



NGUYEN MINH DUC FOR USAID

BEHAVIOR CHANGE IN LOCAL SYSTEMS TO MITIGATE OCEAN PLASTIC POLLUTION

Case Study of USAID's Municipal Waste Recycling Program in Two Vietnamese Cities

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EXECUTIVE SUMMARY

Every year, an estimated 8 million metric tons of plastic waste ends up in our oceans,¹ damaging marine life, coastal communities, and the livelihoods of people who depend on marine resources to earn a living. The majority of ocean plastic pollution stems from the mismanagement of plastic waste on land, specifically in rapidly urbanizing and fast-growing emerging-market cities. In these contexts, solid waste management (SWM) infrastructure and systems have struggled to keep pace with increasing waste volumes, fueling leakages of plastics into the ocean.

In 2016, USAID launched the Municipal Waste Recycling Program (MWRP) to address this challenge in urban and peri-urban areas of four countries: Indonesia, the Philippines, Sri Lanka, and Vietnam. Through grants and technical assistance, MWRP supports local innovations to improve solid waste management and recycling. Underpinning USAID's approach is an understanding that marine plastic pollution is a global problem with local origins. Solutions must be rooted in local realities, guided by the knowledge of communities and stakeholders, whose inputs are crucial for the design and implementation of effective interventions. Local organizations implementing grants under MWRP often target behavioral changes, at the individual and community levels, to improve solid waste management.

This case study report explores the efforts of MWRP projects to create behavior change in two Vietnamese cities. In Ho Chi Minh City (HCMC), Towards Higher Effectiveness of Informal Sector Waste Pickers in Increasing Plastic Waste Recycling (The Informal Sector on Plastics) was implemented by Environnement et Développement du Tiers-Monde (ENDA). In Da Nang City, Plastic Recycling in Strong Communities in a Green City (Oceans without Plastics) was implemented by the Center for Environment and Community Research (CECR). Both projects have behavior change goals of reduced plastic use, increased waste separation, and increased recycling. Through a qualitative case study, we sought to understand how the projects have addressed plastic pollution by changing relevant human behaviors, to gather insights on aspects of the project contexts that support or impede behavior change goals, and to document lessons that can inform future programs.

Key findings from our research are as follows:

- **Effective solid waste management can help reduce ocean plastic pollution, but in places experiencing rapid economic growth and urbanization, solid waste management is an increasingly complex public service to deliver.** Inadequate infrastructure and low technical capacity disrupt the flow of core waste management functions, such as transportation and final treatment of waste. Two factors exacerbate these challenges: limited financial resources in local government and the unwillingness of households to pay for services beyond waste collection. The absence of necessary waste management infrastructure discourages households from practicing recommended behaviors (e.g., waste separation).
- **In Vietnam, regulatory measures are important enablers of behavior change but need strong enforcement to be effective.** HCMC and Da Nang recently changed regulations to require households to separate waste (a targeted behavior change for ENDA and CECR), but both cities have weak enforcement mechanisms. Without the right infrastructure and technical capacity, enforcing solid waste management regulations is difficult for local authorities. In Vietnam, regulations are a necessary but insufficient condition to create behavior change; the weak enforcement environment tempers the effect of such regulations on households' waste management behaviors.
- **In both cities, solid waste management functions are shared between state and nongovernmental actors (households, community groups, the informal sector, the private sector, and civil society), suggesting that achieving large-scale behavior change requires inputs from and collaboration among diverse stakeholder groups.** Especially in HCMC, informal sector actors play a significant role in waste collection, working in parallel with local utilities. They also dominate the recycling ecosystem, without sufficient

¹ Jambeck et al., 2015.

government support or direction. In addition, local non-governmental organizations and sociopolitical organizations like the women's union have supported waste management through programming that is generally well-aligned with governmental efforts to address plastic pollution. Overall, experiences from both cities indicate that government has a crucial role to play in creating an enabling environment for local solutions, including securing household buy-in for behavior change goals like waste separation.

- **In collaboration with government and non-governmental actors, the ENDA and CECR projects sought to change behavior in two main ways: by helping households understand the importance of the recommended behaviors and building their capacity to carry out the behaviors.** Project activities included campaigns to raise awareness about the harm of plastic pollution and trainings on waste separation. Project strategies varied across the two cities, reflecting the unique features of solid waste management in each. For instance, the ENDA project's behavior change goals were situated within the context of improving the welfare of informal waste pickers, a vulnerable group that plays a salient role in the city's SWM system and is affected by households' behaviors (e.g., failure to separate waste). CECR's project, on the other hand, used a neighborhood-based training-of-trainers approach to pilot local recycling models.
- **The journey from increased awareness and knowledge to changes in solid waste management behavior is not linear; infrastructure and trust in the system matter too.** The ENDA and CECR projects appear to have contributed to increased levels of awareness of waste separation and of the negative impacts of plastic pollution. However, increased awareness did not automatically translate to behavior change. Both cities lack infrastructure and processes to manage separated waste, which means that when households separate waste, solid waste management companies end up disposing of the separated waste together. This reality diminishes households' trust in waste management systems and reduces their motivation to separate waste. In the absence of necessary infrastructure, separating waste becomes a pointless exercise, even for those individuals and communities that understand its importance and intend to do so.
- **Addressing gaps in the plastic value chain² is key to sustaining household commitment to waste separation and recycling.** Interviews reflected that monetary gain is the main factor that drives people to separate and recycle plastic. If certain items, like plastic bags, have no market or prices fall, people are discouraged from separating waste and recycling. Other barriers include long distances and limited infrastructure for transporting recyclables. In Da Nang, a lack of market linkages was a disincentive for continued separation of plastic bags. After the project ended, households had no one to sell their separated plastic bags to, so they stopped separating waste.

Based on these findings, there are several program and policy implications for future efforts to address plastic pollution through behavior change:

- **A local systems approach to addressing plastic pollution requires government partners with capacity to support and create an enabling environment for local solutions.** The CECR and ENDA projects represented innovative roles for civil society organizations in Vietnam to coordinate with government action on a pressing environmental issue. The civil society organizations were close to communities on the ground and brought technical knowledge, and they looked to the government partners to cultivate buy-in and address needed policy levers.
- **Project designs need to be based on understanding of personal and situational factors that shape waste management behaviors.** Some people may not separate waste or recycle because of a lack of awareness, while others may want to engage in those

² The global plastics value chain "ranges from the extraction of raw materials for plastics production to final disposal of the plastic or plastic containing products" (UNEP, 2018).

behaviors but need help translating those intentions to action. Because behavioral bottlenecks can vary between individuals and across places, solutions are likely to have a better chance at success if their design is informed by evidence on how and why people behave the way they do in a given context. In other words, project designs need to ensure that they are targeting the right problem in the right places.

- **Policies strengthening the recycling ecosystem are needed to divert plastics from landfills.** Getting households to reduce plastic use and separate plastic waste is only a first step; it has limited impact on diverting waste from landfills in the absence of a strong recycling market and system. As recycling in both cities is largely informal and small-scale, there is room for policy action to build the capacity of existing actors and attract new business investments in the sector, with a view to increasing recycling rates.

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ACRONYMS

CECR	Center for Environment and Community Research
CITENCO	Ho Chi Minh City Urban Environment Company
CS	Citizen science
DONRE	Department of Natural Resources and Environment
ENDA	Environnement et Développement du Tiers-Monde
HCMC	Ho Chi Minh City
IWC	Independent waste collector
MWRP	Municipal Waste Recycling Program
NGO	Non-governmental organization
PC	People's Committee
SC	Steering committee
SWM	Solid waste management
URENCO	Urban Environment Company
USAID	United States Agency for International Development
VND	Vietnamese dong

THE GLOBAL CHALLENGE OF OCEAN PLASTIC POLLUTION

When a 2015 *Science*³ report revealed that a staggering 8 million metric tons of plastic enter the ocean each year, marine plastic pollution gained attention as an urgent environmental challenge that warranted a global response. Before this study, there was no known estimate of the amount of plastic entering the ocean despite abundant evidence of plastic debris in the marine environment. And if current trends persist, the annual input of plastics into the ocean will be twice as much by 2025, reflecting growth in population and waste generation rates consistent with economic growth.⁴

More than 80 percent of mismanaged plastic waste entering the ocean comes from land, and five Asian countries account for more than half of total mismanaged plastic waste: China (27.9 percent), Indonesia (10.1 percent), the Philippines (5.9 percent), Vietnam (5.8 percent), and Sri Lanka (5.0 percent).⁵ The majority of plastic at risk of leaking into the ocean comes from rapidly urbanizing and fast-growing emerging markets.

The impact of plastic debris on marine life is well established. Plastics affect approximately 700 species, including some that are endangered.⁶ Plastic entanglement can injure or kill sea animals, which are also harmed when they ingest microplastics and the myriad contaminants they carry. Evidence of impacts on human health is more limited. Consuming fish or other seafood contaminated by microplastics could carry risks, but the available evidence indicates that the risks to human health are likely negligible. For instance, studies show that microplastics in fish are typically found in areas not commonly eaten by humans, such as digestive organs.⁷ However, ocean plastic pollution has socioeconomic impacts: the loss of wildlife and the damage to the aesthetic value of the environment hurt coastal communities, including the people who rely on marine industries to earn a living.⁸ Further investigation and solutions are needed.

SOLID WASTE MANAGEMENT AND OCEAN PLASTICS NEXUS

Plastic waste leakage into the ocean comes primarily from waste that is uncollected or littered. However, it is important to note that plastic leakage into the ocean does not necessarily stop once waste is collected: one study finds that 25 percent of plastic waste leakage comes from within waste management systems.^{9,10} Plastic waste can leak into the ocean after collection as a result of gaps in waste transport systems, improper dumping, and poor management of dump sites, especially those near waterways.¹¹

Globally, how solid waste management (SWM) systems handle plastic waste varies by the income level of countries: waste management systems tend to be more effective in countries with high incomes than in those with low-to-middle incomes.¹² Because of the differences in the quality of countries' waste management systems, one nation might generate more waste per person than another but contribute less to the plastic pollution. This underscores the crucial role of SWM systems in curbing marine plastic pollution.

Recycling—a key SWM step that involves the recovery and reuse of materials from solid waste streams—offers an avenue to address plastic leakage. In 2015, however, only 20 percent of total plastic

³ Jambeck et al., 2015.

⁴ Jambeck et al., 2015.

⁵ Jambeck et al., 2015.

⁶ Parker, 2014.

⁷ Galloway, 2015.

⁸ Viool et al., 2019.

⁹ Ocean Conservancy and McKinsey Center for Business Environment, 2015.

¹⁰ Estimates are based on averages from five focus countries: China, Indonesia, the Philippines, Thailand, and Vietnam.

¹¹ Ocean Conservancy and McKinsey Center for Business Environment, 2015.

¹² Kaza et al., 2018.

waste was recycled. The remainder was incinerated (25 percent) or discarded in a contained system such as a landfill or in the natural environment (55 percent).¹³

Throughout low- and middle-income countries, the informal sector typically leads the recycling effort in the absence of formal recycling systems or frameworks. However, only a small share of plastics (20 percent) in local solid waste streams has enough value for informal waste pickers to collect it.¹⁴ Furthermore, for recycling to be a worthwhile economic activity for informal sector agents, the solid waste stream must have large volumes of recyclable plastic materials. One general consideration for recycling is that the cost of collecting, sorting, and recycling plastic may surpass generated revenues.^{15,16}

Importantly, projected increases in global solid waste volumes and plastic production are strong indications that more plastics will be at risk of leaking into the ocean over the coming decades. By 2030, annual global solid waste generation is projected to reach 2.59 billion tons, an increase of approximately 30 percent from the 2016 level.¹⁷ By 2050, annual global solid waste generation is expected to reach 3.40 billion tons. Countries with low or lower-middle incomes are expected to drive much of this growth. South Asia and sub-Saharan Africa are set to see waste levels double and triple by 2050 because of the combined effect of economic growth, population growth, and rapid urbanization.¹⁸

In many developing countries, plastic consumption and overall waste volumes have grown without a commensurate development in the capacity of solid waste systems. Crucial infrastructure gaps along the waste management stream (*i.e.*, waste collection, transportation, treatment, and disposal) impede the delivery of services. Challenges are made no less burdensome by fiscal constraints that preclude national and subnational governments from undertaking required investments in solid waste management while they simultaneously face pressing challenges to the delivery of other services, such as water and public transportation. Inconsistent waste collection services, low technical capacity, overlapping responsibilities among actors at different levels of government, limited cost-recovery opportunities, and weak enforcement of policies and regulations are salient challenges in countries that account for a significant share of plastic leakage into the ocean.¹⁹

These challenges reveal a need to pursue technical solutions with an understanding of the local context. Without the right incentives, institutions, and systems in place, efforts to curb ocean plastic pollution will be limited.

ROLE OF HUMAN BEHAVIOR IN WASTE MANAGEMENT

The quantity of waste that SWM systems have to manage is a function of human behavior. Plastic pollution in particular is an interaction between the quality of SWM systems and people's decisions about how much plastic to use and how to manage plastic waste after use. Studies have argued that the consumption and disposal behavior of waste generators (*i.e.*, households and establishments) are the root causes of the problem.²⁰ Given that plastic waste management typically begins at the household and individual levels, human behavior at the community and business level has implications for the persistence of the problem and for potential solutions.

¹³ Geyer et al., 2017.

¹⁴ Ocean Conservancy and McKinsey Center for Business Environment, 2015.

¹⁵ Ellen MacArthur Foundation, 2017.

¹⁶ This is based on evidence from advanced economies. Cost data along the solid waste management stream are hardly available in emerging market contexts.

¹⁷ Kaza et al., 2018.

¹⁸ Kaza et al., 2018.

¹⁹ Kaza et al., 2018.

²⁰ Atienza, 2011.

Existing evidence suggests that waste management behaviors are not random: demographic, psychological, and situational factors influence them. Plastic use and related waste-handling behaviors vary across contexts depending on age, gender, and education level. For example, several studies find that older people are more likely to report intentions to recycle or reduce marine litter.²¹ Furthermore, plastic bag use varies by gender, with women showing more pro-environmental behaviors than men.²² As for psychological factors, environmental attitudes are a crucial determinant of recycling behavior.²³ For instance, a study in Hanoi, Vietnam, finds positive attitudes toward recycling to be the most important predictor of households' intention to practice waste separation—the sorting of organic and inorganic waste for further treatment (e.g. recycling) or disposal.²⁴ People who hold strong moral convictions about recycling are significantly more willing to practice waste separation. It is worth considering that personal norms might be more important than external social pressures in explaining recycling behavior.²⁵

Equally important to note is that a lack of local infrastructure is a major reason that people do not recycle.²⁶ This is true even among people who have strong pro-environment attitudes. Availability of infrastructure matters not only for SWM service delivery but also for people's waste management practices. Studies suggest that availability of infrastructure for waste separation is the most important factor influencing people's willingness to separate waste.²⁷ Where requisite infrastructure is lacking, individuals may opt for harmful practices like open dumping and burning. An implication of these findings is that even though people may be aware of the issues and intend to act in environmentally friendly ways, they may fail to do so because of a lack of necessary infrastructure.

STATE OF THE EVIDENCE ON BEHAVIOR CHANGE SOLUTIONS

Behavioral approaches to addressing plastic pollution documented in the literature fall under three broad categories:

1. **Educational/awareness strategies**, which are designed to raise awareness
2. **Situational interventions**, which primarily address logistical/practical constraints
3. **Citizen science initiatives**, which encourage participation in recycling

The evidence on the efficacy of these strategies is thin, particularly in developing countries. Where there are insights, they are often mixed and context-dependent. A few research insights on each category are summarized in Table I.

TABLE I. EVIDENCE ON BEHAVIOR CHANGE SOLUTIONS

APPROACH	STATE OF EVIDENCE
EDUCATION/ AWARENESS	<p>Awareness building is important but is not always enough to drive behavior change.</p> <ul style="list-style-type: none"> • Information campaigns have been found to be promising complements to recycling schemes. • One quasi-experiment found a statistically significant improvement in recycling quality (cleanliness and accuracy of separation) when university halls were treated with a recycling bin and posters explaining recycling steps.²⁸ • Other studies find that educational interventions can induce waste separation when combined with economic incentives.²⁹ • To strengthen the effectiveness of awareness campaigns, it might be worthwhile to include an action planning component, whereby households develop a plan that details where, when, and how they would go about recycling.³⁰

<p>SITUATIONAL APPROACHES</p>	<p>Results vary across solution designs, but studies find that convenience is a key factor that shapes waste management behavior.</p> <ul style="list-style-type: none"> • It is unclear whether recycling behavior is more prevalent when people have to bring their waste to public spaces or when waste is picked up at their doorsteps (curbside collection). • Minimizing distance to recycling points may improve recycling rates.
<p>CITIZEN SCIENCE (CS) INITIATIVES</p>	<p>CS initiatives likely engage people who already care about environmental issues, and their effect on behavior is unclear.</p> <ul style="list-style-type: none"> • CS initiatives such as beach cleanups are useful for increasing awareness of marine littering in particular; however, the effect on behavior is not clear. • Moreover, untangling the effect of CS initiatives on knowledge awareness is difficult, because the people who have high levels of knowledge and awareness are most likely to participate in such CS initiatives in the first place.

Measuring changes in behavior is a challenge, so most studies capture attitudes and intent rather than empirical evidence of behavior changes. In addition, there is a dearth of studies that focus on behavioral solutions to marine plastic pollution in developing countries.

²¹ Pakpour et al., 2014; Hartley et al., 2015.

²² Madigele et al., 2017.

²³ Chan, 1998.

²⁴ Nguyen et al., 2015.

²⁵ Chan, 1998.

²⁶ McDonald and Ball, 1998.

²⁷ Struk, 2017.

²⁸ Cheung et al., 2018.

²⁹ Agbefe et al., 2019.

³⁰ Pakpour et al., 2014.

FRAMING A RESPONSE

Three arguments for how to respond to the challenges of ocean plastic pollution appear to have taken center stage:

1. **Collecting floating garbage is an impractical and ineffective solution.** The amount of plastic that can be recovered from the ocean through pickup or cleanup interventions is only a tiny fraction of total plastic in the ocean. Cleanup strategies also cannot keep up with the increasing quantities of plastic entering the marine environment.³¹ Additionally, opportunities to recover microplastics are limited, and doing so may cause more harm than good. Ultimately, ocean cleanup activities are useful for raising awareness and galvanizing social action, but they do not suffice to mitigate ocean plastics.
2. **The best way to tackle ocean plastic pollution is to stop it at the source, and this requires long-term behavior changes among individuals, communities, and producers.** Such a source-oriented mitigation approach has a goal of reducing plastic inputs into the ocean. This calls for waste reduction and changes in production and consumer practices. At the production level, tactics to reduce plastics include using alternatives (e.g., compostable or recycled materials), creating new product delivery models, recalibrating product designs to reduce the amount of plastics used in design or packaging, and emphasizing producer responsibility for plastic waste.³² At the individual and community level, reducing consumption of wasteful plastics is difficult because plastic use is convenient and embedded in people's lives. The lack of alternatives to plastic is a challenge. However, increasing awareness of the environmental impacts of consumer choices may help reduce the appeal of plastics to consumers, which could spur people to reduce their plastic consumption—and, by extension, plastic waste generation.³³

Command and control measures like fees on plastic shopping bags and single-use plastics bans can help compel behavior change, but the long-term effects of those measures are unclear.³⁴ These measures demand a concerted effort from and the commitment of consumers, producers, and policy-makers in an attempt to move toward a circular economy, one in which plastic never becomes waste.³⁵ Overall, source-oriented solutions are promising because they could reduce the quantities of mismanaged plastic waste available to leak into the ocean.

3. **Improving solid waste management capacity is a priority for curbing ocean plastic pollution in the short term.** Waste collection, disposal, and recycling are major areas for improvement, and they all require substantial investments in infrastructure and institutional capacity, along with better enforcement of SWM regulations.

Boosting waste collection coverage rates can curb plastic leakage that stems from uncollected waste, but this depends on seamless transportation of waste and availability of appropriate facilities for final disposal. A prevailing method of final waste disposal is landfills, but in most developing countries, many landfills are uncontrolled, operating as open dumps, and are a main plastic leakage point.

Ocean plastic pollution is a global problem that requires action in all parts of the world. At the same time, it is a problem that has local roots. Waste management, a crucial part of the solution, is largely a local affair. Drivers of plastic pollution vary across countries, so solutions need to take local conditions into account. Consequently, a thorough understanding of the local governance context and culture must underpin the design of potential solutions, and the implementation of those strategies must be guided by knowledge of local communities and stakeholders, whose active engagement is important for solutions to have a chance at success.

³¹ Prata et al., 2019.

³² Prata et al., 2019.

³³ Prata et al., 2019.

³⁴ Dikgang et al., 2012.

³⁵ Löhr et al., 2017.

USAID'S APPROACH TO COMBAT OCEAN PLASTIC POLLUTION

The local systems approach is at the core of the response by the United States Agency for International Development (USAID) to the challenge of marine plastic pollution,³⁶ reflecting a recognition that development organizations can partner with local actors (e.g., civil society, government, businesses) to implement culturally appropriate strategies to address plastic pollution.³⁷ It is within this context that USAID's Municipal Waste Recycling Program (MWRP) was conceived.

Launched in 2016, MWRP is a five-year, \$14 million USAID-funded initiative to address the global challenge of ocean plastic pollution. USAID launched MWRP in response to a congressional directive that mandated the Agency to provide "small grants to support initiatives to recycle waste which threatens human health and the environment and which, if recycled, could generate income, improve agriculture, and produce energy."³⁸

MWRP operates in Indonesia, the Philippines, Sri Lanka, and Vietnam (which together account for about one-quarter of globally mismanaged plastic waste³⁹), with an aim to reduce land-based sources of ocean plastic pollution. Through grants and technical assistance, the program supports local interventions to improve SWM and recycling in urban and peri-urban areas. Implementation of the program takes place in the context of the Save our Seas Act of 2018, which urges U.S. agencies to partner with the countries that discharge the largest amount of waste into the ocean to develop mechanisms to reduce such leakages.⁴⁰

To achieve its goals, MWRP has three components:

- **Grant program:** MWRP disburses grants to academic institutions and eligible nonprofit and for-profit non-governmental organizations (NGOs) to support locally led SWM and recycling activities. As of December 2019, MWRP was funding 30 grants, ranging from \$75,000 to \$250,000. The scope of the MWRP grants is broad, including community-led awareness-raising and education campaigns, efforts to improve the working conditions and welfare of informal waste collectors, support for local governments, and collaboration on crowdsourcing of geospatial data on recyclables.
- **Evaluation and learning:** Drawing on insights from results and implementation experiences in the grant program, MWRP develops lessons learned and recommendations to inform future investments in municipal waste recycling. Additionally, under MWRP, USAID combines lessons learned and in-depth research to generate and disseminate knowledge through stakeholder workshops, conferences, technical assistance, technical briefs, and other publications.
- **International cooperation:** MWRP coordinates with the private sector, NGOs, academia, and other governments in reducing marine plastic pollution. Based on what it learned from its grant-making activities, MWRP provides policy and investment recommendations and other forms of technical support for strategic partnerships.

BEYOND MWRP: CLEAN CITIES, BLUE OCEANS

In August 2019, USAID launched Clean Cities, Blue Ocean, a flagship program to address ocean plastic pollution. A central priority for the initiative is strengthening the capacity of local institutions for improved solid waste management by focusing on the three Rs: reduce, reuse, and recycle. The strategy of Clean Cities, Blue Ocean emphasizes private-sector engagement as important for sustainable environmental change. The initiative has a geographic focus in Asia, including countries in the MWRP portfolio (Indonesia, the Philippines, Sri Lanka, and Vietnam); India; and the Maldives. Under Clean Cities, Blue Ocean, USAID has expanded its ocean plastics programming to Latin America and the Caribbean, with programs starting in Peru and the Dominican Republic.

³⁶ Thompson, 2018.

³⁷ Jambeck, 2017.

³⁸ U.S. Government Publishing Office, n.d.

³⁹ Jambeck et al., 2015.

⁴⁰ Save Our Seas Act of 2018.

RESEARCH METHODS

This report explores two MWRP projects in Vietnam as case studies. The case studies' goals are threefold: i) to capture lessons from the design and implementation of behavioral solutions to marine plastic pollution through the experiences of MWRP grantees, ii) to develop understanding of contextual factors that matter for behavioral solutions, and iii) to leverage research insights to inform future programming.

In pursuing these objectives, the case studies will focus on the following central research questions:

1. How have the selected projects, through their design and implementation, used levers of behavior change to augment target behaviors or decrease negative behaviors?
2. What factors have enabled or constrained progress toward desired behavior changes?
3. In the Vietnam context, what forces push and pull actors (households and establishments) toward or away from desired waste management practices?

The two cases were selected because the projects had made significant progress on implementation: the Towards Higher Effectiveness of Informal Sector Waste Pickers in Increasing Plastic Waste Recycling (Informal Sector on Plastics), implemented by Environnement et Développement du Tiers-Monde (ENDA) in Ho Chi Minh City (HCMC), and Plastic Recycling in Strong Communities in a Green City (Oceans without Plastics), implemented by the Center for Environment and Community Research (CECR) in Da Nang City. Figure 1 below summarizes the two projects.

FIGURE 1. PROJECTS OVERVIEW

	Informal Sector on Plastics ENDA Location: HCMC	Oceans Without Plastics CECR Location: Da Nang City
PROJECT GOAL	Improve solid waste management by enhancing welfare and opportunities for entrepreneurship for independent waste collectors (IWCs). <u>Project coverage:</u> Binh Chanh (population: 680,000) Binh Thanh (490,618), Go Vap (663,313), Hoc Mon (422,471), Cu Chi (403,038), District No. 3 (196,433), District No. 4 (203,060), District No. 5 (187,510), District No. 6 (253,474), District No. 10 (372,450), District No. 11 (332,536), Nha Be (175,360), Phu Nhuan (181,000).	Reduce plastic pollution by promoting recycling and separation of waste at the source. <u>Project coverage:</u> Son Tra (pop: 173,455) and Thanh Khe (160,953)
TARGET BEHAVIORS	<ul style="list-style-type: none"> • Waste separation • Waste recycling 	<ul style="list-style-type: none"> • Waste reduction (i.e. reduce plastic use) • Waste separation • Waste recycling
KEY ACTIVITIES	<ul style="list-style-type: none"> • Education and awareness campaigns • Occupational health and safety trainings • Technical assistance • Policy advocacy 	<ul style="list-style-type: none"> • Awareness campaigns • Training on waste separation • Local recycling model • Provision of supporting materials e.g. bins and diary
APPROACH	<ul style="list-style-type: none"> • ENDA worked directly with independent waste collectors and their cooperatives. 	<ul style="list-style-type: none"> • CECR worked at the neighborhood level, with women's unions at the center of implementation.

Data collection to inform these case studies consisted of a review of project documents and a site visit to collect qualitative information from project stakeholders. In September 2019, the research team visited Vietnam to conduct semistructured interviews with key informants, including:

- individuals working in the informal waste collection sector as independent waste collectors (IWCs), representatives of IWC syndicates and cooperatives, and owners of junk shops;
- community leaders engaged in program implementation;
- representatives from government, including the district-level People’s Committee (PC)— executive branch at subnational level, the city-level environmental division, and the city-level publicly owned waste management company;
- representatives from quasi-private enterprises such as the port and local waste management companies;
- representatives from sociopolitical organizations such as women’s and youth unions; and
- relevant observers, including journalists and academics.

Across, 28 interviews the research team interviewed 45 stakeholders; 25 of them were associated with CECR’s project, and 20 with ENDA’s.

The methodology for the qualitative data collection has two limitations worth noting. First, no interviews were conducted with regulators or policy-makers at the national level who could speak to evolving Vietnamese national priorities and plans for SWM and ocean plastic reduction. Second, interviewees were selected with the help of MWPRP grantees, meaning that targeted program beneficiaries who were less engaged or refused to participate in the program were not captured in data collection.

Looking more broadly, the Vietnamese case studies contain lessons for other interventions related to ocean plastics. However, the unique structure and role of the Vietnamese government—which is transitioning the country from a communist model into a socialist-oriented market economy— means that program approaches and lessons learned may not be replicable in other contexts.

SOCIAL INCLUSION FOR IMPROVED WASTE MANAGEMENT IN HO CHI MINH CITY



This section presents the case study of Ho Chi Minh City, where ENDA’s MWRP project, the Informal Sector on Plastics, is currently being implemented. The project started in October 2017 and is expected to last through June 2020. Key takeaways are in Box I.

BOX I. TAKEAWAYS FROM HCMC CASE



KEY TAKEAWAYS

- Solid waste generation in HCMC is growing rapidly, creating challenges for local authorities to deliver adequate SWM services. Independent Waste Collectors (IWCs) are vital actors in SWM processes, especially for recycling efforts.
- Reducing the vulnerability of IWCs through protective gear, safety trainings, and increased income can support SWM goals, such as increased recycling, but there is a need for increased coordination across actors and effective policy implementation.
- To create better habits around plastic disposal, NGOs can use awareness-raising tactics that help residents understand plastic pollution and improve their ability to engage in desired behaviors. But without adequate infrastructure, behavior change is unlikely to take root among households.

HO CHI MINH CITY CONTEXT

Ho Chi Minh City, where ENDA’s MWRP project operated, is Vietnam’s most populous city, home to approximately 9 million people.⁴¹ Over the past 30 years, the city’s population has tripled from under 3 million in 1989 to 9 million people today. Ho Chi Minh City is in the southeastern region of the country and lies along the Saigon River. Since 1999, HCMC’s population has increased by an average annual rate of 6.3 percent.⁴² HCMC’s combined urban built-up area and urbanized open space more than quadrupled between 1999 and 2015, from 22,015 hectares to 99,391.⁴³ With an average population density of 150 people per hectare, HCMC is a dense city by global standards.⁴⁴

HCMC is one of two core urban systems that have driven Vietnam’s rapid economic growth in recent years.⁴⁵ HCMC generates more than 20 percent of Vietnam’s gross domestic product despite having less than 10 percent of the country’s population and a negligible share of its land area.⁴⁶

HCMC has made remarkable progress in reducing poverty, and the standard of living has improved significantly. A surge in the use of motorbikes across the city is one proxy for rising incomes and the emergence of a middle class.⁴⁷ Although less than 2 percent of the population lives below the poverty line,⁴⁸ urban living in HCMC is not without its challenges, particularly for lower-income residents who struggle to cope with rising costs of living.⁴⁹ Many of HCMC’s poor, including rural-urban migrants, work in vulnerable informal sector jobs without social protection or benefits. Against this backdrop, population growth and the city’s economic dynamism have combined to increase pressure on public infrastructure. Government action is required to maintain a healthy urban environment, and

⁴¹ General Statistics Office of Vietnam, 2018.

⁴² Atlas of Urban Expansion, n.d.

⁴³ Atlas of Urban Expansion, n.d.

⁴⁴ Bertaud and Malpezzi, 2014.

⁴⁵ The other is Hanoi.

⁴⁶ World Bank, 2011.

⁴⁷ Truitt, 2008.

⁴⁸ World Bank, 2011.

⁴⁹ The poverty line for urban areas is measured at a monthly income of VND 500,000 (Thanh et al., 2013).

governance structures are necessary to keep up with the forces of urbanization driving changes in HCMC.

Rapid economic growth and urbanization in HCMC have come with environmental costs and quality-of-life concerns. The environmental issues that the city is facing include air pollution (driven by emissions from transportation), water resource challenges, and plastic pollution. Urbanization and industrialization processes have put pressure on the city's water resources as the city struggles to meet the needs of households, agriculture, and industry. Also, water quality has been hurt by pollutants such as leachate from landfills and industrial wastewater,⁵⁰ an indication of inadequate waste management. In recent years, plastic pollution has emerged as an important environmental concern in the city, reflecting national-level prioritization of the issue. Indeed, in December 2019, the Prime Minister of Vietnam approved a National Action Plan for Management of Marine Plastic Litter.⁵¹ Against the backdrop of economic and population growth, HCMC's waste generation rates have increased, without commensurate development in the capacity of the city's waste management system to deal with the growing volume of waste.

SOLID WASTE MANAGEMENT IN HCMC

Ho Chi Minh City generates about 3 million tons of municipal solid waste each year. Consistent with national trends, solid waste generation has increased with population growth, and each person generates about 1 kilogram of solid waste per day.⁵² HCMC's per capita daily waste generation is higher than the national average (0.61 kilogram per capita per day) and is growing at a faster rate.⁵³ Organic waste makes up the greatest share of municipal waste, accounting for up to 65 percent of total waste, while recyclables—including plastic, paper, and metal—make up 25 percent of total waste.⁵⁴ The share of waste coming from plastic is growing because of economic growth, urbanization, and population growth.⁵⁵ HCMC's waste collection coverage rate is among the highest in the country, at 97 percent.⁵⁶

ORGANIZATION OF SOLID WASTE MANAGEMENT

Ho Chi Minh City has a bifurcated SWM system, with service delivery by both the state and the informal sector, as illustrated in Figure 2. Responsibility for core SWM functions, especially waste collection and transportation, is shared between local authorities and IWCs. The Department of Natural Resources and Environment (DONRE), a district-level agency, has overall responsibility for waste management at the local level. HCMC's Urban Environment Company (CITENCO) is a state-owned company that leads waste collection and supports waste treatment.

⁵⁰ Vo, 2007.

⁵¹ UNDP Vietnam, 2020.

⁵² Verma et al., 2016.

⁵³ Verma et al., 2016.

⁵⁴ Schneider et al., 2017.

⁵⁵ Verma et al., 2016.

⁵⁶ Kaza et al., 2018.

FIGURE 2. SWM OVERVIEW IN HCMC

OVERVIEW OF MUNICIPAL SOLID WASTE MANAGEMENT PROCESSES

Ho Chi Minh City, Vietnam



COLLECTION

HCMC's Urban Environment Company (CITENCO) and independent waste collectors (IWCs) collect waste from households and establishments and deposit it at transfer stations. CITENCO collects waste on main streets in addition to collecting from households. IWCs have one-on-one relationships with households for waste collection and collect waste on small streets.

SEPARATION

After IWCs collect waste, they sort it to identify recyclable materials for resale to private recyclers. With a few exceptions, IWCs' waste separation effort is not rigorous as it focuses only on high value materials. Household separation of waste is required, but this regulation is not enforced.



TRANSPORTATION

Waste collected from households and establishments is transported to transfer stations which are temporary holding locations, from where waste is transported for treatment. CITENCO is responsible for final disposal of waste.

TREATMENT

LANDFILLING

Landfilling is the primary method of waste treatment in HCMC. Landfills are not designed for separate disposal of food and inorganic waste, and they currently operate beyond their capacity.

RECYCLING

IWCs sell separated plastic materials to informal recycling agents known as junk shop owners. These agents sell recyclables to other companies operating at a larger scale. Recycling is focused mostly on high-value plastics.



FINANCING SWM SERVICES

Households pay IWCs directly for waste collection services. Local authorities (People's Committee) cover the costs of transferring waste and final disposal.

SOLID WASTE MANAGEMENT CHALLENGES

Stakeholders interviewed for this study identified five key challenges for SWM in HCMC:

1. **SWM policies are often poorly designed.** Recent trends in regulatory activity reveal inadequate considerations of local conditions. A selection of project stakeholders suggested that regulatory ambitions are disconnected from community-level realities. One IWC syndicate leader said, “Regulations are issued by DONRE: these guys are people who just sit in an office and issue something [regulation] that is not realistic.”
2. **Existing policies are poorly enforced.** Regulations in the waste management sector are enforced poorly, if at all. For example, HCMC has a regulation that mandates separation at source, with penalties for noncompliance, but according to estimates by interviewees, only 10 to– 40 percent of households separate waste. Government officials in our sample acknowledged that a lack of mechanisms and tools for enforcing penalties and monitoring compliance was contributing to poor policy implementation.
3. **Authorities struggle to communicate about regulations effectively.** Communication breakdowns both within government and between government and citizens have impeded implementation of SWM regulations. One cooperative leader said: “We also have difficulty in terms of the new regulation, for example, the new one on waste separation at source. There are not so many clear instructions from government on how to separate waste at source.” Local authorities are consistently slow to provide guidelines needed for policy implementation.
4. **Inadequate infrastructure undermines implementation of SWM regulations.** Refuse vehicles and suitable communal waste collection points have yet to penetrate some areas. According to one government official, a consequence of this status quo is that in HCMC, waste collection coverage is less than 100 percent.⁵⁷ Moreover, infrastructure gaps allow leachate from landfills to pollute groundwater sources.⁵⁸ As for implementation of regulations, the city’s landfills are not controlled nor designed for separate disposal of waste, leaving CITENCO with no alternative but to dispose of organic and inorganic waste together. Underpinning these infrastructure deficits is a lack of financial resources for local authorities to make the necessary investments in waste management infrastructure.
5. **Coordination across actors needs improvement.** The view that waste management processes in HCMC, from collection to treatment, are not synchronized is shared across various stakeholder groups, including ENDA’s project team, IWC cooperative leaders, and local authorities. As one IWC cooperative leader explained, CITENCO’s delays in transporting waste from transfer stations to landfills impedes waste collection. Gaps in SWM infrastructure exacerbate this challenge. Transfer stations in some districts have shut down, and this has led to friction between the waste collection and transfer steps.

DYNAMICS OF INFORMALITY

As is the case in other cities in Southeast Asia, the informal sector is an integral part of the SWM system in HCMC. According to ENDA’s project team, government actors recognize that the informal sector collects an estimated 60 percent of waste in the city. ENDA’s project team and other stakeholders estimate that the city has about 4,200 IWCs, 2,000 street waste pickers, and about 1,816 informal recycling agents known as junk shop owners, who purchase recyclable materials. But the World Bank’s *What a Waste 2.0* report estimates HCMC’s IWC workforce to be as large as 16,000 people, a much higher number than the estimates made by respondents in our sample.⁵⁹

⁵⁷ Academic reports estimate the HCMC waste collection coverage rate to be 97 percent (see Kaza et al., 2018).

⁵⁸ Vo, 2007.

⁵⁹ Kaza et al., 2018.

Currently, some IWCs are organized as cooperatives or syndicates. Both entities coordinate and manage IWC operations in certain districts or neighborhoods. (To provide a sense of the operating scale, one cooperative engaged in ENDA’s project has more than 200 members covering 20 communes in the Thong Nhat district. This cooperative serves roughly 50 percent of the district’s 100,000 households.)

In addition to having a significant waste collection role, the informal sector dominates recycling operations in HCMC, which does not have policy frameworks, legal requirements, or functional assignments for recycling. Many stakeholders explained that earning additional income is the main motivation for IWCs’ participation in the recycling trade. As of December 2019, ENDA’s MWRP project was directly engaging about 1,970 IWCs, according to project implementation data.

ECONOMIC AND SOCIAL REALITIES

Even though IWCs are an integral part of the city’s waste management system, most of them are disconnected from formal systems and lack social support. IWCs in HCMC earn about 7 million Vietnamese dong (VND) per month (approximately \$300), making them “the poorest of the poor,” according to ENDA’s project team. In addition, women are overrepresented and discriminated against in HCMC’s informal sector. They account for 56 percent of total informal sector employment⁶⁰ and from 34 to 44 percent of the IWC workforce⁶¹ and earn less than men in the waste sector.

IWCs suffer injuries from sharp objects such as used syringes, and their lack of access to health insurance makes coping with such occupational hazards difficult for them.

“IWCs don’t have many benefits in their job. This is a dangerous job and harmful when they have to handle waste. Other workers may have benefits like danger pay from government, but for IWCs, they only have the fees.”

– IWC Cooperative Leader

Working as a waste collector comes with social stigma. To many interviewees, it was clear that most households do not respect IWCs, let alone treat them with dignity. Some government action may be necessary to increase respect for IWCs among households, although local authorities have so far not been a reliable source of support for them.

INFORMAL SECTOR INTEGRATION

In Ho Chi Minh City, local authorities want to transition more IWCs into cooperatives. However, no evidence exists suggesting that eventual integration into the formal waste management system is a current policy goal. According to ENDA’s project team, the government’s effort to formalize independent waste collection is motivated more by considerations related to oversight and the quality of service delivery than by concerns for social inclusion.

Stakeholders noted that waste collectors have diverging views on the likely consequences of the transition into cooperatives. For one IWC syndicate leader, it is a remarkable business opportunity, bringing the possibility of, for example, waste collection contracts with hotels and perhaps opening the door to access to credit. For others, however, the transition appears burdensome because it comes with additional tax responsibilities as well as increased government oversight of IWC activities.

⁶⁰ Cling et al., 2011.

⁶¹ According to estimates from interviewees.

RECENT DEVELOPMENTS IN THE SWM REGULATORY ENVIRONMENT

In 2019, the local government issued the following three SWM regulations, which have provoked varying responses across stakeholder groups:

1. **Requirement of household waste separation (Decision 44).** This regulation forces households to separate waste at source and imposes a fine for those who fail to comply. ENDA's project team considers this regulation a measure to reduce plastic pollution and protect the environment, while IWCs are more concerned about its effects on their work and SWM in general. Some see the regulation as valuable, pointing out that waste separation is important for waste treatment. It "makes it easy for treatment companies to do their job," one IWC syndicate leader explained. Others argued that IWCs' jobs would be easier if households separated waste, while others said the regulation had no implication for their work.
2. **Requirement for IWCs to upgrade waste collection vehicles (Decision 4448).** A regulation signed in October 2018 prohibits IWCs from using their three-wheeled vehicles for waste collection and requires them to purchase trucks. Several stakeholders recognized that compliance will be challenging for IWCs because of costs⁶² and other barriers, such as learning to drive and securing a license. Many stakeholders also pointed out that the required trucks are large and unsuitable for waste collection along narrow roads, a major feature of the waste collection routes of IWCs. One stakeholder considered this regulation an attempt by government to re-create the aesthetics of other cities abroad.
3. **Increase in upper limit of waste collection fees (Decision 38).** This regulation increases waste collection fees collected by IWCs from approximately 25,000 VND (\$1) to 48,000 VND (~\$2). Although the fee increase is expected to double the incomes of IWCs, applying the maximum rate seems infeasible. Some interviewed IWCs recognized a need for negotiations to consider how households and IWCs may respond to a fee change. One IWC explained: "If we apply maximum price, households won't be happy to pay. If we pay minimum price, independent waste collectors won't be happy." The next step for the implementation of this regulation is for district-level authorities to update fees in their respective areas, but this had not happened at the time of this study. In the meantime, some IWCs are leveraging the regulation to negotiate higher fees with households.

Taken together, these regulatory changes reflect an intention among policy-makers to strengthen links between waste management processes while promoting the economic well-being of the IWCs on whom HCMC depends heavily for the delivery of SWM services.

PROJECT OVERVIEW: INFORMAL SECTOR ON PLASTICS

ENDA-Vietnam is an international NGO with a mission to develop environmental, social, and economic solutions to enhance the standard of living of poor, disadvantaged Vietnamese citizens. Its MWRP project, Informal Sector on Plastics, focuses on serving IWCs, who are a crucial part of the city's waste management system. The project has four focus areas:

- improving the living standards and working condition of IWCs
- strengthening the network of IWCs to raise IWC voices
- conducting advocacy to increase government attention and provision of guidance on plastic pollution
- identifying a dynamic market for the value chain of plastic materials, which ranges from the extraction of raw materials for plastics production to final disposal of plastic or plastic-containing products

⁶² IWC cooperative and IWC syndicate leaders said in interviews that upgrading vehicles would cost 100 million to 220 million VND (\$4300 to \$9,470), an amount that most IWCs cannot afford.

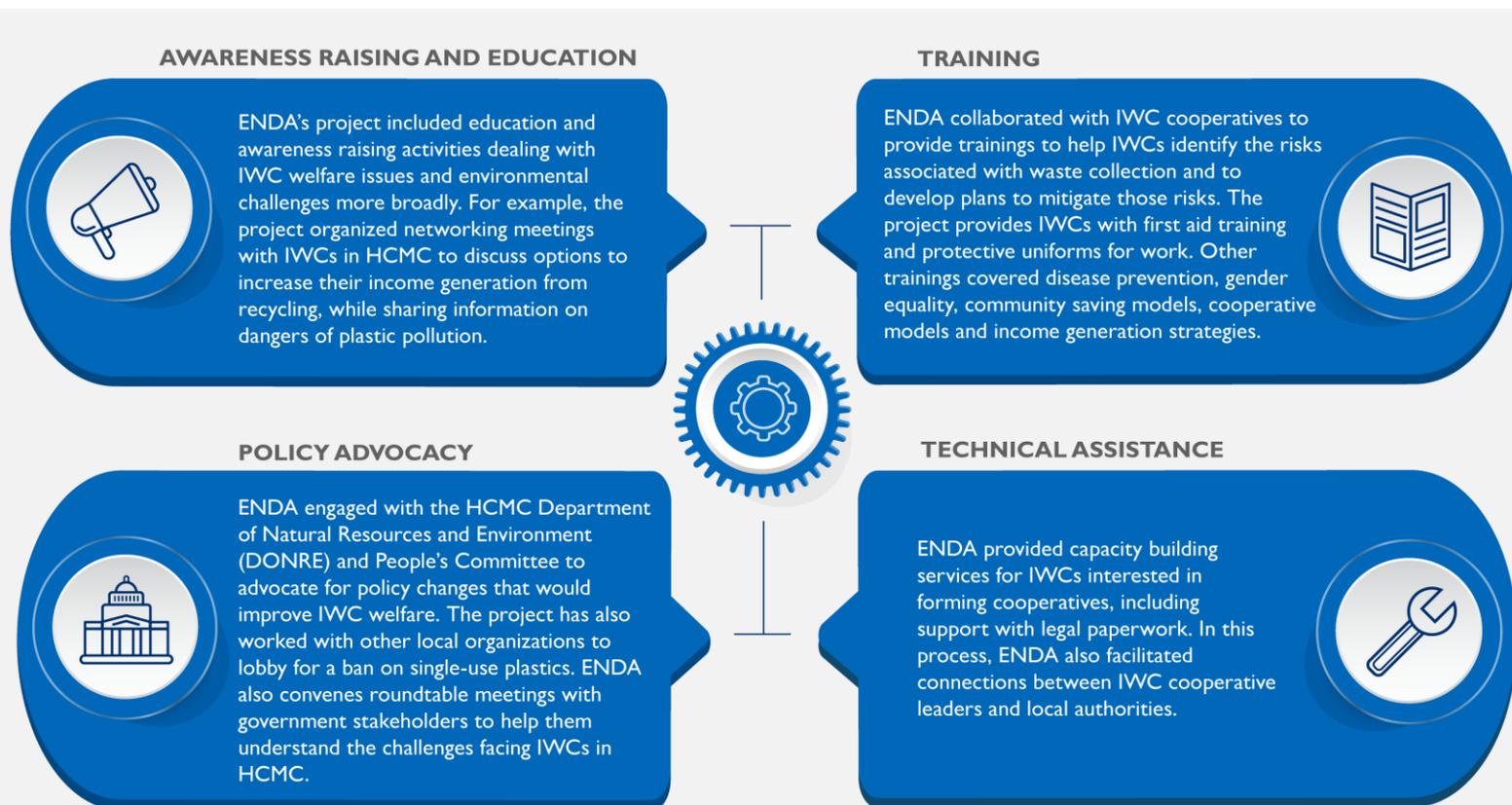
For ENDA, supporting IWCs and combating marine plastic pollution are directly linked. One project team member explained the thinking this way: “To solve marine plastic pollution, they [IWCs] are key group to recycle plastic. We mobilize them to recycle, which is important to the solution. This project leads to meaningful change when we work with IWC and get them to recycle.” ENDA’s project operated in 13 districts in HCMC: Binh Chanh (population: 680,000) Binh Thanh (490,618), Go Vap (663,313), Hoc Mon (422,471), Cu Chi (403,038), District No. 3 (196,433), District No. 4 (203,060), District No. 5 (187,510), District No. 6 (253,474), District No. 10 (372,450), District No. 11 (332,536), Nha Be (175,360), Phu Nhuan (181,000).

The overarching strategy of ENDA’s USAID-funded Informal Sector on Plastics project is to increase social protection for workers in HCMC’s informal waste management sector through activities described in Figure 3. The team has a vision of IWCs’ having access to government-funded benefits that support their social and economic development.

ENDA’s Informal Sector on Plastics project began in October 2017 with funding for activities to take place over a 2.5-year period. The project activities described below cover a range of issues related to IWCs’ welfare and vulnerabilities, household waste management behaviors, and SWM policy.

Assessing program outcomes is beyond the scope of this study, and we have not collected or analyzed data on them. That said, the interview protocols included questions driving at stakeholders’ perceptions of what worked best with ENDA’s project, as well as the challenges that arose during implementation. On the question of what the project appears to have done well, a selection of stakeholders highlighted improvements in IWCs’ negotiation skills and job safety, as well as an increase in community awareness of the dangers of plastic pollution.

FIGURE 3. ENDA’S PROJECT COMPONENTS



Source: Authors’ interpretation based on interviews and review of project documents

ENDA’s project team noted improved IWC negotiating as a result of the project’s technical assistance. Also, the project team had a sense that community members valued and respected IWCs more than they did before IWCs organized into cooperatives.

IWCs who were interviewed associated their participation in the program with increased on-the-job safety, confidence, and motivation. IWC cooperative leaders in the sample agreed that the project equipped independent waste collectors with knowledge of first aid and the importance of wearing protective gear. Accordingly, some IWCs said that through ENDA’s MWRP project, they learned how to protect themselves from on-the-job risks (e.g., injuries from needles) and that this makes their work “a lot better.” A few IWCs noted that the uniforms provided by ENDA’s MWRP project made them feel professional, which may have helped challenge the social stigma surrounding waste collection.

NAVIGATING BEHAVIOR CHANGE

Understanding the status quo of waste management behaviors in the project context is a good starting point for making sense of the project’s approach to bringing about desired behavior change. Before the start of ENDA’s MWRP project activities, no baseline data collection was done among the project’s target population on levels of awareness (e.g., on plastic pollution), attitudes (e.g., toward recycling and waste separation), or behaviors or habits (e.g., plastic use and waste separation). Data from government sources on attitudes and behaviors at the city or district level seem limited or unavailable,⁶³ and it is unlikely that any such data informed the project’s design or implementation strategy.

These data constraints aside, a few respondents in our interview sample offered relevant insights into households’ solid waste management attitudes and practices. Some agreed that household waste management practices needed improvement, although there was disagreement on perceived levels of awareness and the implication of a lack of awareness for waste management behaviors. ENDA’s project team suggested that communities were aware of the harmful effects of single-use plastics but continued using them because doing so was convenient. By contrast, one IWC cooperative leader suggested that households were not only unaware of the environmental issues but were also unwilling to practice waste separation. On average, about 20 percent of households separate their waste, according to estimates provided by stakeholders interviewed for this study.

The extent to which a lack of awareness is responsible for poor household waste management practices (e.g., littering, failing to separate waste) is unclear, although some stakeholders seemed to consider awareness a major factor.

“The biggest problem with plastic waste is that there is a huge amount of plastic bottles and cups and straws that we see everywhere. People buy drinks because they are thirsty, and they litter. If they are more aware of the environment, at least they will take the trash home or bring it to a trash bin.”

– independent waste collector and junk shop owner

Absent a consensus, it seems likely that factors other than awareness influence households’ waste management behaviors, a conclusion for which the literature offers substantial support.⁶⁴ Several stakeholders see a clear role for government action to raise awareness of waste separation and environmental issues in general. We found that awareness-raising activities are a core component of

⁶³ When asked to comment on the level of community awareness of plastic pollution, recycling, or waste separation, a government official in our sample said he could not rate the status of the behaviors, citing a lack of data.

⁶⁴ For examples, see Afroz et al., 2017; Ahmad et al., 2016; Ari and Yilmaz, 2017; Chan, 1998; Nguyen et al., 2015; Pakpour et al., 2014.

government activity related to environmental issues. ENDA’s project approach seems well aligned with such efforts, at least from the perspective of government stakeholders interviewed.

These stakeholders noted that considering citizens’ environmental attitudes and behaviors in the context of Vietnam’s macro-level experiences of rapid economic growth is important.

“Vietnam’s economy developed before the knowledge and attitude of the people developed. People only think of convenience when it comes to plastic use. They don’t think on environmental effects.” – Member of ENDA Project Team

PROJECT BEHAVIOR CHANGE GOALS AND MECHANISMS

In pursuing its broad goal of improving IWC welfare, ENDA’s project targeted the following changes in four behaviors that have implications for the city’s waste management outcomes:

- increased at-source waste separation
- increased waste recycling
- reduced quantities of waste (*i.e.*, reduced use of single-use plastics)
- reduced stigmatization of IWCs

These targeted behaviors are interconnected in that proper separation of food waste and inorganic waste from recyclables is necessary for recycling to work. Success on these fronts advance the effort to mitigate marine plastic pollution by diverting plastics from landfills, which reduces the amount of plastics at risk of leaking into the ocean. Relatedly, targeting reductions in the use of single-use plastics contributes to mitigation of plastic waste by reducing the overall volume of plastic waste generated in the project context.

Our interviews and review of project documents found that education and awareness-raising were the main tools that ENDA’s MWRP project used to try to change behavior. ENDA’s education and awareness-raising activities included community meetings and door-to-door outreach in which project staff members shared information about waste separation, the impacts of plastic pollution, and strategies to prevent it.

“During awareness raising, we mentioned marine plastic pollution in general. ...We encouraged the local community to reduce single-use plastics as much as possible.” – Member of ENDA Project Team

The awareness-raising activities targeting IWCs often emphasized the health impacts of plastic pollution as a tactic to encourage them to champion reduced use of plastic. ENDA also conducted awareness-raising meetings with local stakeholders to discuss ways to reduce waste pollution in the Hiep Tan canal, where nearby households dispose of their waste, which then flows into the marine environment through the Saigon River. The awareness-raising efforts included outreach to children in primary and secondary schools to prepare them to take on environmental protection responsibilities in their respective communities. In addition, ENDA’s awareness programming included communication about the experiences of IWCs as a way to improve public perceptions of the workers. Specifically, the project’s Photovoice campaign created a platform for IWCs to tell their life stories, challenges, and aspirations through photography and storytelling. These products were shared with households and authorities during community meetings to foster greater understanding about IWC experiences.

Interview data and a review of project documents did not reveal a description or explanation of the pathways through which these activities were expected to bring about the targeted behavioral changes.

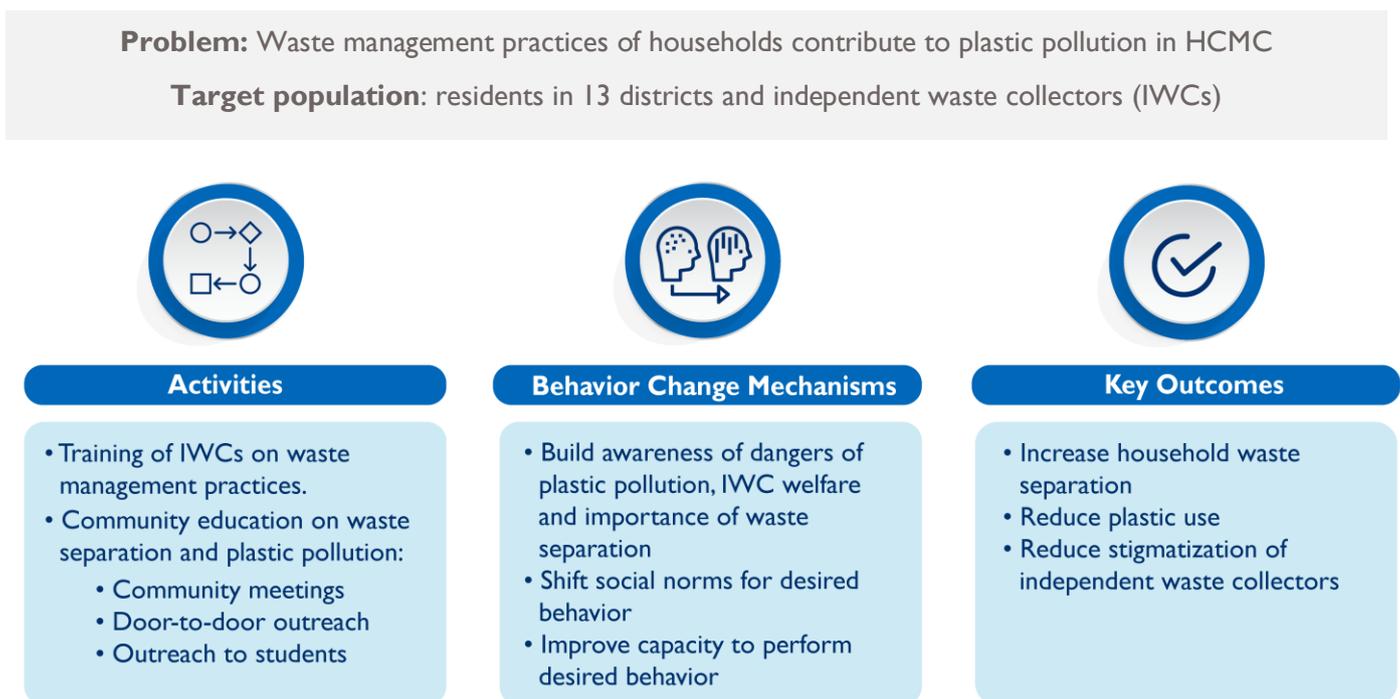
However, in considering the project’s activities together, we can infer that ENDA relied on at least the following three levers of behavior change, with information as a core instrument:

- Eliminate awareness-related barriers to performing behavior
- Improve people’s ability to perform desired behavior
- Shift social norms related to behavior

First, communicating the desired behavior (e.g., waste separation) may be one way to eliminate barriers that prevent people from performing it, especially if a lack of awareness is a salient barrier. Although information seems to be a relevant instrument for behavior change, ENDA’s strategy suggests that providing information in its raw form will not suffice. Adding elements of social marketing may be necessary for the target audience to form a personal, social, or emotional connection with the information and subsequently change their behavior. An example of this is in ENDA’s Photovoice campaign, which socialized households and local authorities to IWCs’ aspirations and struggles in an effort to reduce stigmatization.

Second, information may contribute to behavior change if it empowers people to carry out the desired behaviors. In the context of SWM, learning the importance of separating waste is unlikely to be enough to change household behavior if households do not know *how* to separate waste. Assuming that ENDA’s project design was guided by evidence that a lack of knowledge of how to separate waste was a key behavioral bottleneck, it becomes evident that conveying information that helps close knowledge and skills gaps can change behavior in the project context. Figure 4 maps out the thinking behind the project’s approach to behavior change.

FIGURE 4. ENDA’S APPROACH TO BEHAVIOR CHANGE



Source: Authors’ interpretation based on interviews and review of project documents

Third, the project sought to influence behaviors by using information to affect social norms related to those behaviors. Evidence from behavioral sciences shows that people often try their best to conform with what they perceive the social norm to be. In other words, people’s decisions are influenced by their consideration of what counts as acceptable behavior in their society. Against this backdrop, **some of ENDA’s awareness-raising efforts sought to encourage behavior change by changing social norms. In an effort to establish respect for IWCs as a new norm, ENDA used its Photovoice campaign to socialize households and local authorities to the experiences of IWCs.**

Whereas some aspects of ENDA’s awareness-raising activities may help households understand the importance of waste separation and equip them with the knowledge to practice it, the act of communicating itself may help develop the social norms that can sustain the behavior. In this regard, it is noteworthy that ENDA’s awareness-raising efforts were organized with local stakeholders and took place in community meetings. The project’s use of authority figures (e.g., elders) in the community to spread information on plastic pollution is indicative of an appeal to social norms. Whatever the project design rationale might have been, a justification for considering social norms comes from the empirically supported idea that “messaging about social norms can change people’s perceptions about what is normal and thus change behavior.”⁶⁵

We suggest that these awareness-centered tactics’ main mechanism for influencing behavior is to strengthen people’s intentions to practice recommended behaviors or to avoid less desired ones. Yet, as subsequent findings in this report show, factors other than awareness, such as environmental factors, are as important, if not more so, in shaping people’s waste management behaviors.

ENDA’s Photovoice Campaign

Independent Waste Collectors (IWC) play a critical role in HCMC’s solid waste management system, yet society does not value them or their work. The lack of respect from citizens is a shared experience among IWCs interviewed for this study, with a few reporting that they regularly face physical violence at the hands of households while collecting waste. In sum, the stigma that comes with working as a waste collector leaves IWCs vulnerable in a city that is heavily dependent on their services.

Addressing the stigmatization of IWC was a priority for ENDA. One way the project sought to do this was through its *Photovoice* campaign, a strategic communications initiative that leveraged media to affirm IWC’s value. Under the campaign, ENDA recorded videos documenting IWC’s daily experiences. Some IWCs were given cameras to record videos of themselves in which they spoke about their work as well as their challenges and life aspirations. In addition to the videos, ENDA also captured IWC narratives in a photo album that was shared with relevant stakeholders. This opportunity for IWCs to share their stories was a key activity to build their confidence, according to ENDA’s project team.

As IWCs rarely have opportunities for their voices to be heard, the campaign products (i.e. the photo album and videos) became an important tool for ENDA’s advocacy and awareness-raising efforts through targeted exhibitions. ENDA used *Photovoice* materials to engage DONRE officials and members of the People’s Committee in conversations on challenges facing IWC’s and potential solutions. What is also unique about the campaign is that it also provided IWCs with an avenue to share their experiences directly with local government stakeholders. During ENDA’s *Photovoice* exhibition on the 2018 World Clean Up Day, for instance, IWCs shared their concerns and hopes with audiences. Campaigns such as *Photovoice* allow IWCs to participate in key conversations that they would otherwise be excluded from—an important contribution to enhancing their social standing. Future research could explore how such campaigns could be leveraged to promote social inclusion for informal waste workers.

⁶⁵ Datta and Mullainathan, 2014.

CONSTRAINTS AND ENABLERS OF BEHAVIOR CHANGE

In addition to making sense of the mechanisms through which the MWRP projects sought to influence behavior, this study has a goal of shedding light on enabling factors for behavior change—that is, “forces that facilitate or impede individual, collective, or environmental change based on their level of availability.”⁶⁶ This definition of enabling factors implies that any given factor can support or constrain progress toward behavioral change depending on the degree to which the factor is present in the relevant context. In this case, people’s waste management behaviors are influenced by several factors that are rooted internally (e.g., personal factors such as motivation, attitudes, and habits) or externally (e.g., environmental/situational factors).

PERSONAL FACTORS



Plastic use habits are hard to break, but understanding the dangers of plastic pollution and the benefits of waste separation and recycling is helpful for people.

Our interview data show that people’s past behaviors and their plastic-use habits are constraints to behavior change. Stakeholders explained that plastics are a small but integral part of people’s lives, which makes reducing plastic use difficult for people even if they have been exposed to information about plastic’s harmful effects. According to one government official who was interviewed, two factors have helped sustain plastic-use habits, making behavior change even more challenging to realize: convenience and availability. The literature review conducted to inform this study found that convenience is strongly associated with the intention to use plastic.⁶⁷ As for availability, a member of ENDA’s project team cited the low price of single-use plastics as one reason that merchants refused to give them up.

“Behavior doesn’t change easily when a habit is set. Even when we tax plastic like 2,000 – 3,000 VND [approximately \$0.10], people are still willing to pay for plastic even though the price is higher. This is because of convenience.”

– Government Official

Education level—along with associated attitudes, awareness levels, and knowledge—may play a role in enabling or constraining behavior change. As one IWC cooperative leader explained, education level is one factor that determines whether people are aware of environmental issues, leading to a conclusion that for less educated people, “it is difficult to change their behavior from old to new ways.” A key assumption here is that people with more education are more likely to be aware of environmental issues and to respond positively to behavior change interventions like ENDA’s awareness-raising initiatives. The literature appears to include some empirical support for this reasoning, given that some studies have found that education level is positively associated with people’s willingness to participate in campaigns that encourage them to reduce their use of plastic bags.⁶⁸

Importantly, another factor that influences people’s decision to engage (or not) in recommended behaviors is their perception of the extent to which doing so will make a difference. For example, our data analysis concluded that households in ENDA’s target population are skeptical about the impact of waste separation, and, as one IWC syndicate leader suggested, when households doubt the benefit of separating waste, they are less inclined to respond well to programming that encourages them to do so. A government official in our interview sample suggested that **residents are less motivated to separate waste if they feel that their individual actions would not make a significant impact on the complex challenge of marine plastic pollution.**

⁶⁶ This is the definition of enabling factors in the public health context, according to Oxford Bibliographies (see Gilmore, 2013).

⁶⁷ For additional information, see Lam and Chen (2006).

⁶⁸ For additional information, see Afroz et al. (2017).

These findings suggest that information may have a role to play in correcting inaccurate beliefs or building understanding about the benefits of waste separation, particularly among populations with low levels of education. Doing so, however, requires identifying the benefits of waste separation and conveying such information in a compelling manner. In addition, external factors like the availability of infrastructure and the regulatory environment appear to influence people's perceptions of the benefits of separating waste and by extension their decision to do so or not. These external factors are explored below.

SITUATIONAL FACTORS



Availability of infrastructure, enforcement of SWM regulations, and social norms shape waste management behaviors of households.

This study finds that decisions about whether to engage in certain waste management behaviors, like waste separation or recycling, are not made in a vacuum but are influenced by situational factors.⁶⁹ At least two things are noteworthy here: the regulatory environment and social context in which people are expected to perform the behavior (e.g., waste separation) and the availability of infrastructure needed to perform the behavior.

First, a few stakeholders observed that changing the behavior of Vietnamese people is difficult. They said the existence of laws or regulations that require waste separation is an important condition, if not a prerequisite, for changing households' waste management behaviors. Although HCMC has a regulation that requires households to separate waste, the weak enforcement environment discussed above is an impediment to bringing about the desired behavior change. Recognizing this challenge, **a few respondents suggested that better enforcement of SWM regulations would lead to increased household waste separation, with government officials noting the importance of imposing fines, especially when awareness-raising efforts have failed.**

Given that people's behaviors are often influenced by what they consider to be socially acceptable, we can view the waste separation regulation as an external tool to make waste separation a norm in the city. Viewed from this lens, the absence of the social expectation that every household should separate waste is a constraint to behavior change. Behavior change goals are difficult to realize in HCMC, where government cannot enforce its waste separation regulation and no social expectation for people to separate waste exists.

“People know that it is wrong to violate rules or discharge waste, but they still do it because they know that they can get away with it. They won't do separation at home, but when they move overseas to Singapore, they change their behavior.”

– Government Official

Second, our research strongly suggests that the lack of necessary infrastructure and synchronized waste management processes are constraints to behavior change. Three district/city-level infrastructure gaps are noteworthy: i) the inability of IWC and CITENCO to collect and transport food and inorganic waste separately; ii) the limited number and capacity of transfer stations, and iii) the lack of facilities for separate final disposal of food and inorganic waste. As a result, IWCs and CITENCO workers typically end up disposing of food and inorganic waste together, thereby defeating the purpose of household separation of waste.

According to several stakeholders, many households feel that they have no reason to separate their waste because they know CITENCO is unlikely to have separate treatment of different types of waste. This observation illustrates the earlier point that external factors (in this case, the availability of infrastructure) influence people's perception of the benefits of

⁶⁹ Existing literature often characterizes such external forces as “situational” or “environmental” factors.

practicing the recommended behavior (in this case, waste separation) and by extension the degree to which they engage in the behavior.

Households also need suitable infrastructure to hold separated waste in their homes; otherwise, acting on their commitment to separate waste becomes difficult. In particular, the small size of living spaces was noted as a limitation on households' adoption of waste separation practices.

DECENTRALIZED RECYCLING: A NEIGHBORHOOD APPROACH, DA NANG CITY



This section presents the case study of Da Nang City, where CECR’s MWRP project, Oceans without Plastics, was implemented between October 2017 and June 2019. Key takeaways are in Box 2.

BOX 2. TAKEAWAYS FROM Da Nang CASE



KEY TAKEAWAYS

- In Da Nang City, the pressing issues for solid waste management, according to stakeholders who were interviewed, include inadequate infrastructure, especially for waste treatment; low management and technical capacity; and the limitation of recycling to high-value plastics.
- Oceans without Plastics was designed to reduce plastic pollution by promoting at-source separation and recycling through a participatory approach anchored to women’s leadership.
- Strengths of the intervention noted by stakeholders included the connection to scientific data on environmental harm and impact and practical guidance on how to take individual and collective action to address the problems.
- Behavior change is possible when people feel empowered, with skills and resources, and are encouraged by fellow community members to carry out desired waste management behaviors.

CITY CONTEXT

Da Nang is a coastal city in central Vietnam that had just over a million residents as of 2018. It is the third-largest city in Vietnam and one of the countries’ major port cities. Da Nang is a tourism hub and receives approximately three million tourists annually. Da Nang is also a business-friendly environment, recognized in a national survey as one of the best Vietnamese cities for doing business.⁷⁰

The city has been a leader in urban environmental movements within Vietnam. It adopted a citywide green growth strategy in 2008 that committed to transforming Da Nang into an environmentally friendly city by 2020.⁷¹ This plan responded to the pressures of population growth, urbanization, and the decreased quality of environmental resources like water, air, and soil. The city is also tied into “smart” city movements and is committed to modernization of public administration and use of technology. Da Nang was also accepted as part of the 100 Resilient Cities network, which sought to build social, economic, and physical resilience to natural and man-made shocks by supporting the integration of resilience in member cities’ urban planning. Under this initiative, the city also released a citywide resilience strategy in 2015.⁷²

Key environmental issues in Da Nang include flood risks and waste management, especially as the Khanh Son landfill nears capacity. The city is committed to improving waste management and recycling for greenhouse gas mitigation.⁷³ Furthermore, clean oceans and environments are important to the city’s tourism economy, which has motivated the city to take actions and make commitments on this issue.

⁷⁰ General Statistics Office of Vietnam, 2018.

⁷¹ Lee et al., n.d.

⁷² 100 Resilient Cities, n.d.

⁷³ See action 3.10 of Da Nang’s resilience strategy, which commits to transforming Khanh Son landfill into a park or zoo; establishing solid waste classification at source; creating a solid waste treatment complex that includes a recycling module, composting, energy collection from incineration, and hazardous waste classification and treatment; and more.

SOLID WASTE IN DA NANG CITY

Da Nang's population and economic growth has increased production of waste in the city and added pressure on the city's waste management capacity. It is estimated that 0.65 kilogram of household waste is generated per person daily and that 69 percent of it is organic, although the share of plastic in the waste stream is increasing.⁷⁴ Although detailed city-level data are not available for Da Nang, studies suggest that the city's waste collection system has not kept pace with the rise in waste generation. Approximately 92 percent of solid waste generated is collected in Da Nang. However, plastic leakages into the environment, including on beaches and in oceans, remains a challenge for the city's tourism sector.⁷⁵ Da Nang has only one landfill, and it is operating at capacity. Furthermore, only 5 to 7 percent of solid waste is recycled⁷⁶ because of a fragmented recycling system that lacks facilities to support waste recovery. A lack of household waste separation also undermines the recovery of plastic waste. Public awareness of the importance of recycling and the value of plastic products remains low despite recent efforts.

Informal actors such as waste collectors and pickers play a role in the plastics recycling value chain. Because the city lacks policy frameworks that recognize the role of informal waste collectors, their position in the value chain remains threatened by government efforts to shut down informal waste-handling centers, a move that could further reduce Da Nang's recycling potential.

ORGANIZATION OF SOLID WASTE MANAGEMENT

As in Ho Chi Minh City, the DONRE has overall responsibility for the solid waste management sector at the local level in Da Nang City, but its activities are guided by policies from the central government, in particular the Ministry of Natural Resources and Environment. Although DONRE sets guidelines, waste management in Da Nang is decentralized to the district level. At this level, the Environment Protection Agency, a unit within DONRE, takes charge of the waste management system, performing roles such as educating and communicating with people about policies and guidelines related to environmental issues. URENCO, the state-owned Urban Environment Company, leads waste collection, transport, and treatment. Although URENCO conducts the majority of waste management, the city has about a thousand IWCs who supplement URENCO's collection and transportation efforts, according to estimates from stakeholders interviewed. Figure 5 summarizes SWM processes in Da Nang.

⁷⁴ Dang, 2018.

⁷⁵ Japan International Cooperation Agency, 2014.

⁷⁶ Lee et al., n.d.

FIGURE 5. SWM OVERVIEW IN DA NANG

OVERVIEW OF MUNICIPAL SOLID WASTE MANAGEMENT PROCESSES

Da Nang, Vietnam



WASTE COLLECTION

The Urban Environment Company (URENCO) collects household and business waste daily and transfers it to landfills. At the household level, households bag their waste and keep it outside their homes for collection by URENCO staff. Although the formal waste collection system via URENCO covers most of the waste collection in Da Nang, an estimated 8 to 10 percent of waste is collected by the informal system, through a network of independent waste collectors (IWCs). They may collect waste from households with whom they have a personal relationship and then deposit it at transfer stations.

FORMS OF COLLECTION

- Door-to-door collection from households
- Collection on main streets using trucks
- Collection from bins placed at roadsides



WASTE SEPARATION

While Da Nang has relatively high coverage rates for waste collection, waste separation is a challenge and is governed by a largely informal system that separates high-value materials for resale and sends the remainder to landfills. Most waste separation occurs after URENCO staff and IWC collect waste. Waste separation is not a formal function of URENCO, although recent regulation requires separation at source. Economic incentives motivate URENCO staff to separate and recycle waste (staff can resell high-value recyclables.) IWCs also separate and recycle to boost income.



TREATMENT

● RECYCLING

URENCO staff and IWCs connect with agents to sell separated plastic materials for recycling. IWCs deal closely with smaller agents who depend on larger agents for the sale of plastic goods. These larger agents generally have the trucks and workers for a broader scale of operation, moving recycled materials to other parts of the country for treatment.

● LANDFILLING

Landfilling is the primary method of waste treatment in Da Nang. URENCO transports waste items not recycled to landfills for disposal. The city's landfills are not designed for separate disposal of organic and inorganic waste, and they currently operate beyond maximum capacity.

Prices for recycled materials fluctuate based on international and domestic changes.



FINANCING SOLID WASTE MANAGEMENT SERVICES

- URENCO is funded by fees paid by households and businesses.
- The city determines the price per quantity of waste collected, and URENCO enters into waste collection contracts with businesses based on that price.

Source: Case study interview data

SOLID WASTE MANAGEMENT CHALLENGES

In Da Nang City, the pressing issues for solid waste management, according to stakeholders interviewed, include inadequate infrastructure, especially for waste treatment; low management and technical capacity; and the limitation of recycling to high-value plastics.

- **Waste treatment infrastructure is inadequate.** The city needs a systematic process for handling waste throughout its life cycle (i.e., from collection to treatment). A lack of infrastructure for separation in transit and at landfills reduces households' motivation to separate waste. Some government officials described the city's lack of a detailed plastic waste treatment management system as one of the district's most pressing environmental issues. Prior investments in infrastructure have not yielded results; interviewees attribute this to inadequate or inappropriate technology.
- **The landfill operates beyond its capacity.** Limited space in the landfill and a lack of land to build others are major challenges. Moreover, the landfill is too far from the city center, making solid waste management more difficult, in light of the city's lack of adequate vehicles to collect and transport waste. More recently, environmental conditions around the landfill have sparked protests by local residents. When these protests occur, waste collection grinds to a halt because URENCO and others are denied access to the landfill to dump waste. At these times, government officials are concerned that waste is illegally dumped or burned, which has severe environmental repercussions.
- **Waste management agencies need improved management and technical capacity.** Plastic pollution is only one small part of the environmental responsibilities of district-level DONREs. But despite having a broad mandate, these units are often made up of small teams. Also, URENCO faces challenges with equipment, such as a lack of trucks with separated compartments, and staffing. These capacity constraints make ensuring compliance with the city's waste management regulations difficult.
- **The value chain for recyclables needs strengthening.** Some stakeholders who were interviewed said the city's SWM system needs a reform effort that includes support for private sector roles and addresses investment problems. The lack of technology for waste treatment and recycling challenges the value chain for recyclables, which is limited to high-value materials that can be resold through different scales of recyclers before being transported to industrial zones of the country for repurposing. Without improving these market linkages, materials will continue to be disposed of in landfills.
- **SWM data are inadequate.** There is a lack of data to inform policy decisions on solid waste management. Data on daily waste generation, informal waste collection activities, and recycling are limited. Additionally, there is limited information on the share of households that separate waste. Not only do these data gaps preclude local authorities from having a full grasp of the city's waste management challenges, but they also hinder an effective policy response.

RECENT DEVELOPMENTS IN THE SWM REGULATORY ENVIRONMENT

Since Da Nang City People's Committee approved the 2008 plan for developing Da Nang as an "environmental city," several regulatory decisions have aimed to increase solid waste management capacity at the city level. These regulations have set fee amounts, types of fees, and the management and use of fees for waste collection in Da Nang; have established public procurement procedures for environmental management services in Da Nang; and have set thresholds for investment in waste management services. Most recently, regulations have focused on household behavior. In April 2019, the city approved a plan for separation of household waste at source by 2025.

In addition to recent regulatory changes, city and quasi-governmental institutions have changed internal practices to reduce the use of single-use plastics and have launched efforts to reduce plastic pollution. For example, the Son Tra district coordinated with sociopolitical organizations such as the women’s union, a party-controlled body that promotes women’s interests nationally and at subnational levels; the farmers’ union, an interest group of agriculture sector workers; and others to organize campaigns focused on educating the public about waste collection, separation at source, and the importance of reducing plastic waste. Additionally, the government has provided households with bags to use for separating waste that are collected later. Interviewees recognized that attention had previously been on solid waste management in general but that attention to plastic waste management and pollution is nascent, largely in response to a commitment by the Prime Minister.

Stakeholders hold mixed views on the efficacy of earlier efforts to address plastic pollution. Some see the city’s past efforts as having successfully raised district residents’ awareness of environmental issues. Consistent with this claim, one community leader credits the community and district-level campaign with improving public knowledge of the health and environmental impacts of plastic waste. Others, however, think the earlier efforts were too general, lacking specific steps for people to follow. Several interviewees noted progress in awareness campaigns but a lack of results because of the infrastructure limitations.

PROJECT OVERVIEW: OCEANS WITHOUT PLASTICS

The Center for Environment and Community Research is a Vietnamese NGO that partners with other local entities to promote and support community participation in environmental protection initiatives. Insights from a previous CECR project in Tho Quang harbor informed the teams decision to select Da Nang City for the project, which focuses on coastal districts.

Recognizing an intersection between water pollution and plastic pollution, CECR designed its MWRP project to build on its past work on water pollution in Da Nang City. Its MWRP project, Oceans without Plastics, was designed to reduce plastic pollution by promoting at-source waste separation and recycling through a participatory approach anchored to women’s leadership. The project’s theory of change states:

“If women, youth, and local communities are equipped with sufficient information and capacity to carry out innovative community-based waste reduction and recycling, then creating a supporting and empowering partnership of local authorities, women, communities, and recyclable waste collectors is likely to lead to more widespread and effective reduction in ocean plastic pollution.”

Interestingly, the project sets out a vision for shared responsibility and contribution for effective management of waste among individuals, communities, and government.

PROJECT DESIGN

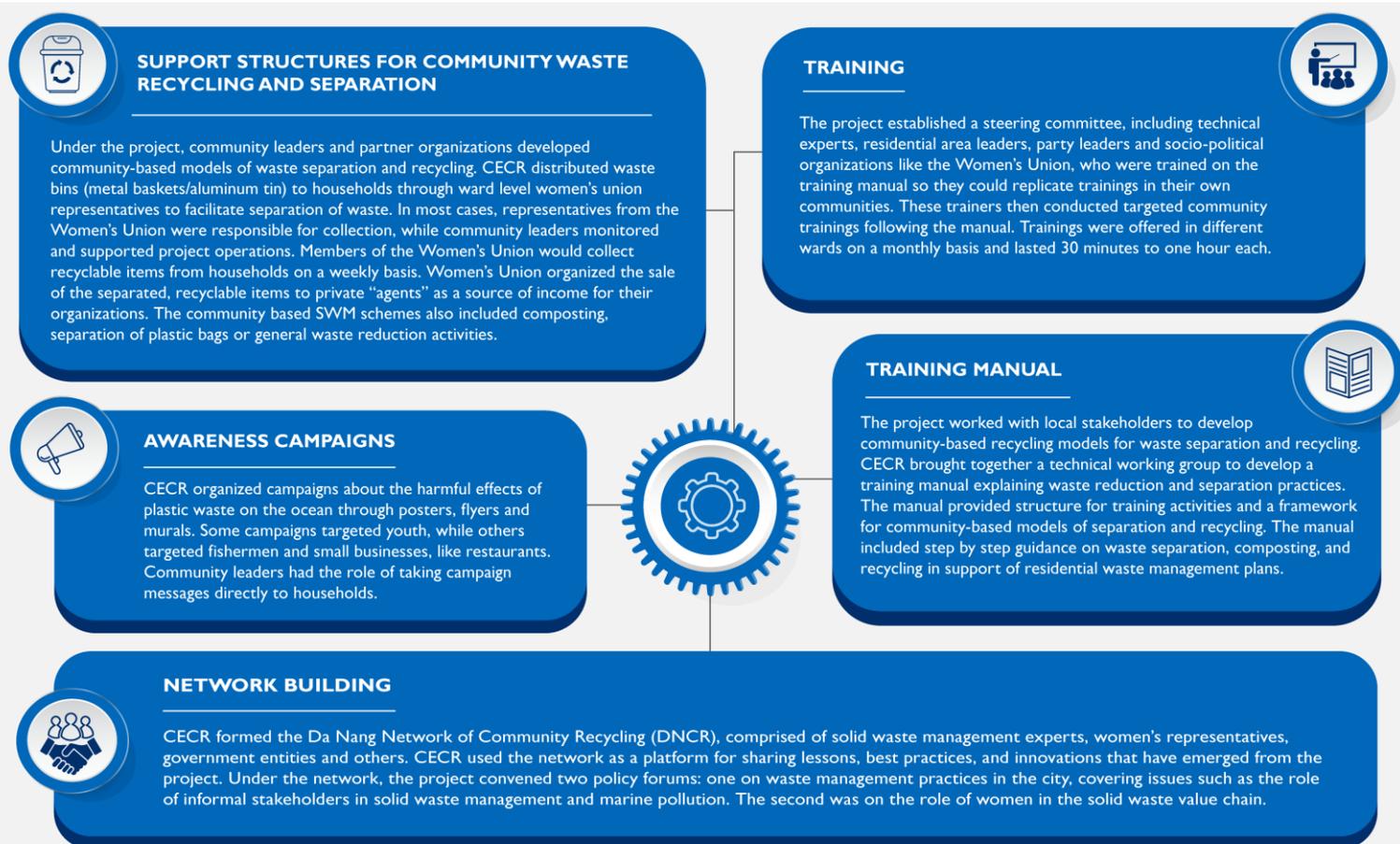
The overarching strategy of CECR’s Oceans without Plastics is to train residents in coastal communities in Da Nang to manage plastic waste. CECR’s project used a neighborhood-based training-of-trainers approach to pilot local recycling models, targeting behavior change goals of increasing household segregation of waste and recycling. See Figure 6 for an overview of project activities. The project’s designers and stakeholders think of the model as balancing the existing top-down approach with a bottom-up approach, providing opportunities for neighborhoods to connect with one another to improve their communities. To accomplish its goals, CECR emphasized partnership with local

government in the districts, existing organizations such as the women's union and youth union, and neighborhood leaders. All these entities are closely aligned to the priorities and interests of the PC.

CECR's Oceans without Plastics project occurred between October 2017 and June 2019. Project activities were implemented in two districts in Da Nang: Son Tra (population: 173,445) and Thanh Khe (population: 160,953). They were selected because of their coastal location and issues with waste management.

CECR's project began with analysis of waste management trends in the two districts via a survey to estimate waste generation and separation patterns. Based on analysis, the team implemented the following activities to raise awareness for behavior change.

FIGURE 6. CECR'S PROJECT COMPONENTS



Source: Authors' interpretation based on interviews and review of project documents.

STRENGTHS AND CHALLENGES

Although the case study methodology does not permit an outcome assessment of the Oceans without Plastics project, qualitative data from local stakeholders reflect the project's strengths and challenges, particularly as they relate to contributing to increased household awareness of plastic's environmental impacts. Strengths noted by stakeholders included the connection to scientific data on environmental harm and impact and practical guidance on how to take individual and collective action to address the problems. Furthermore, the project was perceived to be effective because it tapped into support from local political party structures (an important caveat for replication efforts). On the other hand, the structural realities of SWM and value chain dynamics in Da Nang and Vietnam more broadly limited the project's impact, which has implications for the sustainability of project outcomes.

In interviews, stakeholders and program beneficiaries noted anecdotal evidence of increased awareness of the harm of plastic pollution and a better technical understanding of the issues among households. In designing the community training, CECR may have learned from other government training efforts often criticized for not being practical. For example, the training materials clearly established citizens' responsibilities in waste management: sorting waste at source and reducing the use of plastic bags. **In addition to commending CECR for presenting training content in a visually appealing way, many interviewees agreed that its training program was more practical than others that have been implemented in the city.** That said, stakeholders did not have a unanimous definition of "practical." For one official, "practical" referred to the inclusive nature

of the training (i.e., local people had the opportunity to participate). For another, “practical” meant that the training guidance was concrete. According to one program partner organization:

“We have so many other projects. What makes this project different is that CECR provided practical training to participants. When they participate in the project, you are trained immediately on what to do, practically—you are more motivated to do it. It was not just theoretical. They engaged in the project through their real work. The work they were doing was simple, so they feel that they were about to do the job. It was so simple that everyone—youth, women, others—could do it.”

Flexibility and adaptability to community-level contexts were key principles of the intervention. CECR’s community recycling model was not designed to be uniform across districts. Indeed, communities had the final say on what model to pursue. As a member of the program team put it:

“The model that CECR proposed was flexible—they just provided a model and framework. Based on the reality of each district or communal level, they can adapt to unique needs of each district.”

Some areas opted to focus on composting, others recycling. And some did both. As one stakeholder put it, “What made CECR different is that they engaged all stakeholders in community to make clear that it’s the responsibility of everyone to separate waste.” For example, the training manual created clear typologies for community action on plastic pollution, as documented in Table 2.

TABLE 2. MODELS OF COMMUNITY-BASED SWM

Communication	Separation of waste at source
<p>The purpose of this model is to establish consensus in the community on the necessity of separating waste at source.</p> <ul style="list-style-type: none"> • Step 1: Establish a steering committee (SC) for the residential area. • Step 2: The SC meets to develop an action plan for the residential area. • Step 3: The SC meets with all households in the area to communicate, share feedback, and build consensus around the action plan. • Step 4: Implement the action plan. • Step 5: Monitoring, supervising, and reporting. 	<p>The purpose of this model is to separate plastic waste, collect and sell the plastic waste to IWCs and URENCO, after which the plastic waste is transferred to recycling centers.</p> <ul style="list-style-type: none"> • Step 1: Agree on the method/process to collect waste in the residential area. • Step 2: Households commit to practice waste separation under the guidance of the SC. • Step 3: Collect and sell waste to IWCs or URENCO. • Step 4: Record data on nonorganic waste according to agreed schedules. • Step 5: Monitoring, supervising, and reporting.

Source: Adapted from CECR training manual, translated to English.

Women are at the center of SWM in Da Nang because of the traditional division of household responsibilities and a history of action by the women’s union. CECR’s project effectively built on this legacy by putting women at the center of the design and intervention. The project leaned heavily on the women’s union for the implementation of the waste separation and recycling model. This was a strategic decision on the part of the project designers, given the broad and deep reach of the women’s union and its history of involvement in recycling. According to a government partner, “the reason why they selected women’s association for campaign is because women association are the one who could reach out wider and deeper.”

Project strengths related to the quality of materials, the flexibility of the model, and the engagement of key actors seem to have helped the project yield results. According to interviewees, target populations seemed receptive to the project. For instance, some stakeholders observed that households were using the waste bins that CECR provided. **Economic incentives, specifically the income-generating opportunities from recycling, played a crucial role in facilitating and sustaining buy-in.** Furthermore, project results seem to have been sustained in some residential areas, and there is a continued commitment to waste separation. One official noted that the project reduced the amount of plastic waste in households, though this result was not captured systematically in quantitative data. Moreover, the steering committees formed as part of the project are still active in some areas, where they provide households with guidance on waste separation.

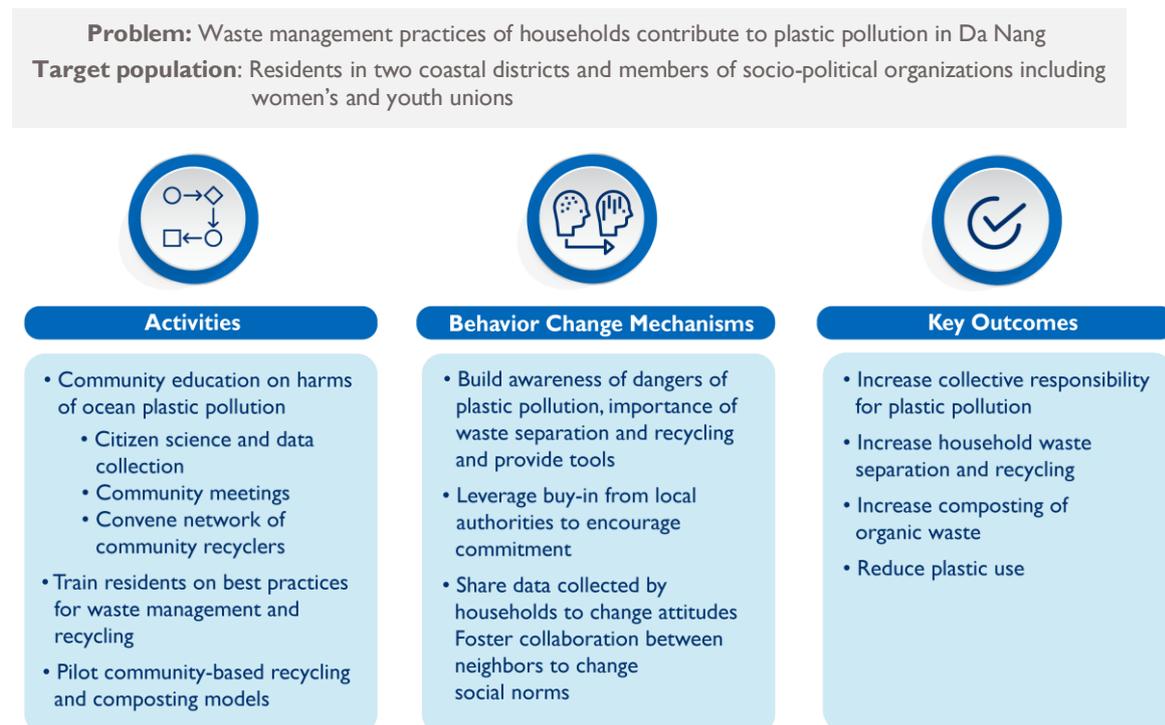
On the other hand, CECR's intervention had several noted limitations. By focusing primarily on households, the project was not targeting commercial entities, which on an individual basis generate larger quantities of plastic waste. The project's limited engagement of small businesses (e.g., restaurants) was noted as a weakness, given the role of businesses as a generator of plastic waste. There are strong norms supporting plastic use in these contexts, which leaves room for the project to target behavior change.

NAVIGATING BEHAVIOR CHANGE

CECR's program model, illustrated in Figure 7, rests on the core assumption that households and community networks can improve waste management practices at a neighborhood or ward level to reduce plastic pollution. The project assumes that some mismanagement of waste, including plastics, stems from a lack of knowledge among residents about the harmful effects of plastic pollution. As a result, a major focus of the training and campaigns was to provide scientific knowledge about the impacts of plastic pollution on human health, the environment, and the tourism and fishing economies.

Although not articulated in the program design, the assumption that follows is that armed with this knowledge, residents will be motivated to change their use of plastics and management of household waste to mitigate these harmful effects. The project assumes that a collaborative approach in which neighbors can influence the behavior of other neighbors would be most appropriate for this goal. It also assumes that easy-to-adopt models of collaborative recycling, waste reduction, and composting are achievable in Da Nang, where residents are perceived to have higher levels of environmental awareness because of the city's coastal, tourist economy and prior efforts by the city to advance pro-environment priorities.

FIGURE 7. CECR'S APPROACH TO BEHAVIOR CHANGE



Source: Authors' interpretation based on interviews and review of project documents.

However, stakeholders noted that past efforts had not focused as intensively on plastic pollution. As such, the CECR project targeted households in target districts for the following behavior changes:

- Reduce use and increase reuse of plastic products, especially plastic bags from markets
- Begin to separate organic, recyclable, and inorganic waste
- Collect and sell recyclable materials to IWCs, URENCO, or recycling agents
- Compost organic waste in community structures

As noted above, before the project, efforts had been made to encourage some of the targeted behaviors, aligned with the three Rs, but stakeholders estimated that adoption of these practices by Da Nang residents was limited.

CONSTRAINTS AND ENABLERS OF BEHAVIOR CHANGE

Moving from engagement, to awareness, to behavior change is a difficult endeavor. In Da Nang, CECR and its partners found that many personal and situational factors contributed to and constrained their ability to effect behavior change among targeted populations. At the personal level, buy-in to environmental issues, knowledge, and peer and community pressure seemed to affect people's willingness to engage in desired behaviors. Situational factors—such as infrastructure for waste separation and market function for the plastic value chain—also played a role.

PERSONAL FACTORS



Behavior change is possible when people feel empowered, with skills and resources, and are encouraged by fellow community members to carry out desired waste management behaviors.

Knowledge of the issue, including technical know-how of how to address it, is a major enabler of behavior changes pursued related to waste reduction and recycling. The clear link between plastic use and mismanagement and environmental harm as demonstrated in the CECR training materials motivated actors to not only assume more environmental awareness but also move to a sense of community responsibility to protect the environment. For example, neighbors felt they should not only change their waste management but also encourage community members to do the same. One neighborhood created a community mural about the environmental hazards of marine plastics and positive recycling practices. One trainer described the response to knowledge as: **“People reacted passionately and curiously. They were surprised with the reality and got to realize that it’s not responsibility of government alone but also their responsibility for environment. They kept asking me about the issues, and this was encouraging.”**

Such positive responses to the new knowledge encouraged communities and businesses to adopt new practices like reducing the use of plastic bags. This lends credence to CECR's project design choice to prioritize raising awareness.

On the other hand, stakeholders reflected that convincing people to adopt waste management behaviors such as separation and composting is difficult if they do not understand why it is important. Trainings were limited, and recruiting all community members to participate in such offerings can be hard. As such, knowledge and technical know-how are both enablers and constraints of behavior change. This is supported in the literature, which suggests that people are likely to take on the recommended behavior if they feel as though they can perform the behavior.⁷⁷

One enabling factor is past behavior and attitudes, which are influenced by social forces—gender norms in particular. **Gender was frequently cited as a factor in engagement with SWM issues, and stakeholders unanimously recognized women as taking more leadership than men in the effort to reduce plastic pollution.** In part, this followed the project design, working closely with the women's union to implement the program. Interviewees noted that waste management at the household level is considered a traditional task of women as part of housework. **Several interviewees noted that women appreciated the urgency of the issue and moved to action, with women leaders involved in the project diligently applying the acquired knowledge.** A local trainer reflected that after just a few trainings, one woman reduced the number of plastic bag she uses from 80 plastic bags per week to 10 and that on some days, she did not use

⁷⁷ For examples, see Shen et al., 2019; Strydom, 2018; Tonglet et al., 2004.

plastic at all. Project leaders want to capitalize on this important contribution by finding ways to foster women’s roles in the plastic value chain and reflecting their responsibilities across the industry and not only in the home.

Stakeholders also observed how age helps or hinders engagement with recycling. Some stakeholders reflected that older people with time to devote could take on some of the community-based waste management models more easily than younger people, and indeed many key program participants were retirees. On the other hand, when children are exposed to the issue, they express interest and concern.

SITUATIONAL FACTORS



For changes in households’ SWM behavior to take root, SWM processes must be reliable, and a functioning resale market for plastics is crucial.

As in HCMC, interviewees in Da Nang emphasized that the convenience of plastic use and its ready availability are barriers to desired waste management practices. People use plastic as a matter of habit. Using alternatives often requires households to make structural lifestyle changes that are inconvenient, and as a result, behavior change goals, such as waste separation or recycling, suffer. Although a few stakeholders committed to alternative practices, such as reusable bags, they noted that breaking tradition, especially in market settings, is difficult.

Infrastructure affected people’s ability to change to desired behaviors in big and small ways. At the household level, **most residents live in small houses and cannot store their separated waste in a hygienic way.** As such, many households did not separate their recyclable and organic waste and were reluctant to keep separated organic waste in their homes for an extended period. Under the project’s waste separation model, household-separated waste was to be picked up only once a week. This meant that practicing waste separation came with a cost of living with trash for a week. To bypass this cost, households abandoned separate waste disposal and opted to dispose of their waste through URENCO, which had a more regular pickup schedule than CECR’s model.

On a structural level, a lack of trust in solid waste management systems discourages households from separating waste and recycling. Household incentives to separate waste and recycle dissipate upon realization that URENCO disposes of organic and inorganic waste together. **URENCO’s lack of capacity for separated transport and treatment of waste prompts many to lose trust in the system.** This is even though households have high levels of awareness of waste separation’s importance. One government official explained, **“The reason why they refuse to separate waste is because they know that after they separate it, everything will be put in the truck together, so there’s no point. Even at landfill, waste won’t be disposed separately.”**

Project partners held a similar view: “In Da Nang, there’s only one landfill for waste. And Da Nang doesn’t have any other places to put waste. At the end, separated waste is dumped together. When people notice this, people become demotivated. Therefore, the city needs to think of how it treats waste at the end.”

This reality implies that the project’s behavior change goals are inextricably linked to the availability of infrastructure.

Although infrastructure is part of the story, a functioning resale market or value chain for recyclable materials is equally important, and the lack of one was noted as a key challenge to realizing the program’s goals. Indeed, it was cited as the key reason that the plastic bag recycling effort was not successful. During project implementation, women were encouraged to separate, clean, and store plastic bags for recycling, which committed women’s groups did despite the inconvenience. CECR

negotiated with a recycling agent to accept the bags, but after the project, no agents would continue to accept bags because of their low resale value. This challenge frustrated participants, who had learned about the harms of plastic bags, committed to taking action, but no longer had a solution.

On the human side, community and government pressure to engage in these practices is an effective enabler of behavior change. In particular, stakeholders reflected that support from the political party at the communal level was an important lever for achieving program buy-in and by extension commitment to practice waste separation and recycling. CECR's partnership with local government was seen as a strength in this regard.

As reflected in findings from HCMC, behavior change is only as feasible as the real possibilities for effective solid waste management and recycling. Although the project demonstrated the promise of community engagement, knowledge building, and innovative models for SWM, it was limited by some situational factors that pushed against the broad goals.

The sections that follow briefly explore key themes across the two cases before presenting recommendations based on the findings.

CROSS-CUTTING THEMES

Across the two cases studies, a few themes emerged that provide lessons for future efforts. First, local solutions benefited from an approach that tapped multiple interconnected actors and linked government and civil society initiatives. Second, structural realities of complex systems such as solid waste management can stymie local actions and point to the need for larger, systemic changes. That said, an awareness of structural realities can help projects position themselves for feasible gains.

GALVANIZING LOCAL ACTION

ENDA's and CECR's projects were implemented within the framework of a local systems approach that relies on interconnected sets of actors—including government, civil society, and citizens—to work together to produce a development outcome.⁷⁸ In working toward the goal of improving solid waste management, stakeholders take on various roles and form relationships, which are governed by formal (e.g., regulations and mandates) and informal (e.g., tacit agreements) rules. Our study highlights two interrelated points about local system dynamics: **that solutions to development challenges can come from multiple sources and that local solutions need effective government partners to thrive.**

Experiences in Da Nang and Ho Chi Minh City illustrate that within the local systems framework, initiatives to address waste management challenges can originate from the contributions of distinct stakeholder groups. These initiatives can occur in parallel and can complement each other, even if there are varying degrees of coordination among them. For instance, IWCs share waste collection responsibilities with local utility companies, and informal sector actors take the lead on recycling, without government direction or support. At the same time, environment-focused NGOs mobilize citizens to participate in recycling schemes, as CECR did in Da Nang. In addition, civil society actors can help bridge communication gaps between government and citizens, helping mitigate the problem of limited public knowledge of or compliance with regulations. They also draw upon their expertise to provide inputs to dynamic policy-making processes at the local and even national level. In HCMC, ENDA informed government of the realities of IWCs, crucial actors in the city's waste management ecosystem.

Importantly, across both projects, it is evident that local solutions to plastic pollution require government partners that have the capacity to coordinate, support, and create an enabling environment for local solutions to thrive. The support of local authorities, for instance, proved critical to securing households' buy-in to waste separation and recycling goals at the neighborhood level in Da Nang. When breakdowns occur between the city-district interface, initiatives of local actors suffer, as they did in HCMC, where expected gains in IWC income have yet to materialize because of shortcomings in district-level implementation of Decision 38, which was issued at the city level.

In sum, local/city government is the crucial link for striking a balance between top-down and bottom-up responses to plastic pollution, especially in settings like Vietnam, where deference to authority figures is a salient feature of cultural, social, and political life. But civil society and private actors have an important role to play given capacity constraints that local/city government face.

ADDRESSING STRUCTURAL CHALLENGES

Although the solid waste management contexts for the two cities have sharp differences—most notably the significant role of the informal sector in HCMC—three observations about structural barriers cut across them, each with implications for the viability and sustainability of a behavior change approach.

⁷⁸ U.S. Agency for International Development, 2014.

First, inadequate infrastructure and poor technology make waste treatment a weak point in the SWM system. The recycling ecosystems in both cities is primarily informal, operating with low-quality technology; moreover, the recycling market is centered on high-value plastics. Where investments have been made to boost plastic waste treatment, the low technological base has precluded them from yielding desired improvements. Additionally, some stakeholders expressed distrust of products made from recycled content given the lack of rigorous enforcement of environmental standards. It is also noteworthy that even though the recycling process in both cities helps divert plastics from landfills, it is not robust, as it is mainly centered on high-value plastics. Moreover, both systems have infrastructure gaps. Chief among them and relevant for behavior change goals are facilities for collection, transportation, and disposal of separated food and organic waste. **Households also need facilities (e.g., separate bins) and accommodations (e.g., timely or flexible collection schedules) to conveniently separate and recycle waste.** Without these convenience factors, people lose trust in the system and are not motivated to sustain desired SWM behaviors.

Second, the plastic value chain has gaps. Even though the recycling market in both systems seems dynamic, households struggled to find buyers for their separated plastic waste. **Without functioning markets in which households can sell their separated plastic waste (directly to agents or indirectly through IVCs), their motivation to separate waste seems to diminish.**

Third, **both cases reveal that waste management regulations are rarely implemented as intended.** Local stakeholders, including local NGOs and community leaders, recognize that regulatory frameworks can support behavioral changes by requiring them, just as HCMC and Da Nang issued regulations that made at-source waste separation mandatory for households. Beyond the behavior changes targeted by the ENDA and CECR projects, regulatory instruments can reinforce efficient and sustainable waste management.

Yet our findings demonstrate that regulatory measures have not made a significant difference in behavior (and in SWM systems more broadly) because of the limited monitoring and enforcement capacity of government authorities. This failure to be successful and sustainable is exacerbated by governance issues. **Specifically, there are many actors with unclear mandates and very little coordination among them.**⁷⁹

Addressing these challenges is key to building households' trust in the waste management system, a crucial factor that shapes whether they comport with desired SWM practices. Beyond the immediate behavior change goals that are of concern to the projects, these challenges raise questions about how best the two cities can arrive at a systemic process to improve management of plastic waste throughout its life cycle.

POTENTIAL OF A BEHAVIOR CHANGE APPROACH

The ultimate ambition of the behavior change approach to solving marine plastic pollution is a large-scale change in how societies use plastic and manage plastic waste, with a focus on sustainability. In the context of global calls for a move toward a circular economy, in which plastic is designed with an emphasis on its reuse in a closed-loop system, the case for behavioral solutions seems clear. The experiences of the ENDA and CECR projects show that behavioral interventions can help drive progress toward the core resource-efficiency priorities of reducing, reusing, and recycling waste (the three Rs), each of which warrants changes by consumers (*i.e.*, individuals and communities that use plastic in their daily lives) and producers (*i.e.*, businesses that design plastics or use plastic packaging for their products).

Both cases suggest that a promising area for behavioral solutions lies in the opportunity to strengthen people's intentions to behave in more environmentally friendly ways through programming that, on

⁷⁹ World Bank et al., 2005.

the one hand, helps households understand the importance of the recommended behaviors and, on the other, builds their capacity to carry out the behaviors.

However, our study points to a few limitations of a behavior-centric approach, including that it places significant burdens for waste reduction on individuals and communities while giving limited attention to behavioral changes needed by commercial actors. Another experience the cities shared is that even though the approach appears to have improved understanding and awareness, it did not necessarily lead to behavior change. And even when the projects seem to have led to a change in behavior, those changes may be short term. Importantly, the success of a behavior change approach hinges on structural factors like the availability of infrastructure and a robust market for recyclable plastics, issues that might seem beyond the sphere of influence of community-led projects like ENDA's and CECR's.

Despite these limitations, it is important to consider how results from behavioral solutions might feed back into their implementation contexts. Specifically, the success of a behavioral intervention can change contextual/situational factors that influence waste management behavior. For instance, programming that shifts norms around plastic use could result in reduced use of plastics. This study has shown that there is room to strengthen the behavior change approach through rigorous testing of the mechanisms through which and in what circumstances it may contribute to behavior change.

RECOMMENDATIONS

To support future USAID ocean plastics programming in advancing the goal of improving SWM, we offer the following recommendations.

POLICY-LEVEL RECOMMENDATIONS

- **Prioritize investments that address structural barriers to waste separation and recycling, especially a lack of infrastructure.** This study demonstrates that a lack of SWM infrastructure (e.g., treatment facilities) is associated with an increased risk of plastic leaking into the ocean. Additionally, the lack of infrastructure is a barrier to improved solid waste management practices—even among people who are well-informed on environmental issues or intend to behave in environmentally friendly ways. These infrastructure gaps limit the impact of USAID-supported behavioral solutions to waste management challenges.

Underpinning these infrastructure gaps is a lack of national and municipal financial resources for the investments needed in infrastructure for waste collection, transport/transferring, and disposal systems. As a starting point, USAID could support analyses to estimate the magnitude of the infrastructure funding gap, with a view to developing creative solutions to help meet the funding need. Working within the U.S. interagency, USAID could, for instance, help secure guarantees to reduce the risk of investments in waste management infrastructure or undertake investments. Such strategies, like the Agency's \$35 million partnership with Circulate Capital,⁸⁰ can attract private capital to infrastructure projects. Additionally, USAID could undertake projects to enhance the creditworthiness of waste management utility companies in Vietnam, thereby improving their access to capital markets. With the emergence of the United States International Development Finance Corporation, USAID may have opportunities to leverage innovative financial instruments to support investments in SWM infrastructure. This approach would require a clear definition of how such investments advance congressional and Mission priorities.

USAID can also build coalitions with other development partners willing to finance investment in SWM infrastructure. Those efforts may consider how best to maximize financial resources through partnerships with local and international private sector stakeholders. Such efforts could be informed by studies (funded by USAID or in partnership with others) that identify and assess

⁸⁰ See U.S. Agency for International Development (2019) for further details.

relevant constraints and risks, in addition to making the business case for supporting waste management infrastructure investment in Vietnam.

- **Strengthen capacity in SWM systems through collective action.** The USAID/Vietnam Country Development Cooperation Strategy has identified a lack of institutional capacity, including in the public sector, as a crucial impediment to the attainment of development goals in Vietnam. Findings from this study suggest that three capacity gaps relevant for policy implementation are important to address, especially at the local level: low technical capacity of staff members, limited capacity for planning and monitoring, and a lack of tools to enforce regulations. Without addressing these policy implementation challenges, initiatives to improve waste management may have limited success, even if those initiatives are well funded. Through tools like technical assistance and training, USAID can help build implementation capacity. USAID can also draw on its cross-sectoral programming in Vietnam to generate and facilitate sharing of intermunicipal insights on policy implementation challenges and solutions in the development context. Supporting the implementation capacity of local authorities is key to enhancing the effectiveness of a local systems approach.
- **Strengthen local plastics value chain through investments in recycling capacity in priority areas.** The plastics value chain is weak, absent of recyclers with modern equipment. Moreover, neither households nor waste collectors are provided with incentives to collect separated waste, which makes it hard to achieve the goal of diverting plastics from landfills. USAID can strengthen market linkages between waste collectors and recycling firms by investing in strategies to improve the productivity, safety, and environmental standards of informal recycling firms.

Assessments of Vietnam's SWM sector indicate that most recycling centers in Vietnam operate with low technology and as a result may damage the environment. USAID could focus on helping recycling firms mitigate the environmental impacts that stem from their work. In making those investments, building on the expertise of informal sector agents in the recycling trade and enhancing synergies between recyclers in the formal and informal sector will be important.

PROGRAM-LEVEL RECOMMENDATIONS

- **Support social assessments of behavioral drivers of plastic pollution to inform program designs and implementation.** Future USAID programs related to SWM should incorporate behavioral diagnosis at the planning stage to shed light on the internal and environmental factors that shape waste management behavior in a given context. Such analysis will seek to gather insights into the forces that sustain the status quo and in the process reveal behavioral bottlenecks and opportunities for programmatic interventions. In this process, the assessment will also help programs identify the appropriate behavior change goals for a given context. Ultimately, this would allow for an approach to programming that takes into account the individual, social, and practical constraints to behavior change. Data generated from a social assessment would help program designers better understand where their interventions are likely to make a difference and guide decisions on trade-offs between alternative intervention designs amid resource or other social limitations.
- **Support community-based organizations in developing monitoring and evaluation frameworks, including methodologies for measuring behavior change.** There is a need for systematic approaches and guidance for defining and measuring behavior change in the MWRP context and in the field more broadly. Because current MWRP projects do not collect baseline measures of household waste management behaviors, it is difficult for them to track, let alone explain, progress toward stated behavior change goals. The ability to learn from program implementation can be significantly strengthened through investments in grantees' capacity to measure behavior change.
- **Build the policy advocacy capacity of local community-based organizations to enhance partnerships with local authorities.** Addressing plastic pollution requires significant

attention and policy action on the part of policymakers in partner countries. Local actors like organizations in the MWRP portfolio often have insights into the policy barriers to effective waste management in their communities. Yet, as our study shows, local authorities may not sufficiently account for unique local conditions in the design and implementation of policies (e.g., HCMC’s regulation mandating an upgrade in IWCS’ vehicles). By investing in the policy advocacy capacity of community-based organizations, USAID can facilitate synergies between key stakeholders to ensure that government actions related to SWM are not only technically sound but also rooted in local realities.

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