The Incubation Network

Insights Report

Building Inclusive Markets for Plastic Waste Management & Recycling in South and Southeast Asia

Contents

Introduction

Background

Across South and Southeast Asia, municipal governments struggle to provide adequate infrastructure and services for waste management, particularly in rapidly urbanizing areas where the volume of waste continues to grow. In this context, the informal sector plays a critical role in waste management, including waste collection, sorting, and processing.

The International Labor Organization estimates that only up 20 percent of the 19 to 24 million people in the waste management and recycling (WMR) sector globally are employed in the formal sector (Kaza, 2020), which demonstrates that the informal sector provides capacity that far surpasses the formal waste management system–essentially functioning as a decentralized, low-cost solution to waste management challenges.

The informal waste sector is made up of the small enterprises, groups and self-employed individuals who engage in the collection, sorting, recovery and valorization of post-consumer waste streams; these enterprise and individuals operate with little to no regulation from the public sector, and their business activities have low capital investments (GRID-Arendal, 2022; United Nations Environment Programme, 2019). Globally, it is estimated the informal sector handles 58% of all of the plastic waste collected and recycled (GRID-Arendal, 2022). While the informal sector is defined by its lack of regulations and capital, the sector is best understood and strengthened by understanding its assets–namely, the huge environmental, social and economic impacts that it generates across the region–as well as the complex and intersectional challenges of improving the conditions, rights and protections of and for its informal workers.

The work that the informal waste sector undertakes has multiple environmental benefits.

First, it results in significant prevention of waste leakage into the environment, which is important in places where there is little to no municipal infrastructure for waste management; otherwise, waste ends up in illegal landfills, dumping sites, and waterways, resulting in degradation of natural environments and localized flooding (GRID-Arendas, 2022).

Second, the informal sector is helping to build local and regional circular economies through resale of post-consumer materials, reducing demand for virgin materials and stimulating demand for recycled materials. In India, the informal sector recovers 90 percent of PET bottles, which is higher than the formal recycling rate in industrialized countries and regions including Japan, Europe and the United States, and in Indonesia, the country's estimated 3.7 million waste pickers collect one million tonnes of plastic per year, 70 percent of which is recycled (GRID-Arendal, 2022). This value is not captured when recyclable material is landfilled or leaks into the environment.

Third, by reducing the demand for virgin materials and avoiding landfilling and garbage incineration, the informal sector is helping to avoid or reduce greenhouse gas emissions. For example, a study of Bangkok's informal waste sector estimated that informal collection, processing and recycling of waste in one district of the city's 50 districts avoided more than 21,681 tonnes of carbon dioxide emissions annually (ESCAP, 2019). For these reasons, the International Labor Organization posits that waste work should be classified as "green jobs", which should be promoted and facilitated for their contribution to global sustainability goals (Priya and Gupta, 2020).

Beyond this critical role in waste management, the informal sector generates immense economic opportunities which are realized at both the individual, or household, and the systemic levels. Many informal waste workers (IWWs) would have no other employment or source of income without waste collection, which reflects that the the sector's workforce is made up of the most marginalized members of society: women, migrant workers, ethnic minorities, individuals with limited basic education, and in India, the lowest members of the caste system. Thus, informal waste work represents a significant source of job creation and economic activity for individuals. For example, there are an estimated four million informal waste workers in India (Priya and Gupta, 2020).

Despite their essential role in generating the economic and environmental benefits of WMR, IWWs are often unrecognized and unsupported by governments and society.

On the whole, waste pickers are subject to discrimination, exploitation, harassment by police and local authorities, and hazardous working conditions, such as exposure to toxic substances and medical waste. Exposure to medical waste increased during the Covid-19 pandemic, which positioned IWWs as frontline responders in managing the growing streams of medical waste resulting from the pandemic. This put IWWs at greater health risk, at the same time that their livelihoods were destabilized by extensive lockdowns, interruptions to recycling and waste management systems, and in some places, outright prohibitions on waste picking (Kaza, 2020).

Within the sector, gender and other intersectional issues including ethnic and religious minority status and caste serve to compound the social and economic challenges that must be recognized and addressed in any effort to improve the working conditions and livelihoods of IWWs. In India, the caste system has historically forced the lowest castes into waste picking, and in majority-Muslim countries, non Muslims are relegated to waste work which is considered to be impure (Barford and Ahmad, 2021). In southern Thailand, the Moken are a nomadic ethnic minority group, the majority of which has no identity papers; this prohibits them from formal

employment and access to social benefits and the public health system. This group has traditionally relied on fishing and shellfish harvesting for their livelihoods, but have taken a prominent role in recent years in collecting ocean plastics.

The informal waste sector also relies on the labor of women, who are in some places overrepresented in the informal waste workforce relative to their share of the overall population and workforce: there is variation between and within countries, but in Vietnam, an estimated 65% of the IWWs are female, while in Pune, India this number is as high as 90% (GA Circular, 2019). Despite this, women are especially disadvantaged in the informal recycling sector.

Within the sector, their work is often more dangerous because they are relegated to the least desirable and lowest-paying roles such as waste sorting and processing, and their jobs are less secure; in many places, women struggle to even gain access to waste streams. Women also tend to collect lower-value recyclable materials than men. Furthermore, opportunities to build assets and consolidate influence and power in the waste management value chain are often harder for women to access (GA Circular, 2019). External forces, including dominant market systems, reinforce existing patterns of power, privilege and bias by failing to hold accountable companies that devalue women as workers, leaders, and even as customers (by not acknowledging their roles and/or actively engaging them). The lack of support and protection for women in the informal recycling sector, including in addressing critical issues like child care and access to social support systems, perpetuates gender inequality and reinforces social and economic exclusion. Gender-sensitive policies and interventions are necessary to ensure that women have equal access to resources, skills and opportunities in the informal waste sector.

Finally, corporate commitments to reducing plastic waste and increasing circularity, combined with government mandates and policy frameworks with similar goals, highlight further the urgency of recognizing and valuing the role of the informal sector in waste management and recycling. However, these trends also bring a new set of risks and threats, including privatization, increasing pressure to formalize systems to the exclusion of the informal sector, and greater competition for (and resulting reduced access to) high-value materials. In seeking to use market mechanisms to generate and scale solutions to address plastic waste, there is a distinct risk that the resources mobilized and value created flow largely to those in positions of power and privilege.

58% **of all of the plastic waste collected and recycled globally is handled by the informal sector**

90% **of PET in India is recovered by the informal sector**

80% **of the 19 to 24 million people in the WMR sector globally are operating informally**

The Incubation Network

Established in 2019, The Incubation Network was a multiyear initiative by SecondMuse and the Circulate Initiative designed to source and support innovative solutions to plastic pollution, and to reinforce effective and equitable waste value chains in South and Southeast Asia.

It did so by harnessing the power of its regional network, including the private sector, entrepreneur support organizations, civil society organizations, and municipal governments. The initiative has a focus on developing the ecosystem for inclusive circular economies in India, Indonesia, Thailand, Vietnam, and the Philippines.

By its conclusion in March 2023, The Incubation Network had supported 358 startups and small and medium enterprises (SMEs), 40% of which were women-led. It had distributed US$2.8 million in funding, and arranged 1,300+ hours of mentorship for its members by close to 200 industry experts. The startups and SMEs that it supported collectively raised an additional US$63 million in funding, and diverted 148,257 metric tons of plastic waste from the environment over the lifetime of the initiative.

The Incubation Network | SecondMuse | The Circulate Initiative

358

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in funding distributed

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in additional funding collectively raised by startups and SMEs supported

Objectives of this Report

This report provides an overview of two of the programs that The Incubation Network developed in response to the aforementioned challenges within the WMR sector.

The report explains the composition and design of the programs, and the customized impact measurement tools that were developed to both structure The Incubation Network's thinking around the issues at-hand and also determine where practical interventions by the private sector and civil society organizations could catalyze the most change. The interventions carried out by the local experts involved in the programs will be summarized, and used to highlight themes and ideas that were brought into focus by the work of The Incubation Network's partners during this time.

This report is not an exhaustive study of solutions to the myriad challenges in the sector, but rather aims to spotlight examples and insights that have been shared by the expert partners that were engaged with The Incubation Network via its 'Inclusive Markets' portfolio of programs.

Overview of the Inclusive Markets portfolio

Intention and Structure of the Programs

An important pillar of The Incubation Network's mandate was to catalyze improvements for people who are socially and economically excluded while working in WMR in the target countries.

While The Incubation Network supported a broad range of circular solutions to tackle ocean plastic pollution (including, but not limited to, recycling), it identified that the informal recycling sector was an especially important area for intervention, particularly because it relies on the labor of disadvantaged groups.

As a result, The Incubation Network's work in support of marginalized groups focused primarily on the informal waste sector, which mostly operates at the collection, sorting, and aggregation stages of the recycling supply chain in South and Southeast Asia, and is dominated by women. This group typically also includes migrant workers, nomadic communities, people from minority religions and ethnicities, youth and the elderly, and people who are experiencing poverty; this can also be true for those working in the formal waste management sector in the region but the lack of organization and protections in the informal sector makes work even more tenuous.

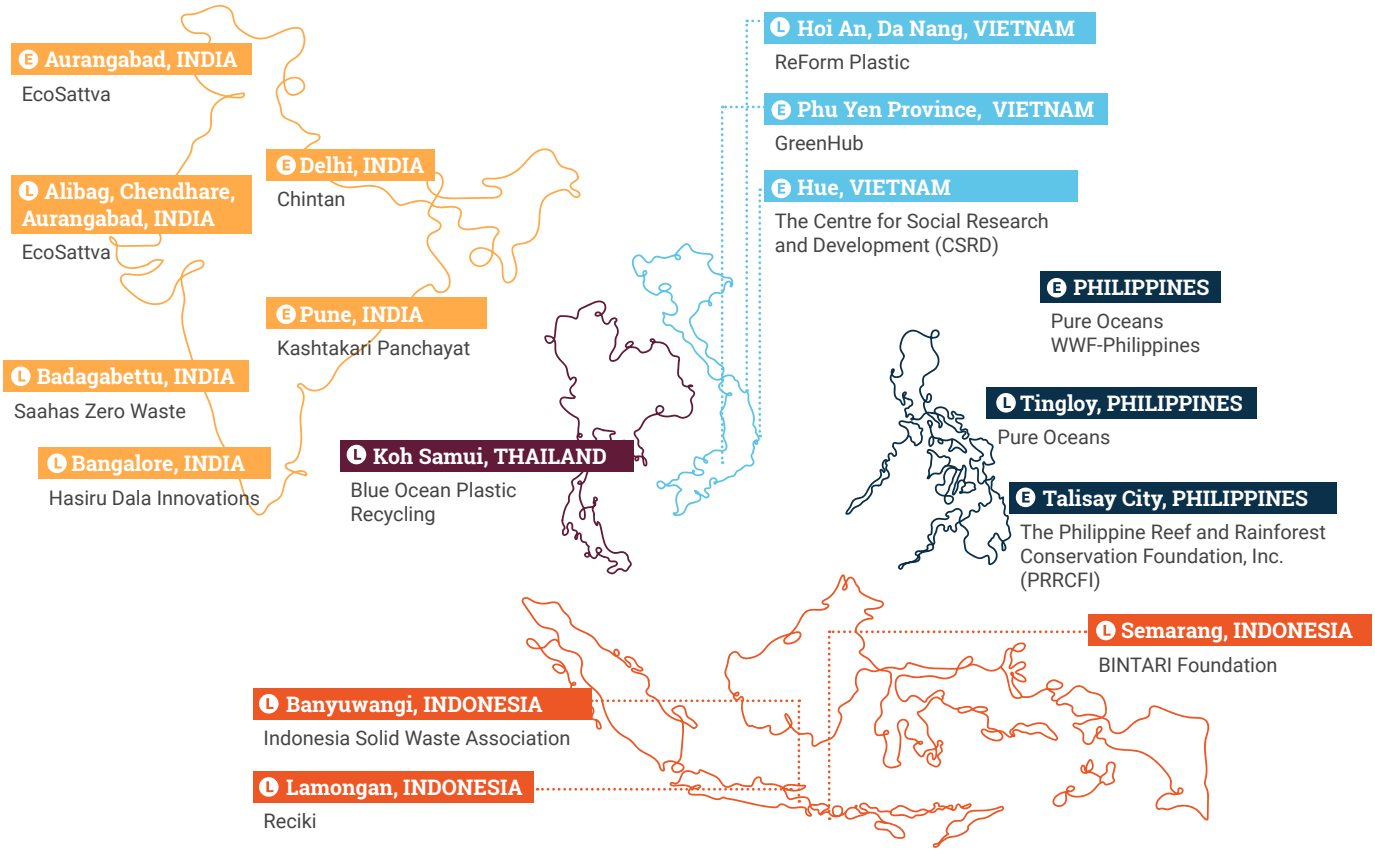
The complex challenges marginalized groups face within WMR require myriad solutions, and The Incubation Network set out to convene the regional ecosystem around solving these challenges in ways that recognized the intersectionality and thorny nature of these challenges. This intention carried through from our initial landscaping exercises and requests for proposals, through to the regular convening that was embedded in the program design. In its early stages, The Incubation Network identified an unmet need for the kind of agile support that would allow social enterprises and civil society organizations in the region to conduct action research, establish pilots, or otherwise experiment with innovative and inclusive models that could be replicated or scaled.

To address this need, The Incubation Network established two programs: Leakage and Livelihoods, and Equality in Plastics Circularity.

Each of the Inclusive Markets programs was based on a specific, yet complementary, theme, and supported a diverse set of like-minded organizations from across South and Southeast Asia working in pursuit of a more inclusive and circular economy.

The design of the Inclusive Markets programs, and the support offered to each participating local partner, was multifaceted and flexible. While the Leakage and Livelihoods and Equality in Plastics Circularity programs ran for 18 months, each individual local project within one of the program cohorts was supported for 12 months on average and had its own timeline and individualized package of support. The Incubation Network provided funding to all projects, but also regularly monitored progress with each local partner, and identified and engaged technical assistance when necessary to optimize the impact of a particular project.

In addition, project partners were regularly brought together in a virtual environment to network with one another to: discuss common challenges and emerging best practices; be exposed to new reports, events, and funding opportunities; and provide feedback on evaluation tools and other resources being developed by The Incubation Network.



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Leakage and Livelihoods

Leakage and Livelihoods set out to support models that improve livelihoods, workplace conditions and social protection for waste workers, while also improving the recovery of plastic material and reducing the extent to which plastic waste leaks into the environment. There were 14 projects within this program, led by six social enterprises, two civil society organizations, and one SME, based in India, Indonesia, Vietnam, the Philippines, and Thailand. The models being tested by these projects involved the integration of informal waste workers into new facilities, supply chains, or technologies, with degrees of formalization or professionalization, capacity building, and other direct support.

14 Projects

- **6** Social enterprises
- **2** Civil society organizations
- **1** SME

E

Equality in Plastics Circularity

Equality in Plastics Circularity specifically focused on the advancement of gender equality within plastic WMR systems. By identifying and supporting a cohort of solutions at the nexus of gender and waste, the program set out to raise awareness of gender issues in WMR, highlight practical responses to improving gender sensitivity and responsiveness, and demonstrate the potential impact of such approaches. In addition to models centered around women waste workers, The Incubation Network invited partners to generate and scale innovative solutions that value women in key stakeholder roles of all kinds, including as sales agents and consumers. Finally, the program aimed to increase opportunities for civil society organizations to influence decision-making in WMR systems. These objectives were carried forward by eight projects, executed by six civil society organizations and two social enterprises, in Vietnam, India, and the Philippines.

8 Projects

- **6** Civil society organizations
- **2** Social enterprises

Project Profiles

All 22 project profiles with descriptions of each project, including their impact, can be found here.

Evaluation and Impact

The Incubation Network evaluated the impact of the solutions being developed and piloted in order to understand where the greatest potential is for addressing the overlapping issues of plastic pollution and socioeconomic marginalization. It developed a set of tools to evaluate the impact of its own programs, as well as for use in the field more broadly.

Impact Framework

Each project within the Inclusive Markets portfolio was evaluated on multiple factors, including the extent to which the project activities, or The Incubation Network's support of the project partner(s), led to:

01

Environmental impact

Diversion of additional waste material into circular economy solutions (measured by the increase in metric tons of plastic collected or avoided each month);

Households reached, for example with access to better waste management systems.

02

Economic impact

The project partner's improved capacity to support the integration of the informal waste sector into formal WMR supply chains.

03

Gender impact

Positive impact on waste workers' livelihoods, health and safety, social protection, and decreased marginalization;

Solutions that were gender aware, gender responsive, or gender transformative (see 'Gender Assessment Rubric' below).

04

Policy impact

The project partner's increased involvement in decision-making within the waste sector and policy environment;

Increased awareness by government stakeholders of mechanisms for developing more gender-sensitive WMR systems.

Assessment Tools

In addition to baseline and final surveys designed to evaluate the effectiveness and impact of specific programs, the Incubation Network developed two customized tools for evaluating various initiatives, including those supported by the Inclusive Markets portfolio.

Tool 1: Waste Worker Impact Rubric

In order to evaluate the impact the Inclusive Markets' projects had on waste workers' lives and livelihoods, The Incubation Network developed the **Waste Worker Impact Rubric.** It was developed in alignment with **NextWave Plastics' Framework for Socially Responsible Ocean-Bound Plastic Supply Chains**, as well as public guidance issued by the International Labor Organization.

Based on direct inputs from waste workers, the Waste Worker Impact Rubric assessed changes across four main outcome areas, as perceived and reported by the waste workers themselves:

Four main outcome areas:

1. Livelihood Opportunities
2. Health & Safety
3. Social Protection
4. Support for Marginalized Populations.

These outcome categories map directly to five of the six goals from NextWave Plastics' Framework for Socially-Responsible Ocean-Bound Plastics Supply Chains; the goal around business practices was excluded because it is not applicable to informal workers who operate independently.

The five goals are:

1. Freely Chosen Employment
2. Fair & Predictable Payment
3. Beneficial Health and Safety Conditions
4. Prioritized Child Welfare
5. Support for Marginalized Populations

The four main outcome categories in the rubric are further disaggregated into 19 outcome areas, which are divided into two categories based on what conditions and risks are present: low-medium maturity, which means there are still some risks but there is potential for improvement, and medium-high maturity, which means that most or all favorable conditions are in place. Proxies are listed for each outcome area, and in total there are 46 total proxies that can be selected depending on their relevance. Each proxy is then translated into a survey question, in which waste workers are asked to reflect on change over time (pre- and post-intervention) and assert whether a particular condition has improved, worsened, or remained the same.

In the final months of the Leakage and Livelihoods and Equality in Plastics Circularity programs, The Incubation Network engaged research agencies in its target countries to develop local language surveys from the Waste Worker Impact Rubric, and conduct in-person interviews with a random sample of up to 25 people per project. Only the projects that conducted direct interventions with waste workers were assessed.

Snippet of
Waste Worker Impact Rubric

View full table

Category	Relevant NextWave Goals	Maturity: Low to Med				Maturity: Med to High			
		Outcome	Proxy	Tracked?	Question	Outcome	Proxy	Tracked?	Question
Livelihood Opportunities	#2 Fair and predictable payment	Fair and predictable payment*	Income/payment and compensation rates are made more transparent and understandable to the WW		Do you understand how your payment is calculated? (Y/N)	Income Growth	Increase in overall income/livelihood		Compared to the same time last year, has your overall income increased, remained the same, or decreased?
					Compared to the same time last year, has your understanding improved, remained the same, or gotten worse?	Career Growth	Better understanding of various roles in the value chain		Compared to the same time last year, has your understanding of the different roles in your facility/company improved, remained the same, or gotten worse?
			Improved ability to afford daily necessities*		Compared to the same time last year, has your ability to afford daily necessities improved, remained the same, or gotten worse?		Improved access to higher-paid roles		Compared to the same time last year, has your access to a higher-paid role improved, remained the same, or gotten worse?
						Technical Capacity Building	Completed more technical training opportunities		Compared to the same time last year, have you completed more, the same amount of, or less technical training?
							Received better technical training opportunities		**If training is received prior to project:** Compared to the trainings you received last year, are the technical trainings you received this year through (insert project partner name here) more, equally, or less useful?
			Wages or compensations are paid in a more timely and direct manner*		Are you paid directly or on time? (Y/N) Compared to the same time last year, has this improved, remained the same, or gotten worse?		Improved technical skillset/s in the waste sector (e.g. identifying different types of materials, operating machinery)		Compared to the same time last year, have your technical skills in the waste sector improved, remained the same, or gotten worse?
		Gender parity	Improved perception of fairness/equality (in terms of income) between men and women		Do you think there is a difference in pay between men and women working in the same role as you? (Y/N) Compared to the same time last year, has the situation improved, remained the same, or gotten worse?	Gender parity	Improved perception of fairness (in terms of training and upskilling opportunities)		**Women WWs**: Compared to the same time last year, do you believe that that your women co-workers have more or less equal access to training and upskilling opportunities as compared to men?

Tool 2: Gender Assessment Continuum & Rubric

Gender inequality was a crucial issue for The Incubation Network, as the two systems its work was focused on - local waste management systems and global markets - typically reinforce patterns of power, privilege and bias, and perpetuate systemic inequalities. Accordingly, The Incubation Network supported initiatives in the region that, as much as possible, challenged harmful patterns of gender inequality.

At its conception, The Incubation Network committed that at least 20% of its funding in support of ecosystem actors would go towards initiatives that were assessed as being 'gender transformative', in that they sought to address root causes of gender inequality, transform harmful gender relations and norms, and actively promote gender equality. At least 60% of funding would support projects that were 'gender responsive', where gender inequality was acknowledged and the project design was responsive to different needs based on gender. Finally, the remaining <20% of funding would be dedicated to 'gender aware' projects, where gender inequality is acknowledged but the status quo is not actively challenged. The Incubation Network determined that it would not support projects that were assessed as being 'gender unequal' or 'gender blind', unless it was determined that its support could move the project along the continuum to an acceptable position.

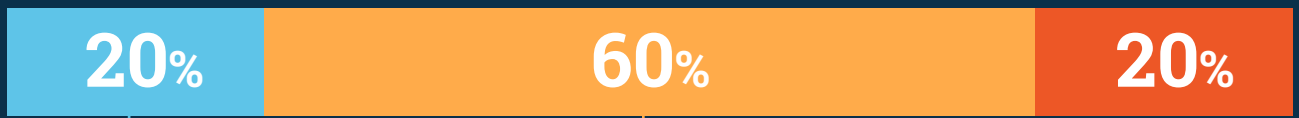
To determine where a project sat on the gender continuum, program managers would undertake a survey with weighted questions that were aligned with a custom **Gender Assessment Rubric** that The Incubation Network developed and contextualized for WMR settings. The rubric identifies components of the project design, strategy and collaboration, monitoring and evaluation, and human resources that can be linked to a position on the gender continuum.

Assessments were made at baseline, to determine the level of support required from The Incubation Network, and gender-related guidance, tools and technical services were then mobilized accordingly. The assessment was repeated at the close of the project.

To support this process, The Incubation Network (in partnership with Criterion Institute) published a **Gender Analysis Framework,** to be used internally and by its partners, in addition to a **supplement for analyzing power dynamics in market systems.**

Gender Assessment Tools >

Our initial goal: supported projects, by proportion of dollar allocation



Gender Aware
aka "Gender Sensitive"

Acknowledges gender inequality but does not seek to challenge the status quo

Gender Responsive

Acknowledges gender inequality and is clearly responsive to different needs based on gender

Gender Transformative

Address the causes of gender inequality; seeks to transform harmful gender relations and norms; and actively promotes equality

Results

This section summarizes the impacts that were observed or measured, using The Incubation Network's tools, over the course of the Inclusive Markets program. The impacts captured here are not exhaustive but provide a sense of the short- and medium-term effects of the work of the programs' implementation partners, and demonstrate the transformative potential of these solutions.

Waste Diversion

Fifteen of the Inclusive Markets projects executed activities that directly impacted or incorporated waste collection. Collectively, this group achieved an additional 27.3 metric tons of plastic waste collected and sorted monthly by the end of the program period. For the 10 out of 15 projects that had a non-zero baseline for waste collection, the average percentage increase in plastic waste collected monthly was 39%.

In addition, the Inclusive Markets projects collectively reached a total of 90,489 households; households were engaged in different ways depending on the intervention, but one common way of reaching households was by providing improved access to waste management systems.

27.3 metric tons
of plastic waste collected and sorted monthly

39% **average percentage increase in plastic waste collected monthly**

90,489 households
collectively reached

Gender Assessment

Eighteen of 22 Inclusive Markets projects were assessed using the Gender Assessment Continuum and Rubric, including projects in both the Leakage and Livelihoods and Equality in Plastics Circularity portfolios; four projects were too short-term to be appropriate for this assessment.

Of the 18 projects assessed, two (11%) were determined to be gender aware, six (33%) were determined to be gender responsive, and 56% were gender transformative. The concentration of projects in the gender transformative category went beyond The Incubation Network's original gender strategy commitment, which was considered to be a success of the program overall.

Our actual achievement: supported projects, by proportion of dollar allocation

Waste Worker Impact

Overall, the Inclusive Markets portfolio directly reached 1,574 informal waste workers, 73% of whom were women. A random sample of 229 of those waste workers (59% of whom were women), were surveyed using the Waste Worker Impact Rubric. An analysis of the survey results determined that 92% of the 229 waste workers reported an increase in access to dignified work, and 85% reported an increase in access to benefits and support services. **More specifically:**

92%
of waste workers reported an increase in access to dignified work

85%
reported an increase in access to benefits and support services

79%
reported an increase in livelihood opportunities

87%
reported an improvement in work-place health and safety conditions or resources

50%
reported an increase or improvement in social protection

76%
reported support for marginalized populations

Findings to inform future design

Multiple regression analysis performed on the Waste Worker Impact Rubric data also revealed the following, all of which have implications for design of future solutions, programs and interventions.

1. **Longer project support periods** were correlated with better outcomes for waste workers: for each additional month of support that waste workers received, waste worker impact scores improved by 10-15%.
2. Leakage and Livelihood projects achieved greater outcomes across all categories compared to those within the Equality in Plastics Circularity program, which seems to suggest that **pursuing dual objectives of plastic diversion and waste worker impact is more effective** than a sole focus on addressing gender issues.
3. For projects that set out to collect plastic waste material as part of their objectives (i.e. excluding the projects that were entirely focused on research, policy advocacy, and/or social impact), a **100% increase in the volume of plastics collected correlates with a 15-20% increase in waste worker impact scores**. A higher amount of funding for such projects was also associated with higher scores.
4. Projects were more **effective for younger participants;** there was a 1-5% decrease in overall waste worker impact score for every 10 year age increase.

1,574 **informal waste workers directly reached**

Moving Towards Social And Economic Justice For Waste Workers

Insights from Local Experts

Summary of Solutions

This section is intended to highlight what The Incubation Network, in partnership with the diverse network of partners supported through the Inclusive Markets portfolio, considers to be the elements of the most promising solutions to addressing the intersectional issues, challenges and opportunities in the informal waste sector.

Table 1 below summarizes some of the most common and impactful efforts that were undertaken by Inclusive Markets' project partners to improve experiences, conditions and outcomes for waste workers and their families, while subsequent sections provide more qualitative insights. Table 1 is based on an analysis of the work, outputs and processes conducted by project partners, and was discussed and validated with them during a final program convening. While it has a heavy focus on plastic recycling, many of the interventions described can also be applied to other circular business models that are engaging with marginalized communities, whether as part of the supply chain or as consumers.

The table is divided into the four outcome categories used at the highest level of the Waste Worker Impact Rubric, and is further arranged into sections that align with different stages of the plastic recycling supply chain, with the addition of 'voice and visibility' in recognition of the significant social and political exclusion typically faced by waste workers. There is significant overlap across these sections.

Table 1: Interventions for the private sector and civil society to promote the livelihoods and wellbeing of the informal recycling sector

	Livelihoods	Health & Safety	Social protection	Support for marginalized groups

Waste separation at source	• Community education
	• Equipment (e.g. bins, vehicle design)
	• Reporting / fining mechanisms
		• Regular information, education & communication about source segregation and safe handling, for:
		  • waste generators (households, bulk waste generators)
		  • waste workers
			• Advocacy for decriminalization of waste picking where necessary	• Support waste workers to collect and treat other income-generating waste e.g. organic

Collection	• Optimization of routes • Intentionally designed vehicles • Public information & awareness • Technology, including for marketing / quality assurance / data monitoring (with game or competition element) • Partnering with government to mandate and collect user fees	• Equipment and training regarding personal protection, first aid, fire safety • Access to safe drinking water, nutritious and inexpensive food near worksites, and education on nutrition • Separate work / living spaces, including bathrooms (separate for women), eating and rest areas, shade from sun • Safe transport • Occupational Health & Safety training, procedures, and monitoring	• Information, education & communication about child labor, forced labor, labor rights • Reporting mechanisms for labor rights violations • Leveraging government incentives to encourage better practices, where available	• Gender-equitable access to higher- paid positions, high value waste, e.g. development of women's entrepreneurship • Provision of mobile / smart phone • Provision of PPE, transport, where inaccessible • Access to working capital
Sorting	• Equipment for operational efficiency, identification of materials • Options / end markets for non- recyclables, bulky waste			• Childcare service / space on-site
Trading	• Protected, ample storage • Other equipment for loss prevention Market rates, transaction transparency, other market information • Vertical integration / valorization	• Material storage that reduces fire risk	• License to operate • Partner with regulators to develop operating guidelines for MRFs, etc	• Information (e.g. via group chat, app, association) • Help developing social license to operate in community • Support accessing buyers, vertical integration opportunities • Access to capital, land, infrastructure
Voice & visibility	• Advocacy for the inclusion of informal sector in policy discussions, especially regarding changes that affect access and income: privatization, EPR, living wages, etc. • Social media marketing	• Social behaviour change communication / awareness campaigns that recognizes and de- stigmatizes waste workers [i.e. to reduce harassment] • Social learning about health and safety via waste worker networks • Advocacy for local authorities to institutionalize health care benefits or packages for waste workers, mandate PPE	• Advocacy for waste workers to be included in local councils / governance mechanisms • Helplines / emergency support • Help waste workers to register for health and injury insurances, income protection, social assistance services, other benefits • Self Help Groups (or similar) supported by government	• Registration for all workers including migrants • Help with access to education • Platform for minority voices (via association, alliance, civil society) • Gender lens applied to policy • Data, research - including stories, empirical evidence
EQUAL ACCESS TO CAPITAL, RESOURCES, INFORMATION, TECHNOLOGY				
TRUST				

Livelihoods

The income of waste workers is typically low, and at risk of extreme volatility, as material prices fluctuate and are tied to quality of the materials. Thus, waste pickers are dependent on access to good quality waste. Appropriate preparation and segregation of dry waste at its source is a crucial first step towards ensuring decent livelihoods for waste workers, as is maximizing the potential for collected material by diverting as much recyclable material from landfills as possible. Once material is collected, proper equipment for maximizing efficiencies in sourcing and preventing loss through theft or damage is critical, as isa transparent and professionalized trading environment. Finally, inclusive discussion about systems-level change is crucial to moving the needle on better livelihoods and proper dignity for waste workers.

Many of the Inclusive Markets project partners worked, often in collaboration with municipal authorities, to improve the quality and quantity of material collected from households and bulk waste generators. This is a significant undertaking that might require a combination of community awareness and education, provision of bins and re-design of collection vehicles, and a mechanism for enforcement. For the Indian social enterprise EcoSattva Environmental Solutions, welding a metal divider into local collection trucks, so that dry and wet waste could be separated by collectors, was one necessary step in their larger effort to transform solid waste management in Alibag and Chendhare. Separately, in Aurangabad, the women waste entrepreneurs being supported by EcoSattva secured their first village client when a consumer brand agreed to pay the costs for the community education required to establish the segregation and collection of recyclable materials for the first time in that village. Meanwhile, in Indonesia, the BINTARI Foundation developed a waste marketplace app and engaged waste pickers with motorcycles to become design partners, who were able to then enhance their service coverage and optimize their collection routes as early adopters of the app.

After the waste is collected, introducing efficiencies in sorting can also impact waste workers' livelihoods, because workers at a facility that employs sorting staff can take advantage of volume-based incentives, wage increases, or job creation as a result of better operations and revenue generation. New conveyor belts at a dry waste collection center in Badagabettu, supported by Saahas Zero Waste, helped to achieve a 60% increase in sorting efficiency. The same center also developed a new unit for processing textile waste, which previously had negative value. Multiple additional partners (including Kashtakari Panchayat, EcoSattva, Reciki, and ReForm Plastic) experimented with valorizing additional forms of waste in order to generate additional revenue for waste workers, or otherwise vertically integrating parts of the supply chain in order to support additional income generation for upstream supply chain actors who typically earn exceptionally low margins. In addition to providing more opportunities for generating revenue, partners also highlighted that gaining broader control of the supply chain is a method for ensuring that safe, responsible, transparent, equitable practices can be more broadly implemented.

For waste collectors and aggregators, the positive impact of safe and sufficient storage cannot be overstated. The ability to reliably store greater amounts of dry waste material results in transport cost savings, and reduces the risk of the valuable material being stolen, or destroyed by fire or weather damage.

The ability to accrue and store material also allows sellers to take advantage of price fluctuations, thus reducing the typical volatility of their livelihoods. For Hasiru Dala Innovations in Bangalore, India, the construction of a large lockable shed to be used as a MRF by two waste picker entrepreneurs, complete with a shared baler (which allows for better storage efficiency and reduced transport costs), was the key to the waste pickers professionalizing their operations and no longer living amongst their collected material and suffering regular loss and damage to their inventory. Access to sufficient recycling technology and infrastructure also leads to better material identification, and better quality sorted material with less contamination, which improves both recovery rates and trading profits.

While plastic has been the focus of The Incubation Network and its programs, its partners have explained that when all forms of waste are properly managed there are positive spill-over effects for plastic recycling. Plastic feedstock will likely be cleaner, for example, when not first mixed in with organic waste. As such, many of the Inclusive Markets project partners expended effort towards valorizing waste material in new ways, which serves a dual purpose of creating new revenue streams while also improving overall recovery rates. For example, Saahas Zero Waste explored the collection and processing of negative value textile waste at their dry waste collection center; CSRD, GreenHub and EcoSattva have incorporated the treatment of organic waste into their efforts; and Kashtakari Panchayat is setting up recycling units so that waste picker-owned businesses can vertically integrate the processing of plastic waste into high-value 3D printing filament.

In order to future-proof the recycling sector as a generator of livelihoods, it is vital that the voices of waste pickers and other upstream waste actors are part of policy discussions that affect the systems upon which they rely. Innovation and growth within private market systems can sometimes reinforce harmful patterns of power and further disenfranchise less powerful players. In relation to the informal recycling sector, new systems around privatized waste collection and Extended Producer Responsibility (EPR) run the risk of further excluding waste pickers and removing their access to valuable materials, unless they are effectively integrated. In other cases, distorting prices can disincentivize waste pickers from collecting a certain recyclable material, which affects not only markets but also the extent to which waste material is diverted from landfills or the environment.

The majority of projects within the Inclusive Markets portfolio incorporated some element of creating a platform for waste picker voices to be heard by policymakers. In addition, the team at Kashtakari Panchayat, who supports waste picker collectives in Pune, India, educated waste pickers on current high-level issues around recycling, and in response the waste pickers mobilized to develop their own formal position on a number of environmental and policy issues, created a set of priorities for their future advocacy initiatives, and strategized about moving their business towards more upstream solutions.

Health & Safety

Jobs in WMR are notoriously some of the most dangerous in the world, and occupational health and safety within the sector requires a comprehensive, holistic approach that goes beyond the provision of protection items or installation of equipment. Education at both the workforce and community levels is vital, as is proper design of the workplace at aggregation sites, and acknowledgement of mental health risks.

During collection, waste pickers and other collectors can be exposed to hazardous material, including mismanaged bio or chemical waste, spoiled food, or sharp objects. The Covid-19 pandemic introduced a heightened degree of risk from medical waste, and a greater need for community education. The ubiquity of mobile phones and social media was an asset during this time. In Bangalore, a woman running a dry waste collection center supported by Hasiru Dala Innovations recorded a video message that implored households to properly separate waste that could put her collectors at risk of infection, and it was shared widely in the local community.

Waste collectors and sorters in South and Southeast Asia can have limited access to personal protective equipment (PPE); even when items like masks, gloves, and closed-toe shoes are available they are often not used. Waste workers in hot climates can feel discomfort from wearing such items, and sometimes assert that they can better identify the type of material by touching it directly. Across the board, Inclusive Markets' project partners not only provided PPE to waste workers, but also provided training and leveraged social learning in order to reinforce the importance of PPE. In Vietnam, GreenHub worked together with the Women's Union and the government's environment department to deliver training to hundreds of waste pickers about their occupational health and safety, and delivered PPE alongside vouchers for check-ups at local hospitals. The installation of conveyor belts by some partners at dry waste collection centers or MRFs contributed to a healthier work environment for sorters, who would previously sit amongst piles of waste.

Health and safety interventions within the working environment at sorting and aggregation facilities is important. Project partners within the Inclusive Markets portfolio provided in-depth, localized training combined with the provision of PPE and first aid kits, and the adoption of fire prevention measures.

The provision of eating and rest areas that are separate from the work site, gender-segregated bathrooms, clean drinking water, and access to food and nutrition information were also reported as important.

Stored dry waste is prone to catching fire as a result of mismanaged electrical or battery waste, sparks from cooking or lighting equipment when waste pickers are living amongst their collected material, or arson by competitors or disgruntled community members. Improper or over-capacity storage is a risk factor, as is the absence of firefighting equipment (which can be as simple as buckets of sand). Through short-term projects under the Leakage and Livelihoods portfolio, partners Hasiru Dala Innovations and EcoSattva sought professional consultations, installed security and fire safety equipment, and conducted training with staff. As a result of this exercise they assert that there is scope for more entrepreneurship in sectors allied with plastics recycling, for example in the design of MRFs and other facilities and the provision of fire safety equipment.

Finally, the mental and physical risks of the harassment and discrimination typically faced by waste workers should not be ignored or minimized. Interventions that help to raise awareness and de-stigmatize waste workers and the work they do can lead to better health and safety outcomes.

ReForm Plastic and CSRD, both in central Vietnam, developed social media campaigns that highlighted waste pickers as local heroes and gave them a voice. Blue Ocean Plastic in Thailand worked directly with local community leaders, such as teachers, to spread awareness around the potential of waste trading. In Indonesia, branded uniforms provided by BINTARI Foundation gave the waste pickers legitimacy in public spaces, and reduced incidents of harassment; they also worked with local police to ensure that the waste collectors on motorcycles were driving safely and legally.

Social Protection

Waste workers in South and Southeast Asia, in particular those in the informal sector, can experience significant risk and vulnerability in their daily lives due to poverty, migration, income volatility, risk of injury and death, and social exclusion, among other factors. Policies and programs designed by the government to protect society's most vulnerable people (such as poverty relief schemes, income- and health-related insurances, and pensions) can be out of reach for waste workers due to lack of formal identification, illiteracy, challenges with the local language, or discrimination by local authorities. Inclusive Markets' SME and civil society partners acted as advocates for waste workers to increase access to forms of social protection, often by liaising with government bodies on behalf of waste workers and their families, but partners noted this as an area in which they were less able to directly influence outcomes.

The treatment of waste workers by government authorities begins with granting waste pickers access to waste, and ideally achieves some integration of the informal system with formal systems. In some cases, informal waste pickers are criminalized or otherwise prevented from operating by local authorities, especially when the local government body has a formal collection system and wishes to retain some of the valuable waste material or where there are clashes between informal waste pickers and formal waste collectors.

The road to integrating or formalizing the work of waste pickers can be long and complex, and not always desired by the waste pickers themselves, but it can represent a first step in making social protections available to groups within WMR who are typically excluded.

While the ability of market actors and civil society organizations to grant waste workers access to social protection schemes by the government is understandably limited, they can be important conduits for support. In many cases, they worked directly with waste workers to guide them through the process of obtaining formal identification, registering as a local resident, or enrolling in social services. One woman waste entrepreneur supported by EcoSattva required help to formally separate from her estranged husband before she could open her own bank account and start a business in her name. Some partners worked directly within government schemes for poverty reduction, as with Saahas Zero Waste directly supporting and building the capacity of a Self Help Group, a type of entity which receives support from the government for generating employment opportunities. Other partners, including EcoSattva, Chintan, and Kashtakari Panchayat in India, WWF and Pure Oceans in the Philippines, and CSRD and GreenHub in Vietnam, have created opportunities

for waste workers and entrepreneurs to engage with, or be represented to, local policymakers. Partners have expressed that waste worker communities should be included in local governance mechanisms, due to the crucial public services they perform, and protected by social security, given their vulnerability to marginalization.

Child labor is all too prevalent within WMR in South and Southeast Asia, and is one area in which regulation and enforcement is essential. Arguably, social protection programs can influence the occurrence of child labor by providing parents with the requisite support, including access to local registration and education systems. When waste workers are migrants, whose children may not speak the local language or have access to schooling, family units often live and work together on WMR sites regardless of age. As reported to The Incubation Network by its project partners, civic schemes designed to integrate marginalized children into the local community are important for ensuring that children are both safe and educated, and opportunities for parents to earn a living wage or otherwise be protected from the risk of severe poverty makes it less likely that children will be forced to contribute to the family income.

Support for Marginalized Populations

Given the typical demographic composition of the informal waste sector in South and Southeast Asia, 'support for marginalized populations' is a somewhat cross-cutting category of support by SME and civil society partners. There is a fundamental need and right for marginalized populations within WMR to have equal access to capital, resources, information, and technology. Regardless, examining targeted interventions in this area is important for bringing to the forefront the efforts that are designed for specific subgroups that are routinely discriminated against, including women. It also presents an opportunity to highlight the diverse desires and ambitions that waste worker populations have, and not present them as one homogenous group.

Efforts to improve the incomes of the informal waste sector are especially urgent when waste pickers are operating entirely independently, often without access to basic PPE, safe transportation and storage, market information, a dignified position in society, or opportunities to progress.

Provision of such access has been a key focus for partners of the Inclusive Markets programs, and can be pivotal for the informal waste sector. For example, a waste picker with proper equipment may be more likely to be accepted by bulk waste generators, such as hotels, as a service provider; this can be very lucrative and provide a stable source of income. In other instances, providing refurbished mobile phones or creating a Whatsapp group for informal waste workers has allowed for an unprecedented exchange of market information among groups that are typically taken advantage of by downstream market actors.

For women, who dominate the most marginalized positions in the informal waste sector, gender-responsive opportunities are essential. This often means addressing the factors that can serve as limitations in their ability to access work opportunities, including the provision of safe spaces for children, transport to the worksite, or basic training. Capacity building was facilitated by all Inclusive Markets partners across the portfolio, and by all accounts served to unlock an incredible amount of human potential in groups that had little to no access to formal education or training. For Kashtakari Panchayat, training women managers of the waste picker-owned scrap shops to conduct their own bookkeeping resulted in not only efficiencies and cost- savings for the business, but also a sense of confidence that fed the managers' nascent leadership abilities.

Beyond establishing stronger ties within the informal waste sector, project partners have clearly expressed the value of making informal waste workers' voices and stories heard by the general public as a way of overcoming marginalization and its many negative repercussions. Whether through social media campaigns or through formal policy channels, de-stigmatization and representation have surfaced as crucial goals for those seeking a greater and well-deserved sense of dignity within the informal waste sector who are serving at the frontlines of the plastic pollution crisis. Establishing a community, as ReForm did via The Collectors Network in Da Nang, Vietnam, or as BINTARI Foundation did by recruiting a service provider network of motorized waste pickers for its app, is reported to catalyze many related positive outcomes. For some members, The Collectors Network provided them their first form of photo identification. For some motorized waste pickers, BINTARI Foundation offered them their first opportunity to feel accepted and professionalized within their community.

Finally, supporting marginalized populations means recognizing their unique motivations, wishes and sense of agency. Some may assume that the goal for all waste workers is to either formalize their work, or move on to something else, but this is not universally true. In fact, many waste workers are proud of their roles as environmental stewards, and while the working conditions are hard and seen by society as undesirable, many have chosen the work because of genuine enthusiasm and passion for it, as well as the flexibility it affords. Some partners in the region have called for a decoupling of perceived success from formalization processes, and for recognition of the entrepreneurial nature of independent waste trading. They point out that waste collection can be a rare form of flexible work that allows the individual to generate income while balancing other duties, which can benefit women who shoulder a disproportionate burden of care within a household.

'Trust' as an Underpinning Theme

Socioeconomically excluded groups who collect, sort and trade waste have historically had little reason to trust anyone in a position of power.

As reported by Inclusive Markets project partners, informal waste workers are typically:

- harassed and taken advantage of by authorities, especially when they are commonly unregistered locally and are economically reliant on access to waste material in public spaces;
- ostracized by the general public, often compounded by caste and other intersectional causes of marginalization;
- at risk of falling victim to scams, trafficking, and fraud, which can arise from a lack of literacy and digital savvy;
- suffering human rights abuses by employers and trading partners, including being forced to work underage or in unsafe conditions.

One of the clearest points that emerged from across this portfolio of work was the importance of establishing and maintaining trusting relationships.

Anecdotally, much of the success of the project partners could be attributed to the fact that they had been working with the informal waste sector for years, steadily establishing the trust to enable partnership with these vital actors in the plastic waste value chain. Many of the partners organized regular meetings with waste picker communities in order to demonstrate their long-term commitment.

Central to developing responsible business practices, material traceability, and more transparent supply chains in general is the need for more, and better, data. The experience of the Inclusive Markets' projects showed that there is a bidirectional relationship between building trust and collecting data. On one hand, waste workers will be more trusting of their trading partners when, for example, their collected material is correctly measured, payments are recorded and made available to them, and they are equipped with the literacy, numeracy, and other skills to be able to interpret their transactions. In the case of the Indonesian Solid Waste Association (InSWA), the provision of weigh scales to itinerant waste buyers was a small intervention with outsized impact; several other projects involved capacity building in the areas of record keeping, numeracy, and digital skills.

While transparent data practices can help to foster trust, the reverse is also true: a base level of trust is also essential to private sector and civil society organizations in order to collect and track the data of waste workers. The waste trade is personal, risky, and volatile, and supporting the informal recycling sector often involves navigating the personal lives of waste pickers who may be lacking formal identification, not speak the local language confidently due to migrant status, and be balancing a burden of care for their household with much-needed income generation. Chintan Environmental Research and Action Group in Delhi, India shared stories of private companies collecting data from waste pickers, only to then use that data to commandeer their routes and materials, and undercut them in the market. This, combined with a general lack of literacy, had caused challenges for them in establishing routine data collection with waste picker groups. Another partner in India, Hasiru Dala Innovations, also noted that the waste pickers community is open to working with reputed organizations to support better data collection and reporting, but they would need to see that organization as trustworthy and invested in meeting their basic needs.

Many project partners identified that a pathway to building trust is to center waste worker voices and take a genuine interest in their challenges, needs, and ambitions. ReForm Plastic in central Vietnam reported that after waste collectors were invited to share their stories in small groups, they were enthusiastic about being interviewed on camera. CSRD, also in Vietnam, conducted Feminist Participatory Action Research (FPAR) with women informal waste workers in Hue, and gained an unprecedented level of access to their daily lives and personal reflections after taking the time to train and establish them as research partners, instead of viewing the waste pickers only as subjects. In a similar vein, the well-established and renowned waste picker collectives in Pune, India that are supported by Kashtakari Panchayat are examples of where waste pickers have grown to trust one another and as a result, feel comfortable with the atypical power dynamics of the waste picker owned-and operated cooperatives. The Philippine Reef and Rainforest Conservation Foundation (PRRCFI) also reported that, while undertaking their localized version

of a human centered design process to innovate around waste collection, developing trust between stakeholders was essential to establishing a sense of ownership by the waste pickers.

In addition to a relationship of integrity between waste workers and the market or civil society actors seeking to partner with them, the Inclusive Markets portfolio identified waste workers' families as being important stakeholders. Waste trading is often a family business, and those families are often experiencing conditions of poverty; they are reliant on, and thus protective over, waste as their source of income. India-based partner EcoSattva reflected on the importance of having buy-in and support from the family unit before integrating women into an innovative entrepreneurial model; of particular importance was support from the husbands of the women waste pickers, as they often controlled their mobility and use of time. For most project partners of the Equality in Plastics Circularity program, who were focused on challenging gender norms and providing new and enhanced opportunities to women, the degree of trust between those project partners and the families of the women waste workers was the main determining factor in whether the engagement would proceed.

Similarly, relationships within the waste worker community are important. In Banyuwangi, eastern Java, the Indonesian Solid Waste Association (InSWA) reported that the trust between itinerant waste buyers (IWBs) was very low during the first visits by InSWA's field team, and there was significant fear of competition and even stealing (though it was not established whether this fear was well-founded). InSWA managed this issue by establishing 'capacity building' events that also served the function of building acquaintance and trust, and creating a WhatsApp group in which the IWBs could share information and discuss tactics. InSWA also took the approach of developing individualized support packages that were responsive to the needs of each IWB and their family unit. The team reported that this approach, as opposed to a 'zero-sum' approach of distributing support, helped to diffuse any feelings of jealousy or competition among the IWBs.

This notion of trust as a key success factor is not limited to the relationship between informal waste pickers and supportive social enterprises or civil society organizations but extends to the public sector as well. Many Inclusive Markets projects interfaced with municipal governments, government staff or contractors assigned to waste collection and management, and households. India's Saahas Zero Waste highlighted that establishing a long-term partnership with the local body gave the project leader the confidence and trust to operate the facility without any fear of harassment. In another example, EcoSattva's staff spent time and effort building a trusting relationship with the government contractor before they could successfully assess and optimize the contractor's work, even managing to add enforcement clauses to future contracts; existing WMR contractors in particular are wary of the 'interference' of outsiders. Across the board, taking the time and effort to establish rapport, clear lines of communication, and transparency around incentives proved critical to all actors working in harmony to transform municipal waste management and to ensure that projects had the license (social or otherwise) to operate.

Conclusion

The insights and examples in this report, provided by the local experts with whom The Incubation Network partnered, are a clear indication of both the opportunities within the sector and the urgent need for support. Solutions within this portfolio have generated positive impacts across multiple dimensions, but need to be scaled and replicated in order to address the magnitude of the challenges within the region.

To achieve this, plastic value chain actors of all types and sizes must be driving holistic interventions and each actor has a different role to play: government is essential as a force for change and for enforcement mechanisms; civil society is a key partner for generating knowledge and supporting the most vulnerable; and start-ups are an effective model for innovation. The Incubation Network has also found that SMEs, particularly well-functioning aggregators who identify as social enterprises or otherwise partner with an NGO to fulfill a social purpose, are very important for catalyzing responsible changes in supply chains.

Scaling these solutions cannot happen without investment and partnership, and the levels of trust required for both. Civil society and smaller private sector organizations perform a vital bridging role in any effort that seeks to integrate the informal waste sector, and are actively tackling complex challenges. They require flexible funding and patient timelines to fully develop their nascent solutions and drive towards scale, as well as to effectively work with local governments. Governments, development donors, philanthropic foundations, and larger private sector players should support local organizations that have already developed deep connections with the informal waste sector, rather than attempting to develop parallel systems that do not take local contexts, wisdom, and constraints into account. As this report has highlighted, trust among WMR actors is a prerequisite for establishing systemic change. Building this trust takes time, but intentional and cross-sectoral partnership along the entire recycling value chain has the potential to expedite the process in a way that is commensurate with its urgency.

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The Incubation Network

About

The Incubation Network The Incubation Network is a joint initiative by impact innovation company, SecondMuse and non-profit organization, The Circulate Initiative, that ran from 2019 - 2022. The program acted as a catalyst for action and investment in the circular economy that aimed to prevent the flow of plastic waste into the world's oceans.

The network created a connected network of innovators, investors, civil society organizations, and government leaders across South and Southeast Asia.

Collectively, we designed and delivered programs that drove investment, innovation, and partnerships for inclusive and gender-responsive waste management and circular economy solutions.

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