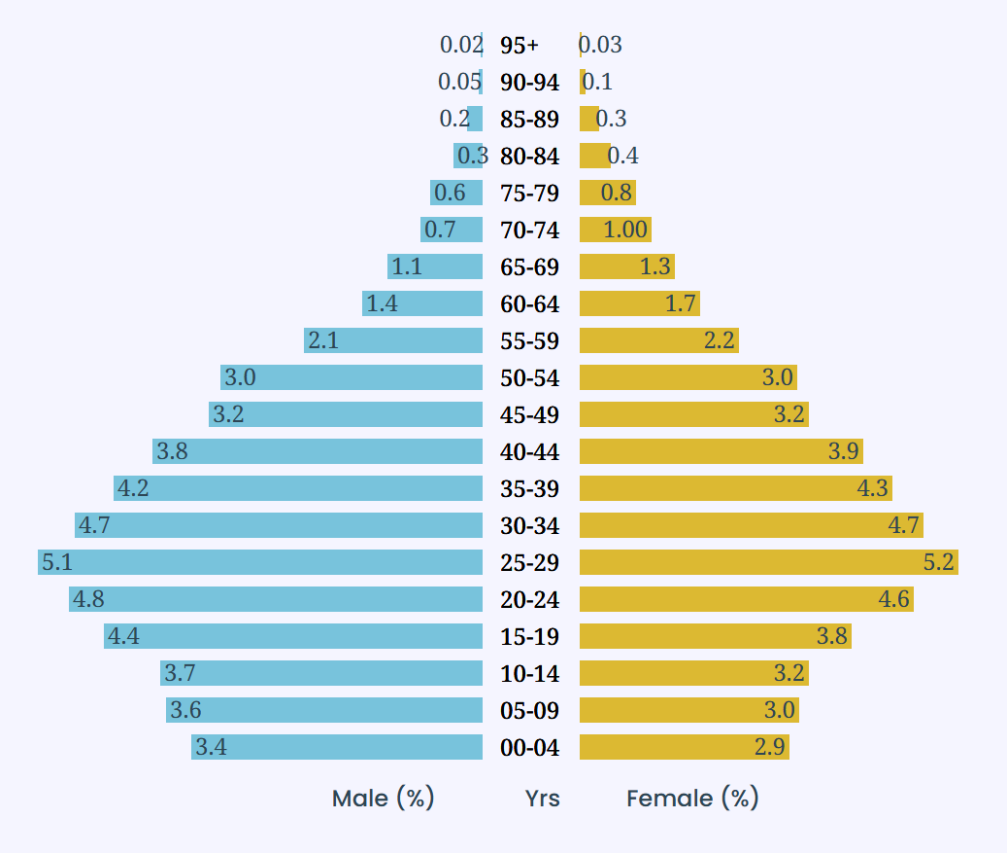
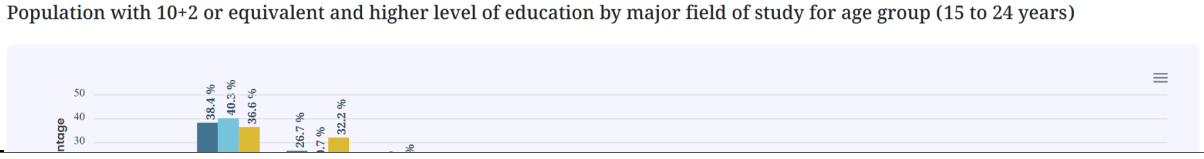


Figure 3: Population Distribution by Age Group in Bhaktapur Municipality[1]



[1] Population | National Population and and Housing Census 2021 Results (cbs.gov.np)

Literacy rate: 86.9% (Male: 93.3%, Female: 80.6%)

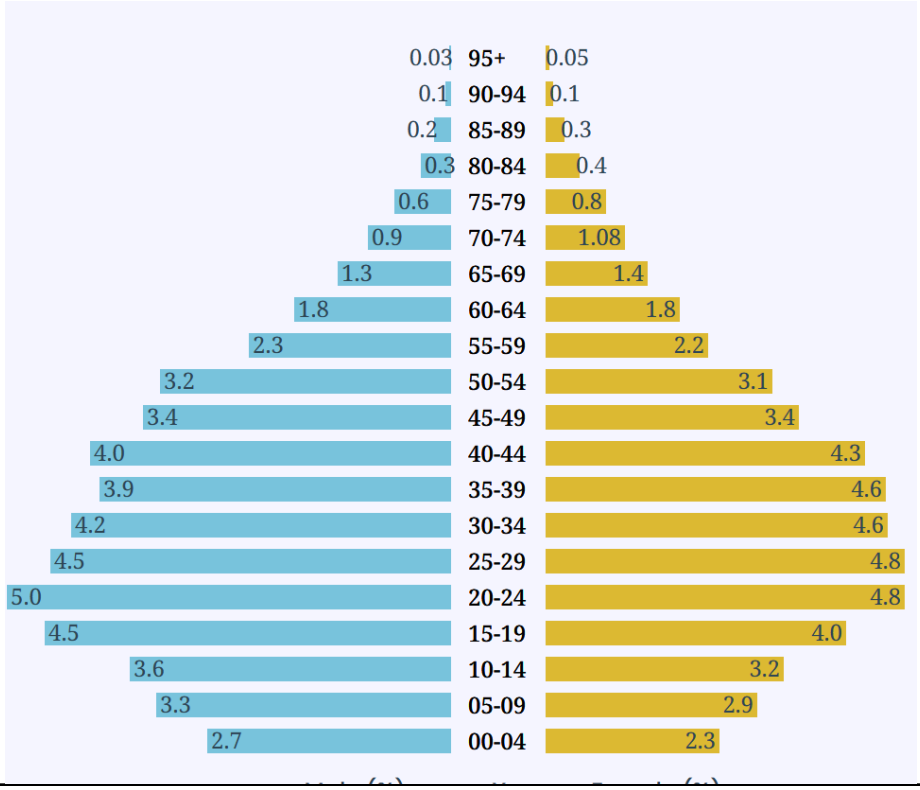
Lalitpur Metropolitan City:

Lalitpur, spread over 37.4 square kilometers, is home to 299,843 residents and 49,044 households, divided into 29 wards. As an industrial hub, it hosts 150 industries within the Patan Industrial Estate and various cottage industries. Waste generation in Lalitpur has risen from 110 metric tons per day (MT/day) in 2015 to 126 MT/day in 2019, of which 17.7% (20.16 tons) is plastic waste.

Despite significant private-sector involvement in waste management—recovering and recycling 35% of the total waste collected—the lack of a dedicated landfill site poses challenges. Waste from Lalitpur is transported to the Banchare Landfill in Nuwakot, operated by Kathmandu Metropolitan City.

The informal recycling sector in Lalitpur collects approximately 29.7 tons of plastic waste daily for recycling. However, recycling rates remain low due to limited data and awareness about the recovery potential from landfill sites. While Lalitpur's equipment and NGO participation in the waste collection are robust, rapid urbanization and waste mismanagement have led to environmental concerns, including pollution of water bodies such as the Bagmati and Nakhu Rivers.

The next two charts depict the population distribution by age group and population distribution by profession.



Literacy Rate: 90% (Male: 94.6%, Female: 85.4%)

Population aged 10 years and above who performed any economic activity in the last 12 months preceding the census by major occupation

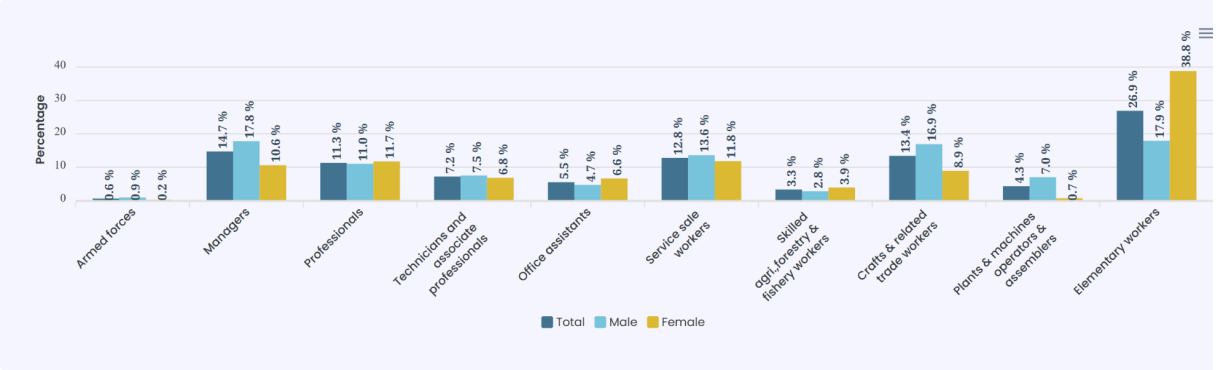


Figure 6: Population distribution by profession

Plastic Waste Challenges and Opportunities:

Plastic waste recovery remains a key focus for both municipalities. Lalitpur Metropolitan City's baseline survey, conducted by Doko Recyclers, highlights the city's plastic recovery capacity but also underlines challenges such as unregulated landfills, fires, and toxic emissions. Bhaktapur, with its rapidly growing plastic waste stream, faces similar challenges, particularly in areas close to water sources like the Hanumante River.

The PRF project aims to tackle these challenges by improving plastic recovery rates and reducing the environmental impact of unmanaged plastic waste. The facility's strategic location near major urban centers, coupled with accessible roads and water supply, positions it as a critical asset in addressing the region's waste management needs.

3. Subproject Description and Activities

The subproject will establish a Material Recovery Facility (MRF) within an existing structure, thereby eliminating the need for new construction. However, renovations will be undertaken to ensure compliance with Water, Sanitation, and Hygiene (WASH) standards and to enhance accessibility through the incorporation of gender- and disability-inclusive features.

Upon completion of the renovation phase and procurement of necessary equipment, the installation of machinery and the development of a structured waste collection system will be implemented. The facility will integrate key processing technologies, including a Trommel screen for size-based sorting, conveyor belts for preliminary separation, and mechanical systems for baling. The recovered plastic materials will subsequently be transferred to appropriate recycling or transformation industries for further processing.

During the operational phase, plastic waste will be collected via the Dry Mixed Waste Collection Channel in collaboration with Bhaktapur Municipality. The project is designed to achieve a recovery target of 750 metric tons of plastic waste over five years, processing an estimated 2,200 metric tons of mixed dry waste.

The process at the Material Recovery Facility (MRF) is as follows:

A. **Collection:** The project will source plastics from Doko's primary collection operations and secondary suppliers. This will be followed by a thorough sorting process that encompasses all plastic grades. Additionally, plastics will be collected from private waste management companies that offer door-to-door collection services. Another source of collection will be the dry waste fraction from municipal solid waste.

B. **Size Screening:** The collected plastic waste will undergo size screening using a Trommel screen, resulting in three distinct outputs based on size. This process will enable the further sorting of larger-sized plastics into different grades, taking into account their recyclability and potential for reforming and reuse.

C. **Baling:** PET bottles and HDPE plastics will be compacted and baled into bundles, preparing them for supply to processing industries as raw materials.

Additionally, the initiative will facilitate capacity-building programs for 50 informal waste workers (IWWs), providing training in occupational health and safety (OHS), gender equality and social inclusion (GESI), and the prevention of sexual exploitation and abuse (PSEA). These interventions aim to enhance economic opportunities for IWWs by improving their engagement in plastic waste collection and resource recovery. Source segregation awareness campaigns will be conducted in high-waste-generating areas, including residential colonies and apartment complexes. Segregated dry waste will be transported to the Plastic Recovery Facility (PRF) for processing. The facility will employ advanced sorting mechanisms, including

a trommel screen for size-based separation and conveyor belts for polymer-grade classification. The processed plastic waste will then be baled and dispatched to specialized recycling units for further refinement.

4. ESMP Matrix: Risk and Impacts, Mitigation, Monitoring

Table 1: Risk and Impacts, Mitigation, Monitoring for the renovation and machine setup phase

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Dust and air pollution due to renovation and installation work can lead to health issues and cause public nuisance.	1. Implement dust suppression techniques (e.g., water spraying). Use enclosed machinery. 2. Daily dust suppression checks. 3. Provision of PPEs 4. Monthly air quality monitoring (dust levels). 5. Introducing GRM for communities	At the site, daily for dust suppression; and weekly for air quality checks.	Environmental Officer	Dust levels in the air. Use of PPEs Air quality reports Complains reported in GRM	Air sampling at construction site boundaries; reviewing GRM	Site Manager PM, , UNOPS, Please project-Nepal	$200
Noise Pollution due to machinery usage can lead to health issues and cause public nuisance.	1. Use noise barriers and equipment with noise reduction features. 2. Limit working hours to minimize disturbances. 3. Daily noise level monitoring. 4. Provision of PPEs 5. Monthly noise level assessments. 6. Introducing GRM to communities	At the site, daily for noise control; and monthly for assessments.	Safety Officer	Noise levels. Complains reported in GRM	Noise level measurements at site boundaries; daily for control, monthly for assessments. Reviewing GRM	Site Manager, PM, UNOPS, Please project-Nepal	$200

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Waste Generation during renovation activities	1. Implement a waste management plan for the renovation stage. 2. Weekly waste audits. 3. Waste tracking records	Construction site, weekly for waste management; monthly for tracking.	Waste Management Team	Availability of waste management plan Amount of waste generated and recycled.	Waste audit reports; weekly for management, monthly for tracking.	Site Manager PM, , UNOPS, Please project-Nepal	$100
Soil Erosion and Sedimentation can cause soil and water pollution	1. Use erosion control measures (e.g., silt fences). 2. Stabilize soil after renovation activities. 3. Regular inspection of erosion control measures 4. Quarterly sedimentation monitoring.	At the site, daily for erosion control; and quarterly for sedimentation.	Environmental Office	Soil erosion and sediment levels.	Visual inspections and sediment sampling; daily for control, quarterly for monitoring.	Site Manager PM, , UNOPS, Please project-Nepal	$150
OHS Risks During Installation of Machines and Maintenance	1. Develop and implement safety protocols/ SOPs 2. Provide necessary PPE and training 3. Recruit skilled personnel for machine installation 4. Daily safety protocol adherence	Maintenance site, daily for protocol checks; weekly for inspections.	Safety Officer	Compliance with safety protocols, and incident frequency.	Daily inspections, safety logs, and incident reports; weekly inspections.	Facility Manager PM, , UNOPS, Please project-Nepal	$350

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	5. Weekly safety inspections and incident reporting						
OHS risk associated with Poor Hygiene and Sanitation	1. Upgrade and maintain WASH facilities to ensure they meet hygiene standards 2. Regular inspections and maintenance 3. Monthly inspections of WASH facilities. 4. Quarterly audits of sanitation and hygiene practices.	Facility site, monthly for WASH facilities; quarterly for audits.	WASH Coordinator	Functionality and cleanliness of WASH facilities.	Inspections, maintenance records, and audits; monthly for facilities, quarterly for audits.	Facility Manager PM, , UNOPS, Please project-Nepal	$1000
Other safety Risks (e.g., falls, equipment accidents)	1. Provide safety training, use proper signage, and maintain equipment. 2. Conduct regular safety inspections. 3. Daily safety checks. 4. Weekly safety inspections and incident reporting. 5. Providing required PPE and Daily safety briefing to the workers 6. Emergency Preparedness plan and necessary trainings	At the site, daily for safety checks; weekly for inspections.	Safety Officer	Compliance with safety protocols, number of incidents, Use of PPEs, Training Records, Emergency preparedness plan	Routine inspections, safety logs, and incident reports; daily for checks, weekly for inspections.	Site Manager, PM, , UNOPS, Please project-Nepal	$200

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	7. Providing sanitary facilities, providing separate washing facilities for male and female workers, and access to safe drinking water						
Inadequate fencing and security leading to unauthorized access, theft, or safety hazards	1. Ensure proper installation and regular upkeep of fencing 2. Conduct security assessments regularly 3. Monthly inspections of fencing 4. Quarterly security assessments and feedback collection.	Facility perimeter, monthly for fencing; quarterly for assessment	Security Officer.	Condition of fencing and security effectiveness.	Visual inspections, and security reports; monthly for fencing, quarterly for assessments.	Facility Manager PM, , UNOPS, Please project-Nepal	$500
Gender discrimination in job opportunities and wages	1. Implement GESI policies and conduct regular training. 2. Monitor and ensure equal opportunities 3. Quarterly GESI training sessions. 4. Biannual GESI audits and feedback collection.	Facility site, quarterly for training; biannual for audits.	GESI Officer	Compliance with GESI policies, and feedback on practices.	Training records, audit reports, and feedback; quarterly for training, biannual for audits.	Facility Manager PM,UNOPS, Please project-Nepal	$400
Project Delays Due to Lack of	1. Ensure all maintenance activities are completed. 2. Verify that all systems are operational and compliant.	Facility site, final checks before operation begins.	Maintenance Team	Status of facility systems and readiness.	Final inspections and operational readiness review.	Facility PM, , UNOPS, Please	$100

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Operational Readiness	3. Final checks on facility systems. 4. Comprehensive operational readiness review before start.					project-Nepal	
Complaints from nearby factories due to operational impacts.	1. Coordinate with nearby factories to manage potential disruptions. 2. Implement measures to reduce noise and dust. 3. Monthly coordination meetings with factory managers. 4. Monthly impact assessments based on factory feedback. 5. Introduction of project GRM	Nearby factory areas, monthly for coordination; assessments.	Factory Liaison	Feedback from neighboring factories. Report of GRM	Meetings and feedback collection; monthly for coordination and assessments.	Site Manager PM, , UNOPS, Please project-Nepal	$100
Heat Stress for Workers	1. Install temporary Local exhaust ventilation (LEV)(fans) 2. provide breaks and hydration. 3. Renovation site; daily during work hours.	At the facility during installation and renovation activities	Safety Officer	Temperature levels, worker complaints.	Monitor temperature using thermometers; daily logs of worker feedback	Site Manager PM, , UNOPS, Please project-Nepal	$1040

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Risk of child labor and forced labor at the facility	1. Comply with minimum age requirements of national laws and document the age of workers upon hiring. 2. Verify the age of workers with communities where required. 3. Provide workers' GRM and access to Project GRM. 4. Raise awareness in communities.	During the recruitment process Throughout the operation of the facility	GESI Officer	Number of workers' grievances filed	Monthly site visit Throughout the project period,	Site Manager PM, , UNOPS, Please project-Nepal	$100
Potential for social issues related to labor influx	5. Worker grievance redress meetings and awareness of communicable diseases. 6. Awareness of gender-based violence. 7. Priority will be given to recruiting workers from the local community.	Throughout the operation of the facility	Safety Office	Availability of meeting and training records Records on Gender Awareness Selection criteria for recruitment	Monthly site visit Throughout the project period,	Site Manager, PM, , UNOPS, Please project-Nepal	$100

Anticipated E&S Risks & Impacts	Risk Mitigation &Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation & Monitoring cost in USD
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Lack of awareness on Grievance Redress Mechanism (GRM)	1. Create awareness of the Project GRM and its reporting channels, implemented by the PIU 2. Provide an additional reporting channel through complaint boxes installed at the sub-project site. 3. Ensure that the contact details of the SEA/SH Focal Point are placed on notice boards in the project location 4. Ensure that complaints received through the complaint boxes at the site are handled appropriately or transferred to the Project GRM	Sub-Project Location	Safety Office	Number of awareness sessions held Number of complaint boxes installed	Monthly site visit Throughout the project period,	Site Manager, PM, , UNOPS, Please project-Nepal	$200

The operation phase of the project entails several site-specific environmental and social risks that must be managed effectively to ensure smooth and responsible operations. The anticipated risks include plastic waste mismanagement, which can lead to increased landfill use and environmental pollution if proper waste segregation and recovery practices are not followed. Surface and

groundwater contamination is a concern due to potential leachate from improper waste handling and storage. Additionally, the risk of fire hazards from waste accumulation could damage property and endanger personnel. Increased traffic from waste transport vehicles may pose road safety risks and cause congestion, while odor from waste processing could be a nuisance to nearby residents and workers. Furthermore, occupational health and safety (OHS) risks are present, related to unsafe working conditions and inadequate personal protective equipment (PPE).

Another main associated risk is from the operation of the machines. The use of conveyor belts for the segregation of waste may lead to risks associated with entanglement. This hazard occurs when clothes and hair get entangled with belt. To mitigate the dangers posed by conveyor belts, the company should establish a system involving engineering controls, administrative controls, and personal protective equipment (PPE). Safety measures like guards, interlocking, and emergency control measures should be installed.

To address these risks, a series of mitigation measures will be implemented. These include establishing strict waste segregation and recovery protocols, maintaining proper waste handling and storage to prevent leachate, installing fire safety equipment, conducting regular drills, and developing traffic management plans. Additionally, proper ventilation systems will be put in place to manage odors, and ongoing safety training along with regular equipment maintenance and PPE provision will be ensured.

The table provides a detailed breakdown of the anticipated site-specific environmental and social risks during the operation phase, along with corresponding mitigation measures and monitoring requirements. By implementing these strategies and adhering to the monitoring protocols, the project aims to manage potential impacts effectively. This structured approach will help ensure that operations are conducted safely and in an environmentally responsible manner, contributing to the overall success and compliance of the project.

Table 2: Risk and Impacts, Mitigation, Monitoring for the operation phase

Anticipated E&S Risks and Impacts	**Risk Mitigation and Management Measures**	**Impact Mitigation**		**Impact/Mitigation Monitoring**			**Mitigation and monitoring cost in USD**
		Location/ Timing/ Frequency	**Responsibility**	**Parameter to be monitored**	**Methodology, including Location and Frequency**	**Responsibility**	
Plastic and other solid waste mismanagement and improper storage can cause soil and water pollution	1. Establish strict segregation and recovery protocols 2. Waste disposal as per the waste management plan 3. Provide training for workers 4. Demarcating space for waste segregation to avoid contamination 5. Proper waste storage practices including designated areas for storage	Monthly review of recovery rates, and adherence to segregation practices.	Waste Management Team	Amount of waste recovered vs. waste generated. waste disposal records Water quality parameters (pH, turbidity, and contaminants).	Monthly waste audits, and segregation checks at waste handling sites. Quarterly water testing near the site.	Facility Manager, Environmental Consultant PM, UNOPS, Please project-Nepal	$400
Fire hazards caused by waste accumulation.	1. Install fire alarms, and sprinklers, and conduct regular fire safety drills.	Monthly checks on fire safety equipment	Safety Officer	Functional fire alarms and readiness	Routine inspections of fire alarms,	Facility Manager	$500

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
		and quarterly fire drills.		of fire safety measures.	sprinklers, and drill reports.	PM, , UNOPS, Please project-Nepal	
Increased traffic and road safety risks	1. Implement traffic management plans for waste transport vehicles. 2. Install signage and ensure vehicle maintenance.	Daily vehicle inspections and weekly traffic reviews.	Transport Officer	traffic flow, any accidents or near misses.	Regular vehicle checks at parking and loading areas; weekly traffic assessments.	Facility Manager, PM, , UNOPS, Please project-Nepal	$150
Odor from waste processing can cause a public nuisance	1. Install proper ventilation systems and ensure timely processing of waste. 2. Providing GRM for the community	Quarterly odor assessments near facility boundaries.	Environmental Officer	Level of odor detected in and around the facility. Complain through GRM	Odor sampling in boundary areas with records kept.	Facility Manager PM, , UNOPS, Please project-Nepal	$150

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Safety hazards from machines - risk from entanglement: conveyor belt	1. Risk Install appropriate guards around moving parts of the conveyor belt to prevent accidental contact. 2. Install emergency stop buttons 3. house the Signage and labels 4. appropriate PPEs	At the facility, throughout the operations	Safety Officer	Availability of guard around the moving parts Availability of emergency stop button Incident reports	Monthly safety audits at the site	Facility Manager PM, , UNOPS, Please project-Nepal	$700
Other OHS risks for workers	1. Provide ongoing safety training, 2. Regular maintenance of equipment, 3. PPE for workers. 4. Conducting frequent medical check-ups for employees	Daily monitoring by a safety officer to ensure PPE use and safety compliance.	Safety Officer	Workers wearing PPE during operational activities and sign boards	Routine on-site inspections and incident logs review.	Facility Manager PM, , UNOPS, Please	$250

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
	5. Accident reporting mechanism 6. Training on First aid and necessary First aid materials are readily available to ensure prompt response to any medical needs. 7. Training on combating fire and installation of appropriate fire extinguishers and a Fire Hydrant 8. Emergency Preparedness plan and necessary training 9. Providing sanitary facilities, providing separate washing facilities for male and female workers, and access to safe drinking water 10. Following good housekeeping and cleaning practice 11. Display Instruction boards			Training records Accident registry Availability of First Aid box and training records Availability of training records and the Fire extinguishers within their validity period, Emergency Preparedn		project-Nepal	

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
				ess plan and training records Availability of adequate sanitary facilities and safe drinking water, House keeping and cleaning checklist			
Heat Stress for Workers	1. Install temporary ventilation (fans), 2. provide breaks and hydration.	Renovation site; daily during work hours.	Safety Officer	Temperature levels, worker complaints.	Monitor temperature using thermometers; daily logs of	Facility Manager PM, , UNOPS,	$1000

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
					worker feedback.	Please project-Nepal	
Risk of child labor and forced labor at the facility	1. Comply with minimum age requirements of national laws and document age of workers upon hiring. 2. Verify age of workers with communities where required. 3. Provide workers' GRM and access to Project GRM. 4. Raise awareness in communities.	During the recruitment process Throughout operation of facility	GESI Officer	Number of workers' grievances filed	Monthly site visit Throughout the project period,	Site Manager PM, , UNOPS, Please project-Nepal	$100
Potential for social issues related to labor influx	1. Worker grievance redress meetings and awareness on communicable diseases. 2. Awareness on gender based violence. 3. Priority will be given to recruiting workers from the local community.	Throughout operation of facility	Safety Office	Availability of meeting and training records Records on Gender Awareness	Monthly site visit Throughout the project period,	Site Manager, PM, , UNOPS, Please project-Nepal	$50

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
				Selection criteria for recruitment			
Lack of awareness on Grievance Redress Mechanism (GRM)	1. Create awareness of the Project GRM and its reporting channels, implemented by the PIU 2. Provide an additional reporting channel through complaint boxes installed at the sub-project site. 3. Ensure that the contact details of the SEA/SH Focal Point are placed on notice boards in the project location 4. Ensure that complaints received through the complaint boxes at the site are handled appropriately or transferred to the Project GRM	Sub-Project Location	Safety Office	Number of awareness sessions held Number of complaint boxes installed	Monthly site visit Throughout the project period,	Site Manager, PM, , UNOPS, Please project-Nepal	$100

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
Social risk due to Sexual exploitation and abuse(SEA)and sexual harassment(SH)	1. Workergrievance addressingmethodology 2. Appointing a point of contactforComplaints 3. Provide training on recognizing,preventing, andrespondingtoSEA andSHfor contractors and and communities atsite, Complaintbox follow up actions for complains Availability of managementplan	Sub-Project Location	Project Manager and EHS officer	Number of awareness sessions held Number of complaint boxes installed	Monthly site visit Throughout the project period,	Site Manager, PM, , UNOPS, Please project-Nepal	
Limited support of the Government and other stakeholders	1. Identify Stakeholders and communities. 2. Conduct awareness programs/consultations as appropriate.	Before the implementation and throughout the project period	Safety Officer	Participation of stakeholders	Monthly site visit Throughout the project period	Facility Manager, PM, , UNOPS, Please	$200

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring			Mitigation and monitoring cost in USD
		Location/ Timing/ Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility	
						project-Nepal	

5. Capacity Development & Training

Based on the implementation arrangements and responsible parties outlined above, several capacity-building, training, and staffing requirements are essential for the effective execution of the project's objectives. These requirements align with the project's theory of change and its focus on developing a Plastic Recovery Facility (PRF) and strengthening the plastic waste collection value chain.

Capacity Building:

1. **Collection and Processing Teams:** The establishment of a semi-automated Plastic Recovery Facility (PRF) necessitates the development of expertise in operating advanced sorting and processing machinery. Capacity-building programs focus on training staff to handle and maintain this equipment efficiently. Training in advanced waste processing technologies and best practices for handling low-grade plastics is crucial to ensure effective operation.
2. **Waste Collection and Segregation:** For the collection value chain to be effective, partnerships with municipalities and private waste collectors must be supported by enhanced capacity among waste collection teams. Training should include advanced techniques for plastic waste segregation and recovery to maximize efficiency and effectiveness.

Training Programs:

1. **Local Government and Municipal Staff:** Training for municipal and local government officials is essential for implementing and enforcing plastic waste management policies and segregation practices. This training will ensure alignment with municipal policies and promote effective collaboration with the PRF.
2. **Waste workers, Informal Waste Collectors, and Community Engagement:** Training programs should be designed for informal waste collectors, including women sorters, to improve their skills in plastic waste identification and recovery. These programs should also cover safety practices, gender sensitivity, and environmental impact awareness to create a safe and inclusive working environment.
3. **Public Awareness Campaigns:** To support the advocacy objectives, training materials and campaigns should be developed to raise awareness among the general public, manufacturers, and other stakeholders about the benefits of plastic waste segregation and the use of eco-friendly alternatives. In addition, training programs will also focus on the prevention of SEA/SH and the project's GRM.

New Staffing Requirements:

1. **Operational Staff for PRF:** New hires will be necessary for the operation and maintenance of the PRF, including roles such as machine operators, maintenance

personnel, and quality control staff. The recruitment process should focus on sourcing individuals with relevant experience and providing them with specialized training.

2. **Advocacy and Training Coordinators:** To manage and execute advocacy and training activities, additional staff members such as training coordinators and outreach specialists will be needed. These roles will be responsible for developing training materials, coordinating with stakeholders, and overseeing implementation.
3. **Safety and Environmental Specialists:** Given the focus on health, safety, and environmental impacts, it is important to hire specialists to monitor and enforce safety protocols, conduct environmental assessments, and ensure compliance with regulations.

In summary, effective implementation of the project will require targeted capacity-building initiatives, comprehensive training programs, and the hiring of additional staff. These measures will support the development of the plastic waste collection value chain, the successful operation of the PRF, and the achievement of the project's objectives related to plastic waste management and recycling.

- Plan for capacity building programs

6. Implementation Schedule and Cost Estimates

Item	Time Line	Cost
Dust, Noise, and air pollution controls	During Renovation and Machine installation	400
Waste Management	During Renovation and Machine installation	100
Soil erosion control	During Renovation	150
OHS measures	During Renovation and Machine installation	3090
GRM,and other training and awareness	During Renovation and Machine installation	1000
Waste Management	During Operational stage	400
Fire safety	During Operational stage	500
Traffic management and safety	During Operational stage	150

OHS measures	During Operational stage	1950
GRM,and other training and awareness	During Operational stage	600
Total cost		8340

7. Annexures

Environmental and Social screening report
Pictures of the Location
PSEA Policy