



Project Management Toolkit

for Inclusion of the Informal
Plastic Waste Recycling Sector

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Authors:

WWF India: Mahashweta Mukherjee, Varun Aggarwal, Yuvraj Singh Bankavat

Saahas Zero Waste: Annie Philip, Arun Murugesh, Sayujya Suresh Babu

Consultations:

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Reviewers:

Megg Humphrey, Peter Skelton, Nalini Shekar, Kabir Arora

Design by:

Ajith Kumar, Sayujya Suresh

Funders:

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Project Management

Toolkit

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Plastic Waste Recycling Sector

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Photo courtesy : Saahas Zero Waste

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Definitions

Bulk Waste Generators (BWG) - means and includes buildings occupied by the Central government departments or undertakings, State government departments or undertakings, local bodies, public sector undertakings or private companies, hospitals, nursing homes, schools, colleges, universities, other educational institutions, hostels, hotels, commercial establishments, markets, places of worship, stadia and sports complexes having an average waste generation rate exceeding 100kg per day.

Source: Rule 3(8) of Solid Waste Management Rules, 2016

Downcycling - recycling where the recycled material properties are deteriorated and therefore the material has lower functionality than the original material, for example, plastic bottles into textiles.

Source: The term defined specifically for this project.

Dry waste - waste other than bio-degradable waste and inert street sweepings and includes recyclable and non recyclable waste, combustible waste and sanitary napkin and diapers, etc.

Source: Rule 3(19) of Solid Waste Management Rules, 2016

Dry Waste Collections Centre (DWCC) - a decentralised waste management facility that aggregates, stores, and sorts dry waste received from the source of dry waste generation like businesses, households, apartments and industries.

Source: Bye-law 3.24 of Bruhat Bengaluru Mahanagara Palike Solid Waste Management (BBMP-SWM) Bye-laws, 2019

Enterprise - a business or company.

Extended Producer Responsibility (EPR) - responsibility of any producer of packaging products such as plastic, tin, glass and corrugated boxes, etc., for environmentally sound management, till end-of-life of the packaging products;

Source: Rule 3(21) of Solid Waste Management Rules, 2016

Ethical supply chain - a supply chain where every stakeholder has a dignified livelihood in a safe workplace.

Source: The term defined specifically for this project.

Formalization - the process of bringing informal workers and economic units under the coverage of formal arrangements, while ensuring opportunities for income security, livelihoods and entrepreneurship.

Source: International Labour Organization | Formalization of the informal economy: Area of critical importance

Inclusion - the process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those disadvantaged based on their identity.

Source: As per World Bank the term "Inclusion" is defined as 'Social Inclusion'

India Plastics Pact (IPP) - IPP is an ambitious, collaborative initiative that aims to bring together businesses, governments, and NGOs to reduce, reuse, and recycle plastics in their value chain, to deliver ambitious targets.

Source: www.indioplasticspact.org

Informal Plastic Waste Recycling Sector (IPWRS) - is a sector that represents plastic waste workers at the bottom of the plastic waste value chain; sorters and aggregators thereafter, and recyclers at the top. In the common parlance as well as in academics, the term used is 'informal waste sector', which refers to the value chains of all waste and recyclables, including plastics.

Source: Informal Sector Report, India Plastics Pact

Materials Recovery Facility (MRF) - a facility where non-compostable solid waste can be temporarily stored by the local body or any other entity mentioned in rule 2 or any person or agency authorised by any of them to facilitate segregation, sorting and recovery of recyclables from various components of waste by authorised informal sector of waste pickers, informal recyclers or any other work force engaged by the local body or entity mentioned in rule 2 for the purpose before the waste is delivered or taken up for its processing or disposal.

Source: Rule 3(31) of Solid Waste Management Rules, 2016

Micro entrepreneur - an IPWRS participant such as dry waste collection centre operators, itinerant buyers, scrap dealers, that runs a facility or a small business to collect, sort and sell the sorted dry waste to generate income.

Source: The term defined specifically for this project.

Plastic waste processors - recyclers of plastic waste as well as entities engaged in using plastic for energy (waste to energy) including in co processing or converting plastic waste to oil (waste to oil) except in cases where feedstock chemicals are produced for further use in the production of plastic which may then be considered under recycling, industrial composting.

Source: Rule 3(qb) of Plastic Waste Management Rules, 2016

Programme executor - a programme partner such as waste picker cooperatives, waste management service provider, PIBOs/other corporates and government authorities to fund, advice, implement and/or monitor the inclusion programmes.

Source: The term defined specifically for this project.

Programme leader - a selected IPWRS stakeholder who acts as a bridge between programme executor and their informal workforce to implement the objectives of the inclusion programme including necessary behavioural changes.

Source: The term defined specifically for this project.

Reverse logistics - a supply chain established to collect the end-of-life or end of use plastic or other dry waste from the waste generators to the end destination.

Source: The term with respect to plastic waste management is defined specifically for this project.

Waste picker - a person or group of persons informally engaged in collection and recovery of reusable and recyclable solid waste from the source of waste generation the streets, bins, material recovery facilities, processing and waste disposal facilities for sale to recyclers directly or through intermediaries to earn their livelihood.

Source: Rule 3(58) of Solid Waste Management Rules, 2016

Acronyms

BWG - Bulk Waste Generators

CBOs - Community-based organizations

CSR - Corporate Social Responsibility

DWCC - Dry waste collection centre

EHS - Environment, Health and Safety

EPR - Extended Producers Responsibility

ESI - Employees' State Insurance Scheme

IEC - Information, Education & Communication

IPP - India Plastic Pact

IPWRS - Informal Plastic Waste Recycling Sector

MRF - Materials Recovery Facility

NGO - Non-Profit Organization

OHS - Occupational Health and Safety

PIBO - Producers, Importers and Brand Owners

PF - Provident Fund

SOP - Standard Operating Procedure



Introduction

Increased waste generation especially dry waste (which also includes plastic waste as a major component) and its management is an escalating issue in urban areas across India. Some of the major challenges faced in the field of dry waste management include:

- (i) Increase in amount and types of dry waste due to rapid urbanisation, variety of packaging available in the market and increasing consumerism.
- (ii) Lack of space for handling and processing the generated dry waste.
- (iii) Inadequate resources, infrastructure, waste processing systems and funding for proper dry waste management.
- (iv) Lack of inclusion and formalisation of the informal waste sector including Informal Plastic Waste Recycling Sector (IPWRS)



Photo courtesy : Saahas Zero Waste

Figure 1: Waste workers working at Diva dumping ground, Thane

Considering these challenges, urgent improvements and interventions are needed through the dry waste management supply chain. In India, the IPWRS form the backbone of this value chain, playing a key role in the collection and channelization of dry waste. The IPWRS has traditionally and uniquely looked at waste as 'resource' and have honed their abilities to be able to distinguish and sort different dry waste materials efficiently.

Despite the critical role played by the IPWRS their operating conditions, including recognition of work, health and safety conditions and earnings, remain poor. They are marginalized from society and remain at the bottom of the social hierarchy. In addition, the revenue generated by the IPWRS from sale of recyclable waste is barely enough to compensate for the true cost of compliant operations and insufficient to establish an ethical plastic waste supply chain. Consequently, the perception of efficiency in terms of cost comes at a high price which communities and workers' pay for, in terms of health and environment issues.

There is a need for comprehensive inclusion and formal participation of the IPWRS stakeholders in the different segments on the plastic value chain. As the plastic waste management sector in India matures and formalises, there will be infusion of capital, development of infrastructure, introduction of new players and creation of new markets resulting from processing of dry waste. This period provides an incredible opportunity for comprehensive inclusion of the IPWRS stakeholder. During the scale-up of the infrastructure development for processing plastic waste, it is expected that there will be development of

- the sources of the plastic waste
- its supply chain (including its traceability and ethics)
- end markets and
- demand for entrepreneurial maturity to operate and manage this entire infrastructure

Given the vast existing experience of the IPWRS in the dry waste sector, they can be supported through comprehensive inclusion models to fully participate in the formal waste management systems.

About the India Plastics Pact (IPP)

The India Plastics Pact (IPP) is an ambitious and collaborative initiative that brings together businesses, governments, researchers, NGOs, and other stakeholders across the whole value chain to set time bound target-based commitments to transform the current linear plastics system into a circular plastics economy. It envisions a world where plastics never become waste and aims to achieve this through a public-private collaboration that enables innovative ways for eliminating, reusing and recycling plastic packaging across the plastics value chain.

The India Plastics Pact is governed by 4 long term time-bound targets that are voluntary in nature and are to be achieved by 2030.

- (i) Define a list of unnecessary or problematic plastic packaging items and take measures to address them through redesign and innovation.
- (ii) 100% of plastic packaging to be reusable, recyclable or compostable
- (iii) 50% of plastic packaging to be effectively recycled.
- (iv) 25% average recycled content across all plastic packaging.

Note: The targets will be reviewed and updated according to the country's changing policy landscape.



This report is a part of the progress being made towards achieving these targets. The integration of the informal sector leads to an increase in the quantity of plastic waste that's collected and transported to the recyclers for processing. This directly feeds into achieving **target 3** i.e., 50% of plastic packaging is to be effectively recycled. The resultant increase in recycling yield will indirectly support the progress towards **target 4**, wherein 25% average recycled content should be present across all plastic packaging.

To know more about the India Plastics Pact and the progress we are making towards transforming the entire plastic waste value chain, please visit our website at <http://www.indiaplasticspact.org> or visit us on LinkedIn at [Link](#).

The India Plastics Pact is a collaboration between the World Wide Fund for Nature, India (WWF India) and the Confederation of Indian Industry (CII), anchored at the CII-ITC Centre of Excellence for Sustainable Development (CESD). It is supported by WRAP, a global NGO based in the UK and funded by UK Research & Innovation (UKRI).

Purpose of this toolkit



Figure 2: Field staff interactions at Badagabettu's DWCC with Zilla Panchayat officers

The objectives of this toolkit are

- 1 To provide simple tools to identify and analyze complex challenges in the local plastic waste value chain.
- 2 To set out processes that need to be undertaken to leverage the existing technical expertise of the IPWRS and turn it into ethical and self-sustained formal businesses.
- 3 To set out a framework for creating interventions for targeted IPWRS stakeholders that enable them to be a part of the formal plastic value chain.
- 4 To provide tools for measuring and monitoring the suitability and impact of the interventions in the inclusion programme and how it can be matured, scaled up and adopted by more stakeholders in the plastic waste value chain.
- 5 To provide an overview of the recommended action points for engagement and inclusion of the IPWRS in the formal plastic waste industry and economy.

Intended audience of the toolkit

This toolkit is aimed at key stakeholders who can drive a holistic agenda for inclusion and integration of the IPWRS into an efficient and ethical plastic recovery value chain. The key audiences and the roles they can play include:

Producers, Importers and Brand Owners (PIBOs) and other corporates

- Drive internal corporate policy changes at board/leadership level that bring accountability and responsibility to ethical and sustainable procurement of plastic waste and its processing.
- Design systems that reduce generation of plastic waste and hard to recycle plastics, which have limited financial returns for IPWRS and can be harmful to the environment.
- Ensure compliance to environmental and labour laws throughout their reverse supply chain and bear the true costs of such compliance as part of the business.
- Fund social inclusion programmes and other plastic waste recovery programmes through Extended Producers Responsibility (EPR), corporate social responsibility (CSR) and other initiatives.

Government/Administration

- Develop policies, regulations, and schemes (financial and social) for the inclusion of the IPWRS in the formal plastic value chain and ensure its proper implementation.
- Be a cohesive voice across different government bodies responsible for implementing policies on ground.
- Enforce stringent regulations on the import of plastic waste by recyclers to provide conditions for a viable market for domestically generated plastic waste.
- Ensure regular monitoring is built into the system to enforce transparency, accountability and proper documentation of data relating to plastic waste managed by different stakeholders in the supply chain.
- Enable appropriate infrastructure for collection, transportation, processing and recycling plastic waste.

Recyclers

- Can offer preferential rate for ethical and locally sourced plastic waste over imported plastic waste to develop a robust supply chain in India.
- Ensure maximum resource recovery with structured and optimal recycling efficiency through better technology.

Waste management service providers

- Embrace inclusion of existing IPWRS actor into a formal waste management ecosystem through a social inclusion programme.
- Fulfil statutory requirements laid out in local regulation policies and labour law standards.

Consumers

- Influencing the corporate sector and local governmental agencies to set inclusive, ethical and responsible plastic waste recovery goals.
- Must adhere to local regulations like source segregation, and pay the true cost for managing and handling of the dry waste generated.

Voluntary organisations/Facilitating partners

- Facilitate transformative initiatives in areas where IPWRS actors are denied access to relevant social security benefits and government schemes.

The Inclusion Programme

Social Inclusion, as defined by the World Bank is: “the process of improving the terms on which individuals and groups take part in society—improving the ability, opportunity, and dignity of those disadvantaged on the basis of their identity.”¹

Social inclusion of the IPWRS is vital to achieving the India Plastic Pact (IPP) vision of transforming the current linear plastics system, in India, into a circular plastics economy. Currently, informal systems exist at different levels and scales which has to be considered as the starting point for building more inclusive systems.

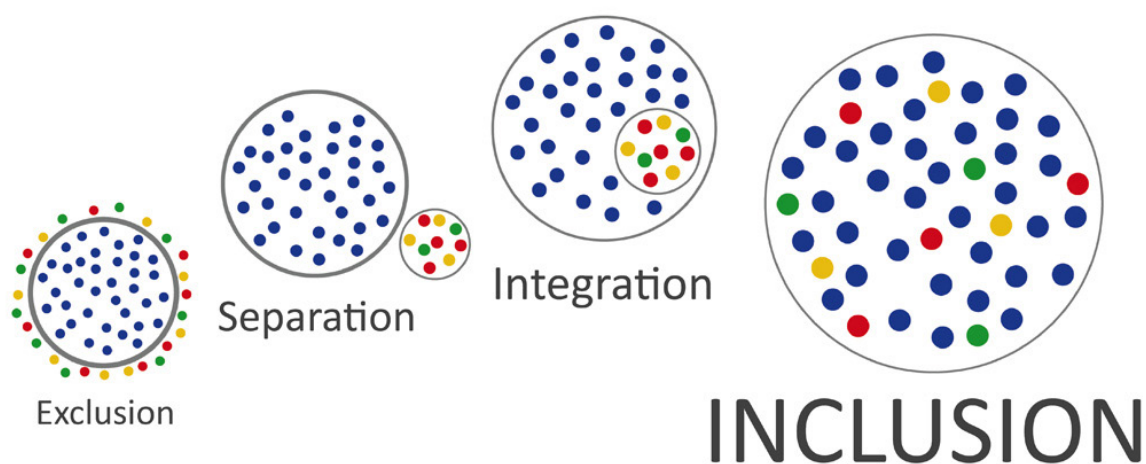


Figure 3: A representation of inclusion

¹ Reference: <https://www.worldbank.org/en/topic/social-inclusion>

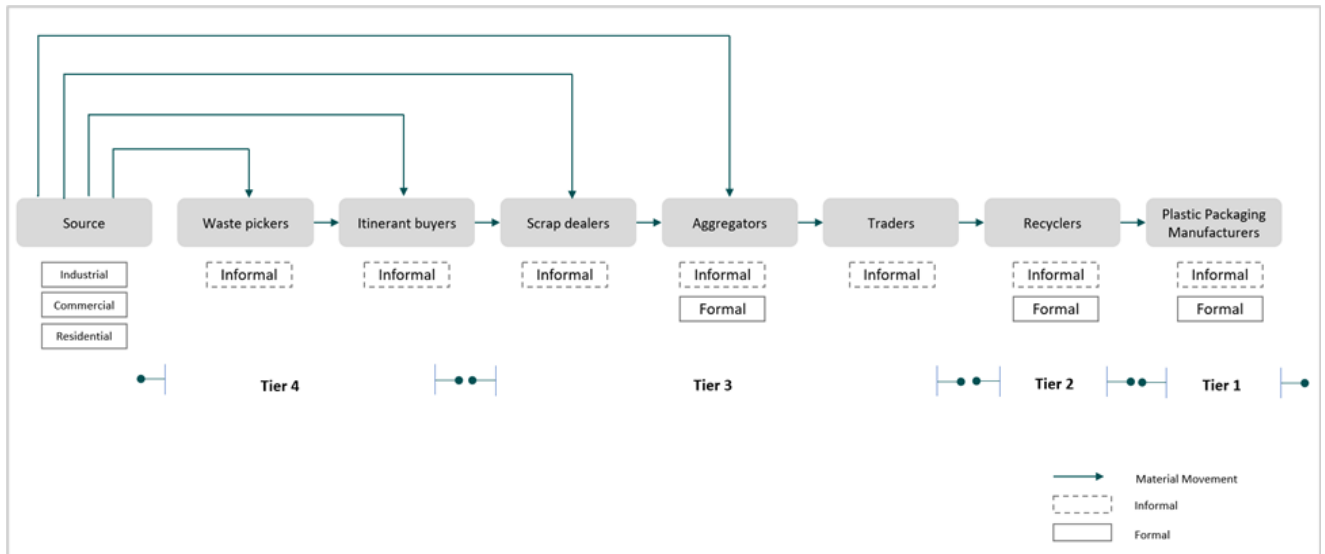


Figure 4: Typical informal plastic waste management supply chain

As seen in the figure 4, the informal plastic waste management supply chain consists of 4 distinct tiers, where each tier is made up of one or more IPWRS stakeholders and/or formal entities. A brief description of each IPWRS stakeholder has been provided in 'Activity 1', which includes stakeholder mapping.

For a circular plastic economy in India, there needs to be a paradigm shift throughout the supply chain, however, the proposed inclusion programmes under this toolkit have been designed and developed to focus only on the Tier 3 and 4 stakeholders of the informal plastic waste management supply chain (waste pickers, itinerant buyers, scrap dealers, aggregators and agents/traders) to transition them to become more formal entities if so desired.



Activity 1: Understand and Map the Ecosystem

To gain a deeper understanding of the dynamics of the stakeholders in the plastic waste value chain and their existing role in the dry waste management ecosystem for a specific geography.



Activity 2: Data Collection

To gather evidence on the identified IPWRS stakeholders for better insights on their existing work practices, socio-economic status, and cost dynamics (e.g. revenue vs expenditure) in the value chain.



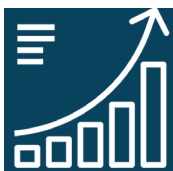
Activity 3: Define the Scope of Intervention

To define the intervention areas based on the analysis of collected data from the previous activities and identified challenges.



Activity 4: Develop and Adapt the Implementation Plan

To develop, adapt and execute an action plan to integrate the target stakeholders into a specific programme.



Activity 5: Measure and Scale-up Impact

To use an impact measurement framework and identified indicators to review the progress using quantitative results of the programmes with qualitative insights. This approach allows more in-depth insight into the activities being implemented and the resultant outcomes.



Activity 1 : Understand and Map the Ecosystem



Figure 5: Surveyor interacting with waste workers in Seemapuri, Delhi during ecosystem mapping

The plastic waste management ecosystem differs based on various factors of the local context such as geographies, local regulations, type of dry waste generated, budget allocation for dry waste management, and existing waste management infrastructure. For the specific context, it is important to understand and map what already exists before designing and implementing an inclusion programme.

Ecosystem Mapping

This mapping exercise is used to start exploring the context around the IPWRS, and the dynamics of the existing system. Exploring these dynamics will help to map all influential elements of the ecosystem which are critical to design an effective inclusion programme and the role played by different stakeholders.

By following the guiding questions, detailed and relevant information of the local context can be gathered. An example questionnaire is provided in Table 1.

Table 1: Guiding questions for ecosystem mapping

Title	Guiding questions
Local context	Understand the demographic of the area and how to collect demographic data. Understand pre- and post-consumer plastic waste generated. What is the allocated dry waste management budget in the municipality? What are the segregation levels in the area?
Institutions	What are the sources of dry waste? Who are the bulk waste generators ² and non bulk waste generators? Are there existing waste picker cooperatives? Which are the waste management agencies/service providers work with IPWRS? Do PIBO's and industries have any existing inclusion programme with the IPWRS?
Local regulations	What policies/ bye-laws are in place formulated by municipal authorities, gram panchayat and state government for plastic waste management ? What policies are in place for inclusion of IPWRS? How are these IPWRS related policies implemented on the ground?
Existing infrastructure	What is the dry waste collection infrastructure i.e. vehicles and other logistics? What are the dry waste aggregation, handling and processing infrastructures (i.e. dry waste collection centres, aggregation centres/MRF, plastic recycling infrastructure, natural recycling market, informal plastic recycling hub)? What infrastructure is available for health, education and social security of the IPWRS and their families?

Stakeholder Mapping

Stakeholder mapping is needed to have a clear understanding of all the stakeholders and their roles in the ecosystem.

Table 2 gives an overview of the most common stakeholders, and their roles in the plastic waste value chain:

Table 2: An overview of the stakeholders in the plastic value chain

Stakeholders	Typical Role
Agent / Traders	An individual or agency who sources sorted dry waste from various aggregators and supplies it to various recyclers. Agent is both a buyer from aggregator and seller to recyclers.
Consumers/waste generators	Includes every person or group of persons, residential premises and non-residential establishments including governmental entities , defence establishments, commercial establishments, institutions and industries/manufacturing facilities which generate dry waste.

² Bulk waste generators also include pre-consumer waste from industries

Stakeholders	Typical Role
Contractors of local government authorities	A person or firm that undertakes a contract to provide dry waste or labour to perform a service for collection and transportation of dry waste for a service providing authority.
Dry waste collection centre operators	Operates a decentralised facility to aggregate, sort and store dry/non-biodegradable waste that is typically managed through resource organisations. The operator can be a waste picker/ informal waste collector/ Self Help Groups, or waste management agencies.
End of life solution operators	Processing destinations other than recyclers such as cement co-processing facilities, waste to energy plants, road making entities or pyrolysis plants.
Informal contractor of waste picker colony (commonly called Thekedar)	A person who manages colonies of informal manpower (typically migrants) to source, sort and aggregate dry waste, which will get sold to stakeholders downstream in the supply chain.
Itinerant buyers (Kabadiwalla)	A person who collects dry waste from door activity of houses, usually on a bicycle or a mini truck, purchases high-value recyclable materials such as newspapers, plastic, glass, unsoiled mixed paper, cartons and metals and sells at a higher price to a scrap shop/ thekedar in a waste picker colony.
Impact investors/incubators	Impact investors/ Incubators actively seek to place capital in businesses, non-profits, and funds in industries with the intention to generate a measurable, beneficial social or environmental impact alongside a financial return.
Local government authorities	Includes municipalities in urban areas, gram panchayats in rural areas census towns, notified areas and notified industrial townships.
Logistics partners	The entities that operate the large vehicles and facilitate movement of assorted dry waste from dry waste collection centre and/or MRF to a recycler or end of life solution destination.
Materials Recovery Facility operators (Aggregators)	Operates a centralised facility where dry/non-biodegradable waste is aggregated, secondary and tertiary process is carried out to facilitate sorting, baling and sends to recyclers/ end of life solution. There are three kinds of MRF operators, one is operated by an agency or enterprise or SHGs and the space and other facilities are provided by the municipal or local body. The second set is of the aggregators run by informal entrepreneurs and third is operated by registered enterprises.
PIBOs	PIBOs those who introduce plastics packaging in the market, and they are mandated to facilitate a reverse collection mechanism and recycling of end of life, post-consumer plastic waste.
Recyclers	Recyclers are entities who are engaged in the process of recycling of plastic or other dry/non-biodegradable waste. These recyclers can be formal and informal in nature.
Research agencies	A company offering market research services to clients, comprising a group of researchers and an administrative infrastructure.
Scrap dealers	A person who owns a scrap shop, collects and purchases high-value recyclable materials such as newspapers, plastic, glass, unsoiled mixed paper, cartons and metals from residential, commercial or waste pickers and sells at a higher price to a specific aggregator. They have a capacity to handle 0.5- 5 MT/day of recyclable dry waste.
Voluntary organizations	A voluntary group is a group of individuals who enter into an agreement, usually as volunteers, to form a body to accomplish a purpose.
Waste pickers (including waste picker cooperatives/self help groups of waste pickers)	An individual or agencies, groups of individuals voluntarily engaged or authorised for picking of recyclable dry waste.

Stakeholders	Typical Role
Waste management service providers	NGOs, CBOs & waste picker associations, enterprises, individually are responsible for meeting the collection, sorting, processing and recycling of dry waste. This also includes managing the entire reverse logistics supply chain from sources of dry waste generation to end destinations such as recycler and/or end of life solution destinations.
Waste workers	A person or groups of persons informally engaged in collection and recovery of reusable and recyclable dry waste. They work on streets, landfill site, DWCC, MRF and end destination facilities.

Using the above table for reference, identify the IPWRS stakeholders and other influential stakeholders who exist in specific geography. Thereafter, map the identified stakeholders to the roles identified in the proposed inclusion programme. This should be done using the stakeholder map diagram as indicated in the sample below:

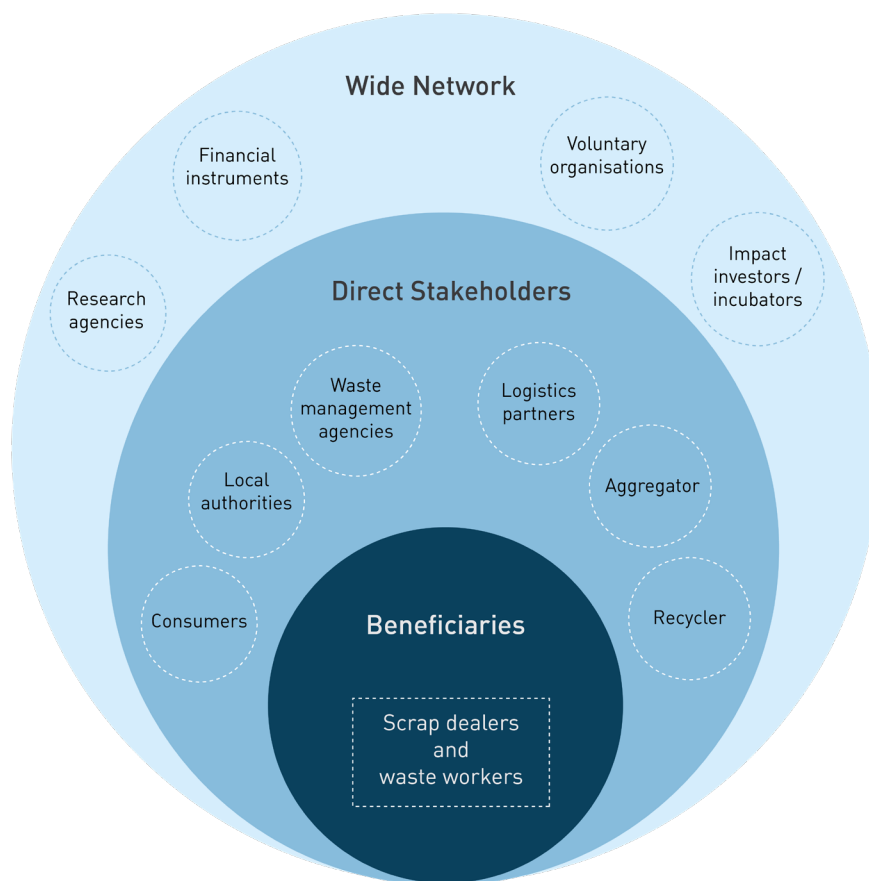


Figure 6: Representation of stakeholder map diagram for the IPWRS inclusion programme

Depending on the specific context, stakeholders may be categorised differently, which helps in understanding the interconnecting relationships and influences of stakeholders.

Affinity Mapping

After completion of the stakeholder mapping, the next step involves mapping of target IPWRS stakeholders based on an identified criteria, such as status of current facility, capacity and existing infrastructure of the facility, and team size. This activity helps group and categorise the IPWRS stakeholders into the following three groups:

Table 3: Proposed categorisation of IPWRS stakeholders

IPWRS Groups	Current Facility Capacity	Team Size	Existing Infrastructure
IPWRS Group 1 Micro-entrepreneurs	Less than 1 MT per day	5 members (average)	Manual sorting
IPWRS Group 2 Aggregators	1 - 3 MT per day	5-20 members	Baler
IPWRS Group 3 MRF operators	3+ MT per day	20+ members	Baler, conveyors, material handling equipment

Below is an example of an affinity mapping diagram created for the identified IPWRS stakeholder of tier 3 and 4 in a specific geography:

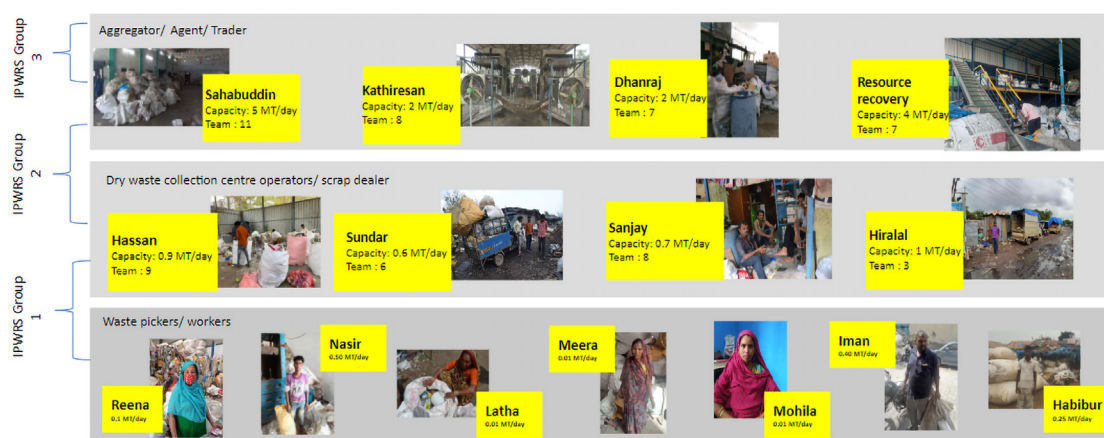
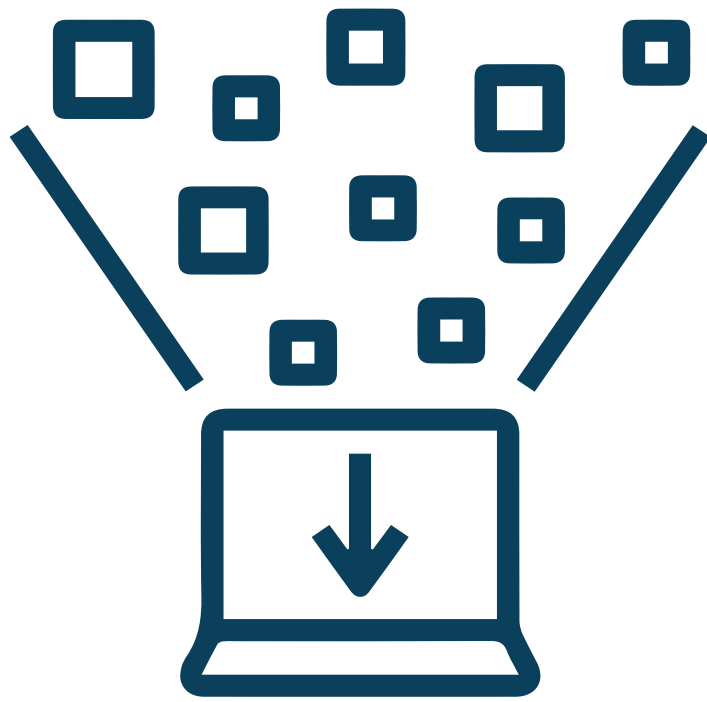


Figure 7: Representation of affinity mapping diagram

This mapping can also lead to identification of potential programme leaders (entrepreneurs) who are ready to move away from their current work practices and embrace a new way of working, which includes aspects of formalisation such as registration, compliance and transparency.

Through these activities, the programme executor would have achieved the following:

- Understanding the ecosystem thoroughly (Refer to Appendix 1 for template)
- 'As-is' understanding of IPWRS stakeholders roles and the value creation in the supply chain
- Grouping the IPWRS stakeholders for designing the inclusion programme
- Preliminary identification of programme leaders for a specific inclusion programme



Activity 2 : Data Collection



Photo courtesy : Saahas Zero Waste

Figure 8: Data collection from a potential programme leader in Thane, Maharashtra

The main purpose of data collection is to glean specific, actionable insights to design solutions for the IPWRS inclusion programme. This activity involves gathering data of the targeted stakeholders, socio-economic profiling, work profiling and identifying the programme leader's plastic waste supply chain.

Programme Leader Selection Survey

The success of an inclusion programme depends on identifying a programme leader (entrepreneur) from the identified IPWRS group. The programme executor will onboard a programme leader for the inclusion programme based on the selection criteria customised for a particular programme environment. This selected programme leader from the IPWRS group will be the facilitator of the inclusion process.

The suggested parameters for the selection of a programme leader are:

Quantitative benchmark of the current business: Quantity of dry waste managed, categories of dry waste, years of experience, number of waste workers, space of the facility, location of the facility, revenue model, existing infrastructure.

Domain knowledge of the dry waste sector: Approach to holistic dry waste management (type of waste managed, transparency of data, traceable supply chain), identification of different plastic waste, local waste regulations.

Mindset towards compliance: Alignment with environmental (no open dumping and burning, emphasis on resource recovery from maximum dry waste streams) and labour regulations (No child labour, social benefit, working hours, living wage, EHS).

Entrepreneurship quality: Basic literacy, inherent resilience, integrity, inclination towards impact, innovation, and working as a team.

Once the top 3 programme leaders have been identified more in-depth checks can be carried out including:

Background checks: Conducted through a third party for verification of government ID, proof of address, and notification of any criminal record.

Reference checks: Through common networks to verify skills, experience and performance.

Baseline Information of the IPWRS Stakeholders

The identified programme leader will work with an existing team or form a new team from the available local waste workers, to guide and mentor in the inclusion process. The programme executor will conduct a baseline assessment of the identified team to evaluate and scope interventions that will meet their needs and address their challenges. An overview of the type of data that needs to be collected for this activity is shown below. More detailed questionnaires are included as Appendix 2 and 3.

Work practice profile: Location of work, type of work contract, typical working hour, average monthly income, types of activities done, working environment, years of experience, special needs and operational challenges.

Socio economic profile: Age, gender, formal education, caste, place of origin, household members, house ownership, monthly income, government ID, health/ social benefit, challenges and special needs.

The data collected is used to understand the key challenges, aspirations and needs of the targeted IPWRS stakeholders, and therefore what the intervention must provide.

Supply Chain Mapping

Supply chain mapping is a process of identifying the programme leader's upstream and downstream network in the plastic waste value chain and understanding the movement of material and financial transactions that take place. This helps to develop an understanding of the costing mechanism for viable and self-sustained operations. This activity is also useful for the next activity, to help identify the challenges and mitigate risk.

Below are some suggested parameters to map the programme leader's network of stakeholders:

Upstream: Geographies/location from where plastic waste is collected, local authority approvals, mode of waste collection.

Waste Material: Type of plastic waste collected, volumes of plastic waste managed, source of plastic waste, material handling practices, pre-processing/ value addition activities performed and quality of plastic waste.

Financial: Purchase cost, selling price, documentation e.g., invoice, delivery challan, e-way bill among others.

Downstream: Entities involved after collection of the plastic waste, location of such entities and mode of transportation of plastic waste.

Outlined below is a material flow chart of plastic waste which helps to understand the IPWRS stakeholders in the system:

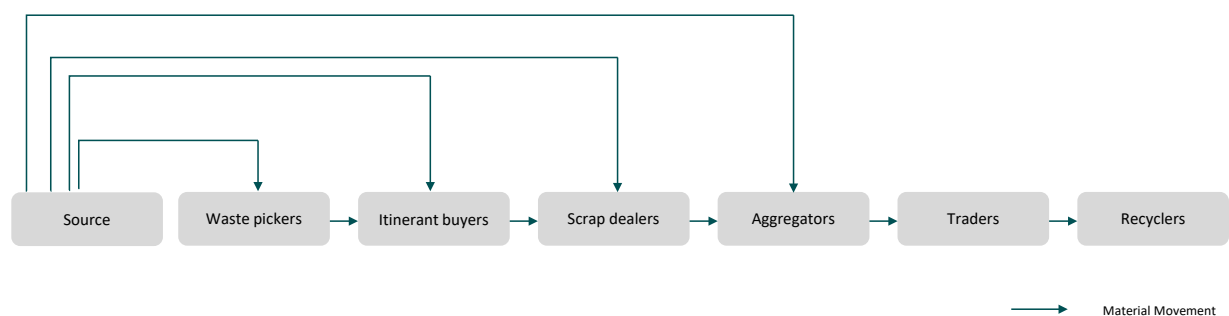


Figure 9: Typical plastic waste supply chain mapping

Through these activities, the programme executor would have achieved the following:

- Identification of the programme leader (Refer to Appendix 2 for template)
- Detailed work practices of the programme leader (Refer to Appendix 2 for template)
- Detailed socio-economic profile of the waste workers under the programme leader (Refer to Appendix 3 for template)
- Profiling of sources and end destinations of plastic waste collected and channelized by the selected programme leader (Refer to Appendix 4 for template)



Activity 3 : Define the Scope of Intervention



Figure 10: Discussion with IPWRS while defining the scope of interventions

Analysis of the data collected in previous activities will help:

- To gain a deeper understanding of the broad challenges of the onboarded programme leader and its plastic waste management ecosystem.
- To identify the specific challenges that will be addressed through the interventions under the inclusion programme.
- To define the scope of interventions under the inclusion programme so that true benefits of the inclusion process can be experienced by the targeted IPWRS stakeholders.

Identify the Enablers and Inhibitors

Drawing on inputs from Activity 1 and Activity 2, the programme executor can frame questions to cull out all the enablers and inhibitors in the programme leader’s waste ecosystem for a successful inclusion programme.

The following guiding questions will help determine enablers and inhibitors for the specific context of the project:

Table 4: Guiding questions to identify enablers and inhibitors

Title	Guiding questions
Enablers	Is there any enabling policy / local byelaw on integrating informal waste workers? Is there an awareness of segregation at source among citizens? What is the existing supply chain infrastructure?
Inhibitors	Is there currently significant exclusion of the IPWRS? What causes this exclusion? Does the recycler provide for fair pricing of the plastic waste supply chain? Is there a lack of EPR support for non-recyclable waste? How well are government regulations implemented?

The detailed questionnaire in this regard is set out in Appendix 5.

Through this evaluation, enablers can be engaged, leveraged, and scaled. The identified inhibitors can be further evaluated for mitigation.

Defining the Challenges i.e. Inhibitors

Defining the challenges faced by the onboarded IPWRS stakeholders is probably one of the most important steps in the inclusion process, as it highlights the potential risks to be aware of throughout the project.

The programme executor will list the potential risks identified in ‘Activity 1’ and ‘Activity 2’ and will indicate the scale of risk to determine how significant the effect of each might be in the inclusion process. As an example, table 5 gives a list of the potential plastic supply chain challenges³ that are broadly classified into the following three categories - environmental, social, and economic.

³ These challenges were compiled while conducting the primary survey of the waste worker and enterprise segment towards the report titled “Ecosystem Approach for Engagement with IPWRS”

Table 5: Example of the potential challenges to an inclusion intervention with the IPWRS

Dimension		Risks/ Challenges	IPWRS
Environment	Moderate Risk	Lack of traceability in plastic value chain	✓
	Moderate Risk	Lack of source segregation (dry from wet)	✓
	Moderate Risk	Sorting to enhance resource recovery	✓
	High Risk	Lack of responsible waste disposal method	✓
	High Risk	Lack of environmental regulation	✓
Social	High Risk	Paying workers minimum wages	✓
	Moderate Risk	Regulate working hours	✓
	High Risk	Prevention of child labour and protection of young workers	✓
	High Risk	Unsafe and unhealthy working condition	✓
	High Risk	Financial inclusion	✓
	Moderate Risk	Emergencies and fire prevention	✓
	High Risk	Lack of social protection and social security	✓
Economic	Moderate Risk	Quantity of domestically recovered plastic	✓
	Moderate Risk	Irregularity in supply	✓
	High Risk	Cost of segregation	✓
	High Risk	Cost of maintenance and transportation	✓
	High Risk	Lack of infrastructure	✓

High Risk
 Moderate Risk
 Low Risk

Cause Analysis

With the challenges identified, it is important to understand the cause of these so they can be mitigated against. The programme executor should use a root cause approach to thoroughly explore the challenge. An example of cause analysis is shown in Appendix 8

In the approach, as a first step, the programme executor should ascertain the causes and the effects of the identified risks/challenges through:

- secondary research of relevant literature
- primary interviews with the IPWRS stakeholders and other influencers
- review of data collected as a result of above mentioned activities in the toolkit
- existing experience through similar projects among others

Below are a few examples of the root cause approach of some of the potential challenges identified in a typical IPWRS inclusion process:

Table 6: Reference of cause analysis for the identified environmental, social and economic challenges in a typical IPWRS inclusion process:

Challenge 1: Lack of traceability in the plastic supply chain		
Environmental	Cause	<ul style="list-style-type: none"> • Lack of appropriate tools for data collection • No history/experience of data recording • Consumers lack awareness of the needs for an ethical plastic supply chain • IPWRS stakeholder unable to read and write and also do not understand the need of data keeping • Lack of any perceived advantages for record keeping among the target stakeholders
	Effect	<ul style="list-style-type: none"> • Lack of accountability on waste generators • Poor data collection • Non compliances of environmental and labour standards • Dumping and/or burning of low and/or negative value waste
Challenge 2: Unsafe and unhealthy working condition		
Social	Cause	<ul style="list-style-type: none"> • History of poor occupational health and safety standards • Low awareness about the best practices in waste management and links between poor working conditions and human health • Lack of financial resources
	Effect	<ul style="list-style-type: none"> • Irregular attendance and participation of workforce • Injuries and fatalities at work place • Occupational illness and hazards • Inter-generational adverse health and other socio-economic impacts
Challenge 3: Poor resource recovery of waste		
Economics	Cause	<ul style="list-style-type: none"> • Poor implementation of source segregation • Existence of several non-recyclable and hard to recycle packaging • Lack of appropriate waste collection infrastructure by the local authorities • Unviable business model • Lack of engagement of municipal authorities or involvement with the IPWRS • No EPR support for management of plastic waste • Sub-standard recycling technology
	Effect	<ul style="list-style-type: none"> • Low value waste is disposed off in the landfill or water bodies rather than getting recovered • Contaminated plastic waste leading to lesser selling price in the market • Poor recycling quality or downcycling of plastic waste

Designing the Interventions

The findings from the previous activities are now integrated to develop and design an intervention through:

- Categorising the themes of intervention by focus area as shown in Table 7
- Define the possible opportunities that will help in identifying the interventions as shown in Table 8
- Designing the interventions is based on the key focus area⁴ indicated in table 8

Table 7: Key focus area in an IPWRS inclusion programme

Infrastructure development	Capacity building	Self-sustaining business models
<ul style="list-style-type: none"> • Upgraded facility for safe and healthy working condition • Material handling equipment • Fire safety equipment • Data capturing system • Facilities for staff hygiene such as toilets and washing areas • Social security and welfare • Viable gap funding till as such time capacities are met for meeting compliance 	<ul style="list-style-type: none"> • Business development training/ support • Entrepreneur development training • Training on EHS, health and hygiene • Leveraging various government schemes • Training on financial inclusion and bookkeeping • Labour and environmental compliance 	<ul style="list-style-type: none"> • Long term partnerships through formal MOUs with customer (including municipalities) and end destination to maximise revenue from sale of waste • Facilitating a viable business case through additional revenue streams for user fees (polluter pays concept), service fee through EPR, ethical sourcing surcharges, incentives for plastics recovery (plastic credit, ocean bound plastic)

Please see the below example for the interventions mapped for the focus area of inclusion process:

Table 8: Reference for the interventions mapped for the focus area of IPWRS inclusion programme

Focus Areas	Risks & Causes	Opportunities	Interventions
Infrastructure development	<p>Lack of traceability in the plastic supply chain</p> <p>Cause: Lack of awareness and tools for data collection, consumers lack awareness of the needs for an ethical plastic supply chain</p> <p>Effect: Lack of accountability on waste generators, poor data collection, non compliances of environmental and social standards</p>	Incentivise local and ethical plastic supply chain	PIBO's, corporates and recyclers should invest in upgrading and up-scaling existing infrastructure (facility, technology, and material handling equipment) for the identified programme leader.

4 The three focus areas (infrastructure development, capacity building and training and self-sustaining business model) are based on the key inputs derived from the various pilot projects implemented for inclusion of informal waste workers. However, the focus area can be developed further through learnings from similar projects.

Focus Areas	Risks & Causes	Opportunities	Interventions
Capacity building and training	<p>Unsafe and unhealthy working condition.</p> <p>Cause: Predefined mind-set of the existing IPWRS, poor adoption of best practices in plastic waste management.</p> <p>Effect: Irregular workforce participation, injuries and fatalities at work place, occupational illness and hazards</p>	<p>Provide an enabling eco-system including access to dry waste and service fees so as to transition the predefined mind-set towards best dry waste management practice</p>	<p>PIBO's, recyclers and waste management agencies should invest in enabling ecosystem and capacity building training for the identified programme leader and the adopted team to transition and sustain over time from within.</p>
Business development	<p>Poor resource recovery of all dry waste leading to an unviable business model.</p> <p>Cause: Poor implementation of source segregation, lack of appropriate waste collection infrastructure by the local authorities, Lack of service fee.</p> <p>Effect: Unviable business model, waste is disposed in landfill or water bodies rather than getting recovered</p>	<p>Build long term partnership with:</p> <ul style="list-style-type: none"> - Waste generators - PIBOs - Local authorities 	<p>Local authorities should enforce source segregation, open market for programme leader to access waste and user fee for collection and processing waste.</p> <p>PIBO should pay a better incentive to programme leader for ethical sourcing/ EPR service</p>

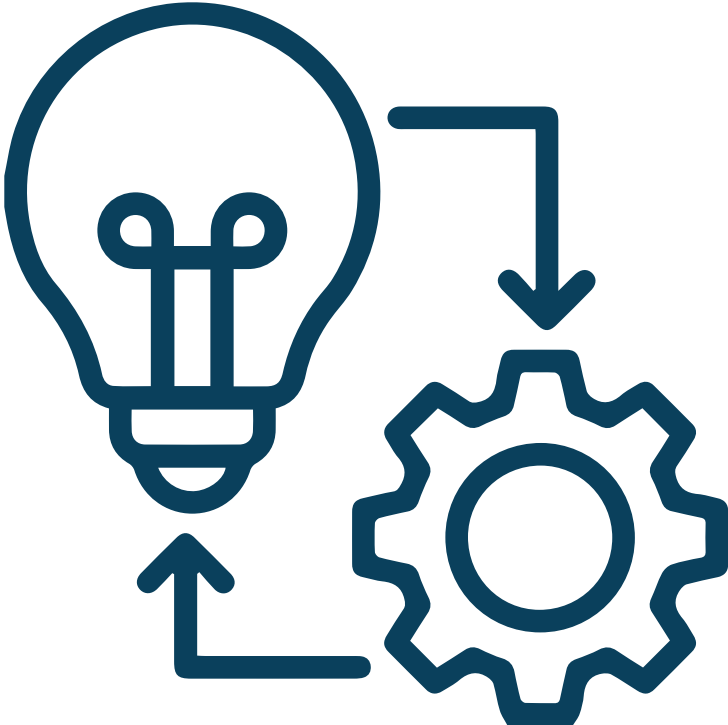
The below table contains an overview of the three programmes which has been designed using inputs from various pilot programmes by Saahas Zero Waste and can be used for inclusion of the targeted IPWRS stakeholder:

Table 9: Overview of the three proposed IPWRS inclusion programme

Micro Entrepreneur programme	Aggregator programme	MRF Development programme
Objective To introduce the targeted IPWRS stakeholder to accountable and compliant operation and bring a mindset shift towards building an inclusive business.	Objective To upgrade the facility infrastructure of the targeted IPWRS stakeholder to scale up operational capacity and maintain fully compliant operation.	Objective To establish an adaptive waste management ecosystem i.e., enable better plastic industry collaboration and build an inclusive plastic value chain which is transparent and ethical for the targeted IPWRS stakeholder.
Target stakeholders Dry waste collection centre operators, itinerant buyers, scrap dealer, waste workers in the facility	Target stakeholders Dry waste collection centre operators, scrap dealer, aggregator, waste workers in the facility	Target stakeholders Aggregators, agent/trader, waste workers in the facility
Facility capacity 1-3 MT/day of dry waste	Facility capacity 3-5 MT/day of dry waste	Facility capacity 5-8 MT/day of dry waste
Expected outcomes: <ul style="list-style-type: none"> Improved resource recovery and reduced leakage into landfill and water bodies ~6 fully compliant direct workforce Access to safe working conditions and social security schemes 	Expected outcomes: <ul style="list-style-type: none"> Achieve 95% landfill diversion rate ~12 fully compliant direct workforce 100% compliance to environmental and social regulations Fully traceable and ethical supply chain 	Expected outcomes: <ul style="list-style-type: none"> Achieve 95% landfill diversion rate 20+ fully compliant direct workforce and 60 indirect improved livelihood Fully traceable and ethical supply chain Potential forward inclusion leading to more viable business cases

Through these activities, the programme executor would have achieved the following:

- Identification of enabling factors that can be leveraged for success, and the inhibiting factors that can be mitigated through risk management (Refer Appendix 5 for template)
- Arrive at insights (risks and challenges) and the reasoning around the insights (Refer Appendix 6 and 8 for template)
- Identification of opportunities for improvement within the cause analysis to determine an appropriate intervention (Refer Appendix 9 for template)



Activity 4 : Develop and Adapt the Implementation Plan



Figure 11: EHS induction of the potential programme leader at a Materials Recovery Facility, Jigani.

This activity to develop and adopt an implementation plan will provide a roadmap of the inclusion programme's activities that need to be executed along with timelines. Below are the proposed outcomes of this activity:

- Details of how to develop the Logic Model (Theory of Change Model) for the inclusion programme
- Develop a timeline-based action plan for implementation of an inclusion programme

Logic Model



The Logic Model (also called the Theory of Change) provides a systematic approach to develop the programme plan. It helps to plan the sequential relationships among all programme components and the intended inclusion programme result through the following components:

- Opportunities
- Inputs/activities
- Outputs (immediate results)
- Outcomes (achievement of long-term goals/objectives)
- Impact

Below is a sample of the Logic Model for each of the three inclusion programmes:

Logic Model for Programme 1 - Micro Entrepreneur Programme

The micro entrepreneur programme aims to integrate the IPWRS, specifically the itinerant buyers, thekedars, scrap dealers and DWCC operators. The identified programme leader will facilitate the inclusion process of the IPWRS. The intended outcome of this programme is to create a shift in the mindset of the programme leader and workforce towards building an inclusive business.

Table 10: Example of Logic Model for Micro Entrepreneur Programme

Problems/ Opportunities	Inputs/ Activities	Outputs	Outcomes	Impact
No or very limited infrastructure and lack of capacity building support to transition to formal ecosystem.	<ul style="list-style-type: none"> • Provide one time support to minimally upgrade the facility and standardise operation in specific areas such as EHS and material handling. • Enforce usage of PPE. • Gap funding incentive to meet the cost of the compliance with respect to wages and partial support towards rent of the facility till the time of the programme. • Support through capacity building and skill development training such as labour compliance, EHS, bookkeeping, material handling. 	<ul style="list-style-type: none"> • Around 8 waste workers on-boarded with a fixed salary in compliance with labour law. • Workers are trained in compliance norms, EHS and basic bookkeeping skills. • Lower rate of injury and better attendance of staff. • Having a proper rental/own facility. 	Better working conditions, established standard bookkeeping and material handling processes.	Initiation of the transition of the Programme leader to formalisation and compliant operation.

Logic Model for Programme 2 - Aggregator Development Programme

Aggregator development programme specifically aims to integrate IPWRS especially the DWCC operators, scrap dealers and aggregators. The intended outcome of this programme is to scale up operational capacity and achieve 100% compliance operations in the facility.

Table 11: Representation of Logic Model for Aggregator Development Programme

Problems/ Opportunities	Inputs/ Activities	Outputs	Outcomes	Impact
Upgrade infrastructure and achieve 100 % compliance operations.	<ul style="list-style-type: none"> • Provide one time support to upgrade and scale up operation • Gap funding incentive to meet the cost of the compliance till the time of the programme • Support through capacity building and skill development training (bookkeeping, labour law, OHS, material handling, fire safety) 	<ul style="list-style-type: none"> • Around 12 waste workers on-boarded with a fixed salary in compliance with labour law. • Workers are trained in compliance norms, EHS and basic business skills. • One time infrastructure support to scale up operation 	<ul style="list-style-type: none"> • Ability to handle larger volumes of dry waste in a more efficient manner due to better sorting rates and material handling processes. • Safe and healthy working conditions for the worker. • No dumping and burning of low or negative value waste. 	<ul style="list-style-type: none"> • Compliance of all labour regulations at the aggregator level. • Maximum resource recovery from dry waste with positive environmental impact.

Logic Model for Programme 3 - MRF Development Programme

This programme aims to integrate an aggregator and transition to a compliant plastic value chain. The intended outcome of this programme is to establish an adaptive waste management ecosystem which enables better collaboration between the various stakeholders where each of them has the ability to influence change at different levels. This brings about adaption by all stakeholders within the IPWRS and the wide network of stakeholders to achieve an inclusive business model based on the principle of circular economy.

Table 12: Representation of Logic Model for MRF Development Programme

Problems/ Opportunities	Inputs/ Activities	Outputs	Outcomes	Impact
Enable end to end waste management solution and closed loop recycling	<ul style="list-style-type: none"> Develop the business plan with the programme leader taking into consideration revenue and expenditure, process layout and material traceability. Provide one time support to setup/upgrade the facility with material handling and processing equipment(s) such as conveyor, baler, shredder, stacker and technology involving IoT and blockchain for quality data management. Standardise operation in specific areas such as bookkeeping, EHS, labour compliance and material handling. A gap funding to meet initial operational costs with respect to wages and partial support towards rent of the facility, plastic sourcing till first six month of programme implementation. Support for ecosystem development including access to waste and user fee collection. 	<ul style="list-style-type: none"> 20+ workers onboarded with a fixed salary in compliance with labour law. Workers are trained in compliance norms, EHS and basic business skills. Continuous improvement in production efficiency and quality such as processing quality and quantum. Deeper engagement with the local body and industry. 	<ul style="list-style-type: none"> Ability to handle larger volumes of dry waste in a more efficient manner due to better sorting rates and material handling processes. Compliant operation (EHS-PPE, fire safety and first aid, minimum wages to all staff, ESI benefits, regular bookkeeping) Increased worker productivity, behavioural, process safety and workplace hygiene. Improved livelihoods of the workforce with predictable incomes. Better Industry collaboration with other influential stakeholders like recycler, PIBO and other corporates. 	<ul style="list-style-type: none"> Enable closed loop recycling through maximum resource recovery from dry waste. Establish adaptive, ethical and resilient value chain in line with the principle of circular economy.

Using the above samples as reference, a specific logic model can be designed using all the identified opportunities. Finally, a step-by-step action plan (detailed in the next section) can be designed by mapping the various opportunities through to the intended impact.

Action Plan

Using the theory of change approach as demonstrated in the above activity, a programme blueprint will be required for programme implementation. For a seamless programme implementation, a clear direction is required considering time bound targets and ideal allocation of tasks to resources.

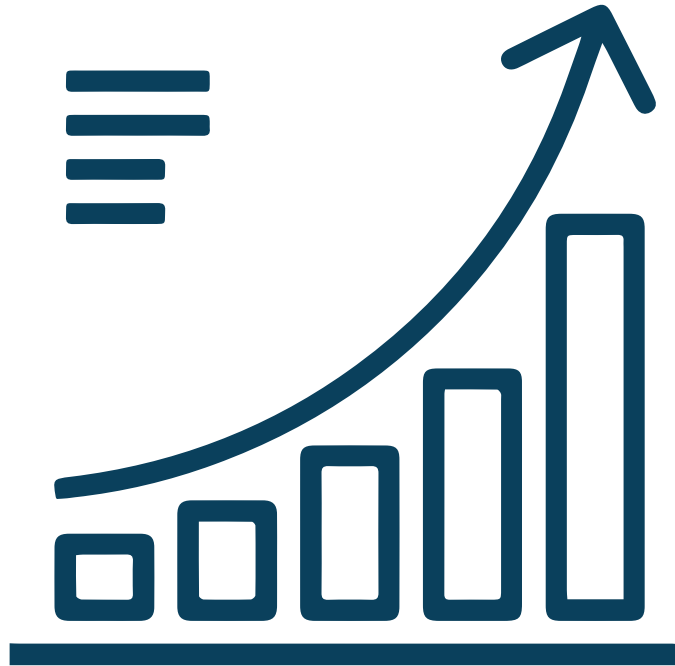
The below activity provides a template to build a programme action plan that will serve as an important tool for programme implementation.

Table 13: Template to build an inclusion programme action plan

Activities	Resources	Duration	Start Date	End Date
Selecting + Onboarding IPWRS stakeholders				
Capacity building				
Infrastructure development				
Business development				

Through these activities, the programme executor would have achieved the following:

- Designed the specific programme in a methodical way using the logic model and arrived at a comprehensive implementation plan (refer to Appendix 10 for template of the logic model)
- Generated a time bound action plan, with resource allocation and time-bound actions, using the findings from the logic model approach (refer to Appendix 11 for template of the action plan)



Activity 5 : Measure and Scale-Up the Impact



Photo courtesy : Saahas Zero Waste

Figure 12: Dry waste recovered at the Materials Recovery Facility, Jigani

Impact management will help describe and articulate intended goals of the inclusion programmes and assess performance vis-a-vis these goals. This exercise of measuring impact helps identify key performance indicators and create a process for evaluating the effectiveness of designed interventions and to understand the scale of impact created. Impact measurement ensures the following requirements are managed:

- Programme output and outcome reporting on periodic basis (quarterly and annual reporting)
- Qualitative assessment of the impact of the programmes, such as case studies
- Feedback loop to the programme executors in case of deviation from plan

To ensure authentic impact measurement and management, it is important to ensure credible data collection. This can be ensured by the programme executor through regular monitoring such as audits of documentation, physical inspections and site visits.

Identify the Indicators and Set Target

Each programme executor should identify the goals of the inclusion programme which can be environmental, social and/or economic. Ideally these goals should be clear, quantitatively and qualitatively and thereafter, the key performance indicators against each of these can be identified.

Some examples of goals and indicators are set out below:

Goal: Recovery of 1000 MT of multi-layered packaging from the coast of Udupi.

Identified environmental indicators are:

Table 14: Template to capture environmental indicators in an inclusion programme

Indicators	Unit of Measurement	Baseline	Target	Methods/ Comments	Tracking Time
Plastic waste managed (Source, Type, Quantity, Purchase Price, Sale Price, End destination)					
Efficiency rate of dry waste managed					
Percentage of resource recovered					
GHG emission reduced					

Goal: Direct employment of 10 women along with compliance of all applicable labour regulations.

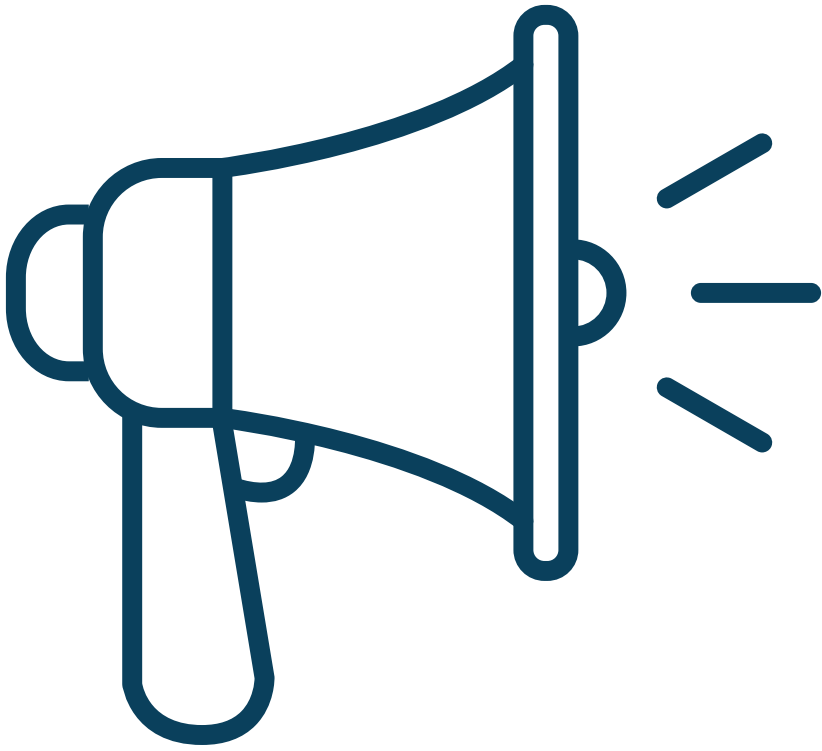
Identified Social Indicators are:

Table 15: Template to capture social indicators in an inclusion programme

Indicators	Unit of Measurement	Baseline	Target	Methods/ Comments	Tracking Time
Direct job (Programme Leader + Field staff)					
Indirect job: Transportation vendors, other IPWRS stakeholders					
Working hours of on- roll employees					
Monthly income of on-roll employees					
Payments made via bank transfer					
Financial growth of enterprise through programme (Increase in sales, operational and profit margins)					
ID cards					
Children from on-roll employees going to school					
Number of social protection recipients (such as ESI/PF)*					
Job tenure					
Job satisfaction					

Through this activity, the programme executor would have achieved the following:

- A method of measuring the intended impact by defining indicators and gathering data. This helps drive strategy to replicate and scale up impact
- Ability to measure quantitative results both positive and negative outcomes of the implementation programme (Refer to Appendix 12 for template)



Communicating Impact and Promotion



Figure 13: Programme discussion with the programme stakeholders

Developing a comprehensive communication plan to promote and disseminate the inclusion programme is an important element. The communications plan should be divided into the two phases of the programme:

- Communications during the programme activity
- Communicating the impact and results after the program has completed

Communications during the programme activity

This element of the plan aims to ensure clear and impactful communications regarding the Information, Education & Communication (IEC) programme and activity to all relevant stakeholders involved and impacted in the program for example, PIBOs and other corporate, recyclers and waste management service providers, local officials, community groups, local media etc. Citizen / householder communications needs to be included as an important component of the plan where relevant. The communications plan should provide regular updates on the progress and activities of the program using the appropriate communication channels.

Communicating the impact and results after the program has completed

Programme executor will be expected to have a detailed reporting structure through which the results of the programme both in terms of environmental and social impact will be available in the public domain. In addition, the programme executor may consider the following reporting and communication measures:



Produce print, video documentation of the program implementation as a resource material. Developing a programme website to act as a repository of all IEC material developed during the project, details of events and successful case studies could be useful and impactful.



Develop training, monitoring and evaluation frameworks for all the activities undertaken under the project to gauge its impact and its efficacy as a model for further implementation, replication and scaling at a regional level.



Produce interim project reports and a final report at the end of project period. The focus areas of the report could include: project methodologies, key sustainability measures and insights, potential to replicate and scale, challenges and learning.



A public report (or other format) containing the documentation of best practices, scale-up and replication recommendations is recommended to be prepared at the end of the project. This report could be released at a workshop involving all stakeholders that will be organized to share best practices. In addition the findings from the project can be uploaded to the project website for easy access and use by the city officials and other stakeholders. In addition, all the IEC content along with supporting raw material created for awareness could be handed over to the municipal authorities and entities working in waste management in the cities for use in future awareness campaigns.

Appendix

Guiding Questions	Response
<p>Local context</p> <ul style="list-style-type: none"> • Demographic data? • Understand pre and post-consumer plastic waste generated? • Allocated dry waste management budget in the municipality? • Segregation levels in the area? 	
<p>Institutions</p> <ul style="list-style-type: none"> • What are the sources of dry waste? • Who are the bulk waste generators and non-bulk waste generators? • Are there existing waste picker cooperatives? • Which are the waste management service providers and other agencies that work with IPWRS? • Do PIBO's and industries have any existing inclusion programme with the IPWRS? 	
<p>Local regulations</p> <ul style="list-style-type: none"> • What policies/ bye laws are in place formulated by municipal authorities, gram panchayat and state government for plastic waste management? • What policies are in place for inclusion of IPWRS? • How are these IPWRS related policies implemented on the ground? 	
<p>Existing infrastructure</p> <ul style="list-style-type: none"> • What is the dry waste collection infrastructure i.e. vehicles and other logistics? • What are the dry waste aggregation, handling and processing infrastructures (i.e. dry waste collection centres, aggregation centres/MRF, plastic recycling infrastructure, natural recycling market, informal plastic recycling hub)? • What infrastructure is available for health, education, and social security of the IPWRS and their families? 	

Name of Programme Leader	
Age	
Address	
Date	

Section 1: Evaluation of Current Business

Indicators	Baseline	Remarks	Score (0-1)
Quantity of dry waste managed			
Years of experience			
Revenue			
Number of workers			
Space of the facility			

Section 2: Domain Knowledge

Guiding questions	Response (Yes/ No)	Remarks	Score (0-1)
Are you aware of the meaning of holistic waste management?			
Do you accept mixed waste at the collection centre? If yes, what's the process to manage it?			
Do you know about different types of waste streams?			
Can you identify different types of plastic? If yes, mention a few.			
Are you aware of SWM rules?			

Section 3: Compliance

Guiding questions	Response (Yes/ No)	Remarks	Score (0-1)
Do you employ workers below 18 years?			
Do you provide social benefits (ESI/ PF/ health insurance) for your workers?			
Do you have an 8 hours working shift?			
Do you ensure environment, health & safety in your facility?			
Do you pay minimum wage to the workers?			

Section 4: Process, Data and Documentation

Guiding questions	Response (Yes/ No)	Remarks	Score (0-1)
Do you have a SOP for your facility? If yes, what do you do to ensure the quality and quantity of inward waste? If not, what's your existing methodology?			
Do you have a process to sort inward waste?			
Do you label the sorted waste at your facility?			
Do you maintain data records on day to day activity?			
Are you willing to share all data and challenges related to operation with the program executor?			

Section 5: Entrepreneurship Quality

Indicators	Guiding questions	Response (Yes/ No)	Remarks	Score (0-1)
Resilience	Do you want to adopt new approaches/ technologies in waste management?			
	Are you ready to take risks and make decisions when situations are uncertain?			
	Are you willing to dive into a significant opportunity even with existing financial risk?			
Integrity	Is it okay to bribe at times in the waste management sector? (Yes/No)			
	Is it ok to pay less wages to women compared to men? (Yes/No)			
	Are you willing to take accountability/resonsibility for your work at all times? If yes, how many hours are you willing to spend at the facility on a daily basis?			
Impact	Are you willing to create environmental impact in the business?			
	Are you willing to create social impact in the business?			
	Will you be the torch bearer to encourage other entrepreneurs to run a sustainable business?			

Section 5: Entrepreneurship quality

Indicators	Guiding questions	Response (Yes/ No)	Remarks	Score (0-1)
Innovation	Do you recognize opportunities in waste management?			
	Can you see the changes over time in the waste management field?			
	Are you aware of the risk involved in your business? If yes, what are the risks that will shake up your business within the next 3 years?			
Team work	Can you lead and motivate others to follow you and to work with you ?			
	Do you delegate work to other people?			
	Do you foster team spirit at work? How much?			

How will you remain persistent and enthusiastic while dealing with difficult situations?	
What are your core values?	
Tell us about your ideas that you want to implement to improve or scale up your current business?	
How do you envision social upliftment in the waste management sector?	
Do you think failures are opportunities to learn and make course corrections? If yes, How have you dealt with failures in the past?	
Is your current business sustainable? If yes, how do you use your profits? If no, what is your idea of bringing in change to the waste sector?	

Guiding Questions	Response
Name	
Age	
Gender	
Caste	
Address	
Blood group	
Migrant worker	
(If yes, what is the place of origin)	
Highest qualification	
Place of origin	
Permanent address (as per Aadhar)	
ID proof	
Previous employer	
Previous work/designation	
Previous monthly salary	
Current work/ Designation	
Current monthly salary	
Year of experience	
Working days in a week	
Working hours per day	
Active bank account	
Mode of payment	
Regular savings in any institution	
Life/ health insurance/ Employee state insurance	
Household members above 18 years	
No. of females in the household	
Children attending School	
House ownership	
Challenges	


Guiding Questions	Responses
Name of the vendor	
Company name	
Is the company registered?	1. Yes 2. No
Do you have a trade license ?	1. Yes 2. No
Do you have GST registration?	1. Yes 2. No
Primary location address of the organization	
Type of vendor	1. Private DWCC operator/ MRF operator 2. Government DWCC operator/ MRF operator 3. Recycling unit 4. Scrap dealer 5. Trader
Start year of operations	
Operation locations	
Current number of payroll employees	
Average number of contract workers in a month	
Average number of women contract workers in a month	
Average monthly revenue	
Current number of women payroll employees	
Average daily wages to man employee	
Average daily wages to women employee	
Mode of wage payment	1. Bank transfer 2. Cash 3. Other
Type of activities	1. Collection 2. Sorting 3. Processing 4. Bailing 5. Transportation 6. Waste picking 7. Other
Source of waste	1. Household (Number of households & location) 2. Apartments (Number of households & location) 3. Commercials (Number of households & location) 4. Industries (Number of households & location) 5. Aggregators/Scrap dealers (Number of households & location) 6. Collection center 7. Trader

Guiding Questions	Responses
Type of waste	<ol style="list-style-type: none"> 1. Wet waste 2. Dry waste 3. Mixed plastics 4. PET 5. HDPE 6. MLP 7. Cloth 8. Cardboard 9. Paper 10. Metals 11. E-waste 12. Glass
Quantity of dry waste managed (MT/ Month)	
Types of end destinations	<ol style="list-style-type: none"> 1. Cement factory 2. Incinerator/burning 3. Landfills 4. Recycling units 5. Scrap dealers
Do you have the following:	<ol style="list-style-type: none"> 1. Fire extinguisher 2. Baler 3. Conveyer 4. Toilet 5. Drinking water at site 6. First aid kit
Do you keep the following documentation:	<ol style="list-style-type: none"> 1. Inward register 2. Outward register 3. Invoice for incoming dry/ plastic waste
Challenges faced at work	
Facility pictures	

Title	Guiding questions	Response
<p>Enablers</p>	<p>What is fostering positive changes in the plastic waste management for IPWRS inclusion?</p>	
	<p>Any enabling policy/local bye-law on integrating informal waste workers?</p>	
	<p>Prevailing awareness of segregation at source among citizens?</p>	
	<p>Existing supply chain infrastructure?</p>	
<p>Inhibitors</p>	<p>What accounts for exclusion of IPWRS stakeholders in the plastic waste management ecosystem?</p>	
	<p>Does the recycler provide for fair pricing of the plastic waste supply chain?</p>	
	<p>Lack of EPR support for non-recyclable waste?</p>	
	<p>Poor implementation of government regulations?</p>	

Programme Leader:		
	List the Challenges	Risk Level
Environment		
Social		
Economics		

 High Risk

 Moderate Risk

 Low Risk

Challenge 1: Lack of traceability in the plastic supply chain		
Environmental	Cause	<ul style="list-style-type: none"> • Lack of appropriate tools for data collection • No history/experience of data recording • Consumers lack awareness of the needs for an ethical plastic supply chain • IPWRS stakeholder unable to read and write and also do not understand the need of data keeping • Lack of any perceived advantages for record keeping among the target stakeholders
	Effect	<ul style="list-style-type: none"> • Lack of accountability on waste generators • Poor data collection • Non compliances of environmental and labour standards • Dumping and/or burning of low and/or negative value waste
Challenge 2: Unsafe and unhealthy working condition		
Social	Cause	<ul style="list-style-type: none"> • History of poor occupational health and safety standards • Low awareness about the best practices in waste management and links between poor working conditions and human health • Lack of financial resources
	Effect	<ul style="list-style-type: none"> • Irregular attendance and participation of workforce • Injuries and fatalities at work place • Occupational illness and hazards • Inter-generational adverse health and other socio-economic impacts
Challenge 3: Poor resource recovery of waste		
Economics	Cause	<ul style="list-style-type: none"> • Poor implementation of source segregation • Existence of several non-recyclable and hard to recycle packaging • Lack of appropriate waste collection infrastructure by the local authorities • Unviable business model • Lack of engagement of municipal authorities or involvement with the IPWRS • No EPR support for management of plastic waste • Sub-standard recycling technology
	Effect	<ul style="list-style-type: none"> • Low value waste is disposed off in the landfill or water bodies rather than getting recovered • Contaminated plastic waste leading to lesser selling price in the market • Poor recycling quality or downcycling of plastic waste

Theme:	
Risk/Challenges:	
Cause	
Effect	

Programme Type:				
Problem statement/ Opportunities	Inputs/ Activities	Outputs	Outcomes	Impact

Activities	Resource	Duration	Start Date	End Date
Selecting + Onboarding IPWRS stakeholders				
Capacity building training				
Infrastructure development				
Business development				

Environmental Indicators

Indicators	Unit of Measurement	Baseline	Target	Methods/ Comments	Tracking Time
Plastic waste managed (Source, Type, Quantity, Purchase Price, Sale Price, End destination)					
Efficiency rate of waste managed					
Percentage of resource recovered					
GHG emission reduced ⁵					

Social Indicators

Indicators	Unit of Measurement	Baseline	Target	Methods/ Comments	Tracking Time
Direct Job (Entrepreneur + Field staff)					
Indirect Job: Transportation vendors, Sourcing vendors					
Working hours of on-roll employees					
Monthly Income of on-roll employees					
Payments made via bank transfer					
Financial growth of enterprise through programme (Increase in sales, operational and Profit margins)					
ID cards					
Children from on-roll employees going to school					
Number of social service recipients (such as ESI/PF)*					
Job tenure					
Job satisfaction					

⁵ As per EPA GHG calculator, GHG emission reduced 2.89 metric tons CO2 equivalent/ton of waste recycled instead of landfilled.



WWF India is committed to creating and demonstrating practical solutions that help conserve India's ecosystems and rich biodiversity. Marking 50 years of conservation journey in the country, WWF India works towards finding science-based and sustainable solutions to address challenges at the interface of development and conservation. WWF India is part of the WWF network, with offices in over 100 countries across the world. WWF India works in over 20 states across thematic areas, including the conservation of key wildlife species and their habitats, management of rivers, wetlands, and their ecosystems, climate change adaptation, driving sustainable solutions for business and agriculture, empowering local communities as stewards of conservation, combating illegal wildlife trade, and inspiring students and citizens to take positive action for the environment through outreach and awareness campaigns.



Confederation of Indian Industry



CII-ITC Centre of Excellence
for Sustainable Development

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India in partnership with Industry, Government, and civil society. It works closely with the government on policy issues, interfaces with thought leaders, and enhances efficiency, competitiveness, and business opportunities for Industry. For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. The premier business association has over 9,000 members, from the private as well as public sectors, and an indirect membership of over 300,000 enterprises from around 294 national and regional sectoral industry bodies. CII has ten Centres of Excellence, of which the **CII-ITC Centre of Excellence for Sustainable Development** is a not-for-profit, industry-led institution that helps businesses become sustainable organizations. It is on a mission to catalyse innovative ideas and solutions, in India and globally, to enable businesses, and their stakeholders, in sustainable value creation.



WRAP is a global NGO based in the UK. It is one of the UK's top 5 environmental charities and works with governments, businesses, and individuals to ensure that the world's natural resources are used sustainably. WRAP collaborated with the Ellen MacArthur Foundation to launch the first Plastics Pact in the UK in 2018. It also leads The UK Plastics Pact. WRAP has been instrumental in establishing the Pacts in South Africa, Kenya, and Europe. It also supports the US, Canada, Chile, and ANZPAC Plastics Pacts. Founded in 2000 in the UK, WRAP now works around the world in over 40 countries. It works collaboratively and develops and delivers evidence-based and impactful solutions to reduce the environmental cost of the food we eat, the clothes we wear, and the plastic packaging we use.



UK Research and Innovation (UKRI) was launched in April 2018. It is a non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy (BEIS). It brings together the seven disciplinary research councils, Research England, which is responsible for supporting research and knowledge exchange at higher education institutions in England, and the UK's innovation agency, Innovate UK. UKRI's nine councils work together in innovative ways to deliver an ambitious agenda, drawing on our great depth and breadth of expertise and the enormous diversity of our portfolio. Through our councils, we maintain and champion the creativity and vibrancy of disciplines and sector-specific priorities and communities. Our councils shape and deliver both sectoral and domain-specific support. Whether through research council grants, quality-related block grants from Research England, or grants and wider support for innovative businesses from Innovate UK, we work with our stakeholders to understand the opportunities and requirements of all the different parts of the research and innovation landscape, maintaining the health, breadth, and depth of the system.



UKRI India plays a key role in enhancing the research and innovation collaboration between the UK and India. Since 2008, the UK and Indian governments, and third parties, have together invested over £330 million in co-funded research and innovation programmes. This investment has brought about more than 258 individual projects. The projects were funded by over 15 funding agencies, bringing together more than 220 lead institutions from the UK and India. These research projects have generated more than £450 million in further funding, mainly from public bodies but also from non-profit organisations and commercial entities, attesting to the relevance of these projects.



Saahas Waste Management Private Limited (Saahas Zero Waste or SZW) is a socio-environmental enterprise (incorporated as a private limited company) that believes in a circular economy, where all waste is converted to resources. In this context, we provide waste management solutions to our clients including onsite management of wet waste and onward transportation of other categories of waste to authorized end destinations. We also assist entities in complying with their Extended Producers Responsibility (EPR) concerning plastic and e-waste by developing and implementing reverse logistics. Finally, to close the loop, we offer products such as stationery items, roofing sheets, clothing, backpacks, and chipboard, made from certain types of waste. In addition to the above, we also engage with the government and municipal authorities on solid waste management policies and assist them in implementing waste management projects.

Developed by



<https://www.indiaplasticspact.org/>

takeaction@indiaplasticspact.org