



**USAID**  
FROM THE AMERICAN PEOPLE



# CLEAN **CITIES**, BLUE **OCEAN**

---

## Guidelines for Developing Integrated Solid Waste Management Plans

**Contract Number: AID-OAA-I-14-00059/7200AA19F00016**

Contract Period: August 29, 2019 to August 27, 2024

Contracting Officer's Representative: Clare Romanik

**This resource was prepared by:**



Sonia Ytuarte-Nasser, PE  
Senior Planning Project Manager  
Tetra Tech Solid Waste West (SWW)  
[Sonia.ytuartenasser@tetrattech.com](mailto:Sonia.ytuartenasser@tetrattech.com)

**Contributing Authors:**

Christine Mejia Arbogast, PE, Christian Ferguson, Cesar Leon, Jisela Herrera; Tetra Tech Solid Waste West  
Melinda Donnelly, Tetra Tech ARD  
Lori Scozzafava, ICMA  
Laurie Krieger, The Manoff Group

**Tetra Tech Contacts:**

Jon Angin, Chief of Party  
[Jon.Angin@cleancitiesblueocean.org](mailto:Jon.Angin@cleancitiesblueocean.org)

Rod Snider, Project Manager  
[Rod.Snider@cleancitiesblueocean.org](mailto:Rod.Snider@cleancitiesblueocean.org)

Submitted: February 26, 2024

*Cover Photos (left to right, top to bottom): Women collect waste in the Maldives, Soneva Namoon for Clean Cities, Blue Ocean; A woman sorts plastic to be recycled in Indonesia, Giulia Sorial/Clean Cities, Blue Ocean; a Prevented Ocean Plastic Indonesia aggregation and plastic processing center, Giulia Soria/Clean Cities, Blue Ocean; a clean canal in Sri Lanka, Giulia Sorial/Clean Cities, Blue Ocean*

This publication was produced for review by the United States Agency for International Development by Tetra Tech, through USAID (United States Agency for International Development) Contract No. AID-OAA-I-14-00059/7200AA19F00016, USAID Clean Cities, Blue Ocean program.

**DISCLAIMER:** This publication is made possible by the support of the American people through USAID. The contents of this publication are the sole responsibility of Tetra Tech and do not necessarily reflect the views of USAID or the United States Government.



# Table of Contents

- Acronyms and Abbreviations ..... 4**
- 1. Introduction ..... 5**
  - 1.1 Purpose of an Integrated Solid Waste Management Plan ..... 6
  - 1.2 The Solid Waste Management Planning Process ..... 6
  - 1.3 Engaging Community Members in the Solid Waste Management Planning Process and Social and Behavior Change..... 8
- 2. Key Considerations in the Planning Process ..... 11**
  - 2.1 Circular Economy Principles ..... 11
  - 2.2 Advancing Gender Equality in the Waste Management Sector ..... 13
  - 2.3 Integrating and Empowering the Informal Waste Sector..... 14
- 3. The Integrated Solid Waste Management Planning Process ..... 16**
  - 3.1 Identify Stakeholders and Conduct Baseline Analyses..... 16
  - 3.2 Review of Regulatory and Industry Requirements, Best Practices, and Current Capacity ..... 20
  - 3.3 Establish Goals and Identify Options for Improvement ..... 24
  - 3.4 Conduct an Economic Analysis..... 28
  - 3.5 Prepare the Plan..... 30
- 4. Ongoing Implementation and Monitoring..... 32**
  - 4.1 Review of the ISWMP..... 32
  - 4.2 Formulating Supporting Public Policy..... 32
- Annex I. Integrated Solid Waste Management Planning Process ..... 34**
- Annex II. Integrated Solid Waste Management Plan Outline..... 35**

# List of Tables and Figures

- Table 1. Compliance Gap Analysis framework ..... 21
- Table 2. Examples of ISWMP Goals..... 25
- Table 3. Sample implementation schedule ..... 31
- Figure 1. The Integrated Solid Waste Management Planning process ..... 6
- Figure 2. Overview of a circular economy..... 12
- Figure 3. Actors involved in local solid waste planning ..... 17
- Figure 4. Example of waste flow diagram..... 24
- Figure 5. Preferred waste management hierarchy ..... 26
- Figure 6. Sample Goal Achievement Decision Matrix..... 28

## Acronyms and Abbreviations

3Rs	Reduce, reuse, recycle
CCBO	[USAID] Clean Cities, Blue Ocean
COSA	Cost-of-Service Analysis
GIS	Graphic Information System
ISWMP	Integrated Solid Waste Management Plan
IWCs	Informal waste collectors
MSW	Municipal solid waste
NGO	Non-governmental organization
RAFT	Rapid Appraisal Facility Tool
SBC	Social and behavior change
SWM	Solid waste management
TIPS	Trials of Improved Practices
USAID	U.S. Agency for International Development
WACS	Waste Analysis and Characterization Study

# I. Introduction

Clean Cities, Blue Ocean (CCBO) is the U.S. Agency for International Development’s flagship program, under its Save our Seas Initiative, to respond to the global crisis of ocean plastic pollution. The program addresses land-based leakage directly at its source in ten countries and over 25 cities in rapidly urbanizing areas across Asia, the Pacific Islands, Latin America, and the Caribbean.

The program’s work supports USAID’s Five Building Blocks for Reduced Ocean Plastic Pollution:



Clean Cities, Blue Ocean works in collaboration with local partners to implement and test locally relevant and sustainable approaches to reduce ocean plastics that can be shared, tailored, and scaled, and tailored to meet the needs and local realities of cities around the world and their waste value chains.

An estimated 11 million tons of plastic flows into the ocean each year globally, and 80 percent of the marine debris around the world is estimated to come primarily from land-based sources. This leakage can be reduced by better managing plastics and other waste at its source, particularly in rapidly urbanizing and coastal cities. To support this process, Clean Cities, Blue Ocean works with local governments to develop Integrated Solid Waste Management Plans (ISWMPs) to improve their solid waste services and infrastructure.

Around the globe, local governments are typically responsible for solid waste management (SWM) planning; providing on-the-ground services to control waste and prevent ocean plastic pollution; and complying with national or regional government laws and regulations, but often do not have the institutional capacity (skills, resources, infrastructure, knowledge, and ability) to successfully plan, build, and operate these systems. Solid waste management plans are strategic, long-term visions (at least ten years) of how the local government will effectively manage solid waste. Plans should follow a pollution prevention hierarchy, with the 3Rs (reduce, reuse, recycle) at the forefront of the recommended solutions. Plans should be renewed every five years to ensure they reflect the current situation of the local authority, as well as current recycling market conditions, technologies, and local regulations.

Many municipal and local governments lack the resources, such as qualified or trained staff in SWM planning and/or the budget to develop an ISWMP without additional resources.

This guide is intended to support local governments in developing a robust ISWMP and is designed for and considers *planners* to be any staff that are part of the planning process—regardless of their educational background. The guide provides an overview of the SWM planning process (see *Annex I*) and highlights how plans can be used to improve local SWM programs and reduce ocean plastic pollution. *Annex II* includes a sample outline for an Integrated Solid Waste Management Plan that planners can use as a guide to develop a new or updated SWM plan. Planners are encouraged to use this guide as a template and tailor their process, as needed, to align with national and/or local regulations, requirements, and procedures.

Before reviewing this guide, Clean Cities, Blue Ocean recommends that users complete USAID’s [Solid Waste Planning to Advance Circular Economies](#) virtual training.

## 1.1 Purpose of an Integrated Solid Waste Management Plan

Integrated Solid Waste Management Plans (ISWMPs) enable local governments to identify, evaluate, and develop short- and long- term strategies and options to meet their SWM needs and goals in a cost-effective manner, while also addressing public health and environmental concerns.

Developing an ISWMP enables local governments to establish a written guideline or roadmap to institutionalize the vision of the future solid waste system and identify and describe the actions and resources that will be needed to achieve the system’s strategic goals.

An ISWMP also enables planners to:

- coordinate with all segments of the community and other key stakeholders involved in waste management to align system plans with their needs;
- understand current waste management practices and systems;
- identify current system challenges, gaps, and needs;
- identify opportunities and set priorities for improvement;
- identify required resources, including financial and budgetary needs (capital and operations costs);
- set goals/targets and measure annual progress;
- communicate details about the plan to the community, key stakeholders, and external agencies, including its goals, recommended improvements, and implementation schedule; and
- develop other critical components to support the plan’s implementation, such as social and behavior change programs.

## 1.2 The Solid Waste Management Planning Process

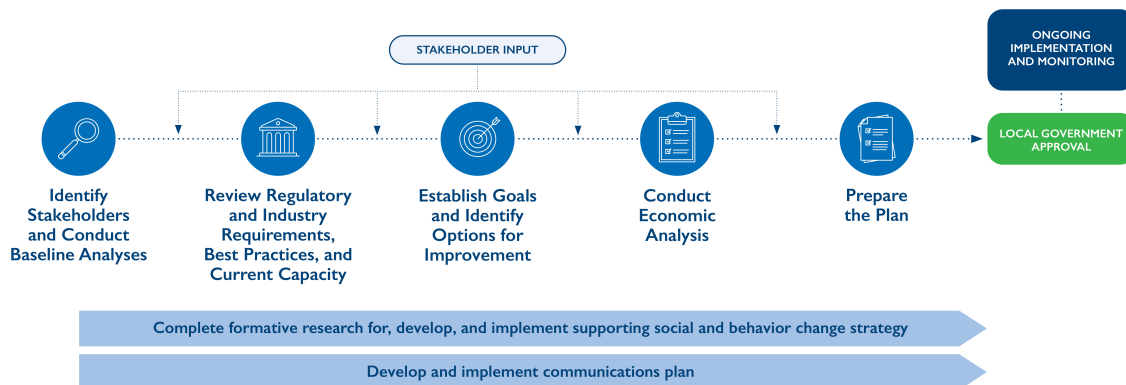


Figure 1. The Integrated Solid Waste Management Planning process

The Integrated Solid Waste Management Planning process includes the following steps:

### 1. Identify Stakeholders and Conduct Baseline Analyses

The first step to develop an ISWMP is the **creation of a Waste Management Advisory Committee** to oversee and implement the planning process. This includes identifying and **engaging key stakeholders** that have an interest in or responsibility for key aspects of SWM to solicit their input throughout the planning process. **Baseline assessments should also be conducted** at this stage to develop an in-depth, data-backed understanding of the current SWM system's capacity and operations. This should include assessing local capacity using USAID's [Solid waste Capacity Index for Local governments \(SCIL\) Toolkit](#) to determine which aspects of the current solid waste management system need improvement. The actions recommended as a result of this process can then be included as part of the final ISWMP. Current and future system requirements should also be assessed, including establishing the amount and type of waste currently being generated and projections for future waste volumes.

### 2. Review Regulatory and Industry Requirements, Best Practices, and Current Capacity

A comprehensive plan should reflect applicable laws and regulations, local markets (formal and informal), and industry best practices to understand compliance requirements and how often plans should be updated. During this step, planners should **complete a Solid Waste Compliance Gap Analysis, describe the current solid waste and recycling infrastructure using USAID's Rapid Appraisal Facility Tool**, and **assess the existing recyclables market**—including an analysis of potential market opportunities to understand whether enhanced collection or more recycling and/or disposal infrastructure is needed.

### 3. Establish Goals and Identify Options for Improvement

Through a public consultation process and research that involves all segments of the community (see Section 1.4), planners must **establish future system goals** and priorities for the planning area that meet the specific needs of its community and develop potential options—programs, policies, and improved or new infrastructure—to meet those planning goals. These goals should address a variety of topics, including solid waste generation and disposal; planning for the projected closure date of the area's open dumpsite; establishing waste diversion goals or other measurable targets; developing programs for waste reduction, reuse, and recycling (segregation); and plans for informal waste collectors—among others. Most plans have short-term (up to five years) and long-term (beyond five years) goals for a given time horizon with established periods for plan specific updates (usually every five years for long-term plans). Once the goals have been established, the plan must outline (specifically) how they will be achieved. This is accomplished by analyzing the waste data (to determine what types and quantities of waste could be better managed); assessing the various strategies, policies, technologies, equipment, and infrastructure that will be needed (for collection/transport, 3Rs, material processing/treatment and disposal); and then outlining the specific approaches that will be taken (in what order and time period).

#### 4. Conduct an Economic Analysis

A vital part of the planning process is **conducting an economic (financial or cost-of-service) analysis** that determines a solid waste system's current cost, as well as the future cost of the planned system—and identifies options to fund these costs. Building an effective solid waste system requires that planners understand the cost of services currently being provided and—once established—estimate the projected cost of the desired integrated SWM system, as it develops. Maintaining sufficient funds to cover the full cost of a sustainable SWM system is a common challenge across many countries as they develop or update SWM plans. Revenue structures vary from country to country, but the general funds that local governments typically rely upon to operate their waste systems are insufficient to manage the quantities of waste being generated by their growing populations. In this step, planners will identify funding options to cover any revenue gaps, lower general-fund subsidies, and cover the cost of the desired SWM system, to be presented to key stakeholders.

#### 5. Prepare the Plan

To prepare the final plan, planners must **develop an implementation schedule** that includes recommended programs and facility improvements—including time to site, design, and obtain regulatory approvals for these improvements; any recommended policy measures; as well as timelines to plan, budget, and track the progress of the plan's goals and targets. To monitor and measure the success of the plan, planners must **establish key performance indicators** such as the waste generation rate, material reduction targets, cost of service, rate of recycling/diversion. Once the plan is drafted, it should be **presented to key stakeholders and decision makers** to collect final feedback to finalize the plan and move toward submission for local government approval.

### 1.3 Engaging Community Members in the Solid Waste Management Planning Process and Social and Behavior Change

It is important that planners develop ISWMPs that will be supported, implementable, and ultimately effective. Every plan must be unique to the local circumstances and conditions, thus planners must engage the community to listen to what their specific needs are; share goals and elements of the plan as they develop; and gather data and insights from the community to inform the plan, including the social and behavior change (SBC) strategy that will be part of and support the ISWMP's implementation.

An SBC strategy and resulting SBC programs must be designed to support and ensure the successful implementation of the ISWMP, as plans may require community members to adopt new behaviors. As detailed in this section, successful ISWMPs and SBC programs rely on brief but crucial qualitative research with the community, which is ideally followed by asking community members to try out new or revised behaviors. This is a key part of successful design so that plans do not include behaviors that some members of the population (e.g., the very poor) cannot implement. Social change may also be required for a plan to be successful (e.g., improving the livelihoods and status of informal waste collectors to enable them to more effectively support SWM objectives). It is critical that before rolling out an ISWMP and SBC programs, planners ensure the SWM system can support the new behaviors. This is key because if the public is asked to source separate their waste at home or work and then see all the waste dumped into one waste vehicle, they will question the purpose of the program and will not continue to separate their



waste. This may not only result in an unsuccessful program but can lead to community frustration with or distrust of the local government.

This section provides an overview of the process planners and SBC experts should follow to engage the community, in parallel with plan development.

### *Identify Key Stakeholders*

The first step in this process is **identifying all key stakeholders** that should be communicated to and with as part of the planning process. This ensures that during planning, parts of the community, institutions, and other groups are included in related research, outreach, and other communications that will be done to inform the SWM planning process and its supporting SBC programs.

### *Conduct Qualitative Research and Trials of Improved Practices*

Once key stakeholders are identified that will be engaged as part of the ISWMP's development, planners should **conduct brief qualitative research** to understand how community members (and everyone who handles waste—from generation to disposal for households, businesses, and members of the formal and informal waste sectors) regard waste, currently manage it, and interact with the SWM system and with local government on waste-related issues. The research will also identify who the most important participants will be for SBC programs. The brief qualitative research should answer:

1. How is waste currently managed in the household and by whom? What waste prevention, segregation/recycling, reuse practices are currently being followed?
2. What factors are influencing their ability to do/not do each of these behaviors (e.g., current or past experiences with the SWM system; gender or age roles; ideas about waste and its intersections with unwanted pests (i.e., vermin, insects), climate change, etc.)?
3. How are household waste collection services currently operated?
4. Are they equally/fairly distributed? (e.g., do tourist vs. residential or wealthy vs. poorer areas receive better collection services? Is waste collected in informal settlements?)
5. How do these collection practices affect households' and neighborhoods' attitudes toward the SWM system and local government?
6. What are the factors affecting the community's participation in waste collection services or other waste system components, like existing recycling centers?

Based on the qualitative research, planners should then **conduct Trials of Improved Practices (TIPs)**, which takes the detailed results of the preceding brief qualitative research, derives behaviors that are possibly feasible for a selected sample of the community to do, and asks these participants to test the behaviors. The goal of TIPs is to learn which SWM and 3R behaviors a population can and is willing to do or is unable and/or unwilling to do (and if so, what can be done to make these behaviors feasible or more attractive) to support an improved SWM system and identify how SWM system needs to change to meet population's needs. TIPs can generally be completed within two weeks, although timeframes may vary based on the local context. The results may be used to inform the ISWMP, including a supporting SBC strategy, and provide inputs to other policies or programs. Detailed guidance on conducting TIPs can be

found in Clean Cities, Blue Ocean's [Trials of Improved Practices Manual](#).

SWM planners who are not used to engaging with the community might consider accompanying SBC staff in one or two of the qualitative interviews or TIPs visits to see first-hand what community conditions are like and hear how and why household members conceptualize and handle waste the way they do.

### *Conduct Community Outreach*

In parallel, planners should begin **community outreach**, as part of their SBC strategy, to ensure that all institutions, parts of the community, and groups are engaged during plan development. Appropriate communication strategies should be developed—such as community outreach sessions—and carefully designed to reach the various audiences within the community, including those with little awareness of the importance and responsibilities of waste management. Planners should take care to design community outreach activities, such as community meetings, in a way that enables attendees to share feedback openly, without fear of judgement or retribution, i.e., multiple sessions can be held, grouping population segments that are comfortable speaking with each other (e.g., not of very different social classes or ages, depending on the community). Good community engagement will reach all segments of the population—including institutions, which are less commonly included in qualitative research but may have their own waste management needs and views that should be considered.

To develop ISWMPs that will be supported and implementable, it is important that everyone involved in community outreach, not just the SBC staff, be good listeners. Qualitative and TIPs research, mentioned earlier, should be supplemented by outreach to the community through community meetings and interactions with religious, civil society institutions, and other groups. Engaging the community is critical to ensure they are aware of the ISWMP in progress and to enable community members to provide feedback. Planners should also stay engaged with the community after the ISWMP is finalized and during its implementation, as frequently community feedback can be gathered to strengthen elements of the plan.

### *Incorporate Findings in the ISWMP and Develop Supporting SBC Strategy*

The act of simply gathering and delivering information to the public is not enough; planners must address and **incorporate all of the factors that surfaced during the preliminary research and outreach in the ISWMP and supporting SBC strategy** to ensure that the necessary behaviors by households, businesses, and institutions are effective and as easy as possible to implement. For example, SBC research and outreach would likely reveal that the cause of a littered beach may be mostly attributed to the absence or shortage of right-sized waste bins and collection. These findings can then be addressed in the ISWMP. At the same time, the SBC strategy should let the public and tourists know that there are now adequate waste receptacles on beaches and equip them with the relevant information to know how to use the receptacles appropriately to ensure beach cleanliness.

Once the qualitative research, TIPs results, and learnings from community outreach sessions have been included as much as possible in the ISWMP, an SBC strategy must be designed. The SBC strategy may be included directly, as part of the ISWMP, or may be a separate document. In any case, the strategy should be designed to ensure it informs the population about changes in the SWM system and the policies that affect them, as well as detail elements to make the new behaviors as easy as possible to perform for residents, businesses, and institutions.

The resulting SBC strategy should be:

- Based on all the research results and community outreach during the planning phase;
- Inclusive of:
  - a. key participant groups (audiences), their current behavior, potential issues in implementing ISWMP components, desires, and activities and programs that meet these desires (when practical);
  - b. a budget that includes the cost of equipment, other resources, and staff necessary to implement the strategy (e.g., are vehicles and fuel needed?)
  - c. a Monitoring, Evaluation, and Learning plan to monitor the SBC program and its results;
- Vetted with a wide group of stakeholders, including local government, non-governmental organizations (NGOs), and other relevant actors in the sector such as other donors and members of the private sector, religious leaders and institutions when relevant. *(This can often be accomplished with a half-day or one day workshop—the planning team should first present the research and planning phase outreach results and obtain agreement that no one is allowed to suggest an activity that cannot be justified by these results);*
- A communication plan, which usually includes any outreach, the selection and training of local 3R experts, or other mechanisms, such as communication materials (e.g., television, radio, print, instructions or reminder materials disseminated via social media, etc.), which should be pretested with the individuals or groups (audience segments) for whom the material is intended. For example, a social media reminder post may be very quickly tested through virtual or in-person focus group discussions with members of each specific participant group for which the posts are intended or through a test social media post that invites comments.
- Rolled out, working with relevant groups, such as community groups, media, schools, parent teacher associations, private sector, and local government (that have already been engaged through earlier outreach activities).

After vetting the strategy with stakeholders, SBC experts should design a communication plan for the communication portion of the strategy.

Detailed guidance on SBC and developing SBC strategies can be found in Clean Cities, Blue Ocean’s forthcoming *Developing and Implementing Social and Behavior Change Programs for Improved Solid Waste Management* resource.

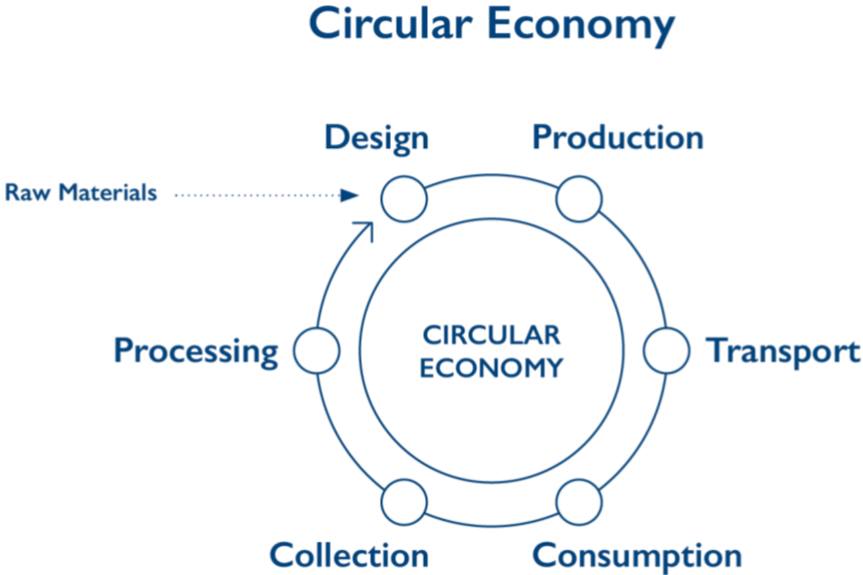
## 2. Key Considerations in the Planning Process

### 2.1 Circular Economy Principles

USAID employs a local systems approach to advancing circular economies—which considers how the entire system impacts the plastics value chain and engages all actors involved in the production, management, and disposal of plastic waste. This includes national and local government, the private sector, civil society organizations, and individuals—including vulnerable populations and the informal waste sector, women, and youth. Circular economy models move away from linear (take, make, waste) economies and, instead, establish economies where products and materials are reused, repurposed, and recycled—with reduced demand for virgin plastic products. At its core, a circular economy describes a system in which

the 3Rs (reduce, reuse, recycle) are incorporated into the life cycle impacts of plastic products. This requires systemic changes such as rethinking product manufacturing and design, reducing single-use plastic consumption, designing alternative and reusable products, strengthening solid waste systems—including through adequate recycling infrastructure and improved markets for recycled, reusable, and repurposed plastic.

Figure 2. Overview of a circular economy



To support the transition to a circular economy, ISWMPs should be developed to include programs that help reduce material being landfilled or discarded into the environment at the point of final disposal and instead recirculate materials back into the economy at the point of purchase, collection, or processing. This may include, for example, strengthening waste collection services, creating recycling and labeling standards, introducing recycled content mandates, regulating and/or phasing out single-use plastics, or introducing an Extended Producer Responsibility (EPR) scheme, in which producers help fund and manage the collection and recycling of their plastic products. In designing ISWMPs, it is also important for planners to consider elements within the overarching system, such as whether national policies influence market development for local recycling innovations.

In addition to addressing municipal solid waste, ISWMPs may also address household hazardous and industrial waste, including through new services such as hazardous material stops, swaps, or hazardous waste drop off centers. For industrial waste, plans may include measures to encourage industrial parks to share data on purchased and discarded raw materials. Using one company’s waste products as another company’s raw material is an economically practical method to reduce industrial waste going to landfill.



## 2.2 Advancing Gender Equality in the Waste Management Sector

Women play a critical role in the SWM and recycling sectors. They serve in both formal and informal positions as waste collectors, owners or employees of small recycling centers and junkshops, workers in plastic and pre-processing companies, and sometimes as owners or workers in upcycling enterprises. In the sector, women face gendered structural barriers that limit their earning power and constrain their access to opportunities for upward mobility. For example, because women have limited access to credit, training, and time, they tend to work in the informal SWM sector where they receive lower wages, few health and safety protections, and are at heightened risk of gender-based violence, including sexual harassment. Few municipalities or waste companies outside Vietnam hire women as waste collectors in the formal sector and, globally, women are virtually absent from the middle reaches of the SWM value chain and represent a fraction of SWM sector leaders.

Despite women's critical roles, SWM planners tend to overlook the contributions that women make, and thus miss opportunities for gender advancement. Growth and formalization of the sector often do not consider the significant role women play in the value chain, professionally and as consumers, perpetuating sectoral gender inequalities and overlooking opportunities for improved SWM systems and services. Addressing gender equality in an ISWMP strengthens the plan as women play a vital role in the SWM value chain. To support a transition to a more just, inclusive sector, Clean Cities, Blue Ocean's [Initial Gender Assessment](#) tool supports organizations to assess whether and how their own organization applies a gender lens to planning and project development and identify areas where they may need to think more thoroughly about implementing its programs in terms of gender.

Key questions from this tool that should be considered by planners in the development of an ISWMP include:

1. Does the district collect data on how many women are in the waste management workforce and what positions they have?
2. Are women encouraged to apply for traditional male roles (i.e., truck driver, supervisor, manager)?
3. Are women and men paid the same amount of money for the same or equivalent work?
4. Do women have equal access to higher paying jobs such as those requiring operation of machinery?
5. Are jobs that women typically hold the same value as jobs that men typically hold requiring similar educational levels?
6. Are there gender differences in how waste is defined?
7. Do men and women have different perceptions of waste management? Do boys and girls have different perceptions of waste management?
8. Do men, women, boys, and girls perform distinct roles in waste management and generation?  
*(Qualitative research and Trials of Improved Practices can provide detailed information)*
9. What occupations do men and women have within the waste sector?
10. What are some of the challenges perceived by women in these occupations?
11. Is gender violence reported more among women working in SWM, especially at the lower level, e.g., IWCs and lower-level waste trading?
12. Are there gender differences with respect to income generated for similar occupations?
13. Are there any gender-specific interventions that may improve the waste landscape?

14. How do women and men react to waste in their environment?
15. What local norms and status categories affect what women do about waste?
16. How do gender stereotypes, roles, status, and identities manifest themselves locally in the waste sector?
17. What are the applicable laws about human rights in work and gender?

## 2.3 Integrating and Empowering the Informal Waste Sector

Informal waste collectors (IWCs) are the foundation of waste collection, sorting, and recycling in many cities around the world. Globally, they are responsible for over half of all plastic waste collected and recycled making the sector one of the world's most important defenses against ocean plastic pollution, especially in coastal, urban areas, and in places where the formal sector does not serve one hundred percent of the population or respond to all waste management needs. By collecting, sorting, aggregating, and transporting waste from underserved areas, IWCs help fill a critical municipal service gap in waste management, reducing municipal expenses in addition to preventing environmental pollution. IWCs also contribute to circular economies by providing recyclable materials to enterprises that recycle or upcycle and return products back to the market, however, the majority lack sufficient access to end markets or commercial recyclers that accept greater quantities and higher quality plastic waste—or are underpaid for the materials they collect. The informal waste sector is disproportionately female. No statistics on the gender distribution of informal waste collectors exist at this date. However, an examination of estimates and censuses (where they exist) of IWCs country by country suggests that women constitute a large proportion of those engaged in this job.

An efficient, inclusive, and equitable informal waste sector is integral to a well-functioning SWM system and a circular economy. Despite their importance, IWCs—especially those that are women—are commonly overlooked, undervalued, and usually represent the most vulnerable and socially disadvantaged groups in society. Communities often conceptualize waste collection as a desperate source of daily living or the occupation of criminals. As a result, IWCs regularly face stigma, marginalization, harassment, and even violence. Worldwide, women IWCs are more likely to experience gender-based violence than other IWCs and women in most other professions. IWCs also have little access to basic personal protective equipment and tools—such as gloves, boots, and protective clothing—increasing their health and safety risks. Worldwide, women IWCs have less access than male IWCs to motorized vehicles and sometimes even to wheeled vehicles, severely limiting their access to more and higher quality, heavier waste (e.g., metal). All IWCs' activities are characterized by unsafe and unhealthy working conditions; usually low or irregular incomes; long working hours; and a lack of access to markets, finance, training, and technology. Connected to this, IWCs lack political and legal representation and are underrepresented in decision making about the solid waste management policies that affect them. Finally, IWCs' livelihoods are highly vulnerable to the impacts of global trends and events, such as extreme weather events from climate change and economic turmoil, like the recessions that resulted from COVID-19. In some areas, such as portions of the Philippines, Brazil, Peru IWCs have formed association or unions, which may give them a voice in representation with local government.

Key takeaways from USAID and its partners' work that planners should consider in developing or updating ISWMPs include the importance of building the technical skills of and providing opportunities for IWCs;

ensuring essential basic tools and services are accessible to IWCs; and providing sufficient end markets for recyclables to ensure fair and sustainable prices for the materials they collect.

- **Research and understand what contributions IWCs currently make to the solid waste system** – IWC research should be conducted to inform any new system developed by the local government. The new system should acknowledge what is currently being accomplished by the informal sector, which often recovers significant quantities of materials, and, as appropriate, build upon informal sector strengths and existing organizational structures. An important consideration is whether the new system will fundamentally change the current system, with the potential risk of jeopardizing IWC livelihoods. For example, halting the dangerous process of picking waste on the face of the landfill could put already vulnerable populations out of work. The local government should consider alternative arrangements such as developing a processing facility where former pickers can work safely to recover valuable materials from the residual waste prior to disposal. Find out:
  - Are there IWCs at the landfill?
  - Are IWCs picking through public/private waste bins?
  - Do hotels or large commercial establishments arrange for IWCs to sort through their waste prior to disposal of the residual waste?
  - Are IWCs collecting waste door to door (and salvaging valuable materials prior to depositing residual wastes at a collection point)?
  - Are materials being returned to the circular economy through private junkshop buyers—and if so, what is the volume of materials being purchased and sold by the largest junk shops (recyclable material processors/aggregators) in the area (since small junk shops sell to the larger ones)?
  - Are IWCs earning income through collection fees or only sale of materials?
- **Prioritize holistic training, including technical training in business and finance** – Many informal workers—especially women—do not have the tools, money, or skills to expand and improve their work, or to access reliable end markets to deliver recyclable materials. Building the capacity of IWCs must include technical training to ensure they have a sufficient understanding of how local, national, and international markets operate and are aware of how to access financing—so they can provide quality recyclables to market and can receive the best prices. For example, CCBO has pioneered the successful [Women in Waste Economic Empowerment \(WWEE\)](#) model in the Philippines and Indonesia, which provides business, psychological, social, occupational and gender training—including how to address gender-based violence—through a phased training, mentoring, small grant, and increased market opportunity program. Such program should be adapted to meet the specific country and city’s needs.
- **Provide critical basic services to informal waste collectors** – Essential elements of a safe SWM system must include a strong commitment to prioritizing the health, safety, and social protection of IWCs, including access to adequate personal protective equipment; health services and insurance; sufficient education and knowledge on occupational health and safety; childcare; and emergency cash grants, when needed. IWCs often lack access to basic services that require national identity cards, such as schooling for their children.
- **Ensure end markets are sufficient, reliable, and accessible to informal waste collectors** – There need to be reliable and sufficient end markets to ensure that IWCs are able to sell the

recyclables they gather and are fairly paid for their services. Local ISWMPs should consider investments in collection, aggregation, and processing facilities/capabilities to ensure sufficient volumes of high-quality material to make recycling economically and logistically sustainable.

## 2. The Integrated Solid Waste Management Planning Process

Before initiating the SWM planning process, planners must establish the planning area to identify which districts, barangays, wards, communes, neighborhoods, cities (or other units of local government) the plan will cover. Once established, a map should be prepared to clearly illustrate the area, including streets, highways, and any solid waste facilities—including disposal sites, recycling facilities, and others. Geographic information system (GIS) maps are useful for this purpose. Since SWM involves transporting materials, it is important to understand the distances involved in collecting and managing waste, as these logistics and the costs associated will be evaluated as part of the ISWMP process.

Once the planning area has been identified, planners may proceed with the planning process—detailed in this section. A corresponding outline is provided in *Annex II* that can be used to develop and guide the ISWMP.

### 3.1 Identify Stakeholders and Conduct Baseline Analyses

#### *Create a Waste Management Advisory Committee and Engage Key Stakeholders*

Engaging stakeholders that have an interest in or responsibility for key aspects of SWM (through the entire value chain) is a critical element of the SWM planning process that is often not given enough consideration. Input from identified key stakeholders is needed throughout the solid waste planning process to achieve successful implementation. Receiving their input at key planning milestones will help develop an ISWMP with strong components, strategies, and recommendations. Accordingly, the first step in planning should be the creation of a Waste Management Advisory Committee to oversee and implement the planning process. The committee should enable planners to solicit and provide inputs (i.e., on existing conditions, needed improvements, and potential solutions) throughout the planning process and provide a forum for all parties to voice their ideas to inform and enable development of the plan.



Figure 3. Actors involved in local solid waste planning



To form the committee, planners must identify all key stakeholders that have an interest in or responsibility for key aspects of SWM (see *Figure 3*). The Waste Management Advisory Committee should enable broad stakeholder representation, while comprised of a manageable number of key stakeholder representatives without being unwieldy. Recommended participants include representatives of national and local government; associated agencies and departments—such as environmental, health, and agriculture; public utilities; municipal councils; education officials; waste service providers—including recycling businesses, landfill operators, waste collectors (formal and informal); NGOs; members of the private sector (including key sectors, such as the tourism industry); and waste management experts. Committee membership should also reflect the gender, race, and cultural demographics of the community. During the SWM planning process, multiple planning workshops may be needed at key milestones.

In addition, planning workshops may be conducted for a larger audience to enable a greater number of stakeholders to learn about the SWM planning process, how they can be a part of it, and ways to share their ideas in the process. At the first workshop, the planning process should be presented and planners should seek input from participating stakeholders on the plan's intent and issues that should be addressed. Potential questions to pose to participants include:<sup>1</sup>

1. What waste management problems have been identified? (i.e., collection, billing, source separation, illegal dumping issues)
2. What causes these problems?
3. Who sees them as important?
4. Do stakeholders see any opportunities for improvement of the SWM system?
5. Is there a tradition of community-based action, and what are the opinions on this approach?
6. Are stakeholders aware of the need to change existing practices to innovative approaches and technologies?
7. Which problems are seen as high priority?

<sup>1</sup> Decentralized Composting for Cities of Low- and Middle-Income Countries, EAWAG/Sandag, 2006.

8. What evaluation criteria are important to community members and stakeholders?
9. Do the priorities of stakeholders differ?
10. Is land available within the community for required waste management facilities?

At subsequent workshops, findings, challenges, and the solutions being considered for improved waste management services and infrastructure can be presented to stakeholders for input. It is critically important to involve the local community in the planning process, particularly when evaluating potential new or improved solid waste facilities. Consultations should include residents that live close to key collection or disposal facilities, as well as customers receiving waste services. If planning for a large area, such as a large city with numerous stakeholders, an outside public relations/advertising agency is recommended to assist with the stakeholder engagement and communication.

### *Conduct Baseline Assessments*

Baseline assessments should also be conducted at this stage to develop an in-depth, data-backed understanding of the current SWM system—including population demographics, the amount and type of waste being generated, and projections for future waste volumes.

#### **Planning Area Demographics**

Demographic information should be gathered such as the planning area's population, number of residents, residents per household, and the number and type of businesses, as available. Planners should also estimate the population projections for a five- to twenty-year planning horizon.

#### **Waste Analysis and Characterization Study (WACS) and Projections**

To effectively plan SWM improvements, it is important to know how much and what types of waste are generated, collected, and disposed—and what materials compose these waste streams. This requires the development of waste characterization and projections for the service areas within the planning area. This data sets the groundwork for developing the goals of the plan; ensuring short- and long-term disposal capacity needs are met; and developing recommendations for programs, policies, and infrastructure to meet these goals and to measure the performance of the ISWMP.

Waste audits at the source (directly from households or businesses) provide waste **generation** data, while waste audits at waste system facilities provide data for waste **disposed**. To gather waste generation data, start by reviewing existing waste characterization studies, if available. If the study is over five years old, it may be necessary to conduct a new waste characterization study. To gather data on how waste is being managed, it may also be necessary to conduct waste characterizations at local facilities such as transfer stations, material recovery facilities, open dumps, or landfills to understand how much and what types of waste is currently being managed.

If both studies are conducted and the quantity of waste generated at the source is higher than the facility disposal quantities, this is an indication that waste is leaking out of the system either from insufficient services (e.g., lack of waste collection and processing infrastructure), diversion of recyclables that need to be accounted for, or because of illegal dumping.

Planners must also establish an estimate of the per capita waste generation for the planning area, which requires knowing the current population and the total waste generation for the area.

Planners may obtain current census data (from the most recent available year) from the national bureau of statistics as well as the projected population growth for the next ten and twenty years. Using the per capita waste generation and projected recycling rates, planners can then predict waste generation for the next ten to twenty years.

$$\text{Waste generation per year} = (\text{annual per capita waste generation} \times \text{population})$$

If the ISWMP area has a high number of tourists as compared to the local population, adding the tourists to the resident population may be required. The national tourism ministry should be able to provide monthly tourism data and related average lengths of stay, as it is typically required of hotels to report this data to the tourism authority. To convert tourist visits to local population:

$$\text{Number of tourist as residents per annum} = (\text{Average length of stay in days} / \text{Number of days in the month}) \times \text{Number of tourists per month} \times 12 \text{ months}$$

$$\text{Annual modified population} = \text{Resident population} + \text{Number of tourists converted to resident population per annum}$$

$$\text{Waste generation per capita (kg/per capita/day)} = \text{Total municipal solid waste generated per annum} / \text{Annual population} \times 365 \text{ days}$$

Planners should calculate the per capita waste generation with and without the tourist data to determine how much the tourist population may be affecting the area's per capita waste generation number, as well as conduct similar calculations with projected tourism growth data to project future waste generation.

### **Marine and Street Litter Audits**

[Marine](#) and [Street Litter Audits](#) may also be conducted to gather data to inform the ISWMP. Clean Cities, Blue Ocean has developed guidebooks to enable users to perform a statistically credible, yet simple survey to measure the rate, extent, and composition of litter in urban and coastal areas to better assess the prevalence of marine debris from land-based sources and identify actions and areas that should be prioritized in SWM planning. Marine litter audits can be conducted where uncollected waste enters creeks, rivers, streams, beaches, and eventually the ocean. A street litter audit is recommended where high pedestrian traffic areas are causing excess litter on the streets. These audits are useful to determine waste hotspots for litter and help inform where bins or collection and cleaning services are needed.

### **Environmental Assessment Studies**

Information on climate, geology, and natural resources will also be needed for planning new or expanded waste management facilities. For example, to site a new landfill, geology, hydrogeology, and archeological and paleontological studies must be completed as part of a required environmental assessment. Planners should consult local environmental regulations to determine what studies are required for components being proposed/included in the ISWMP.

### **Solid Waste Management Capacity Assessment**

Local governments should use USAID's [Solid Waste Capacity Index for Local governments \(SCIL\) Toolkit](#) to determine which aspects of the current solid waste system (planning, legal and policy framework, financial management, service delivery, human resources or community engagement)

need improving and could benefit from capacity-building resources. The actions recommended out of this process can then be included as part of the ISWMP.

## Related Resources

- **Waste Analysis and Characterization Study (WACS) resources** - *There are many methodologies for conducting WACS. First check to see if local, national, or regional regulations require a certain method, then select one based on what is most suitable for ISWMP data needs. The following resources can be used to guide selection and implementation of a WACS methodology. USAID recommends planners hire a qualified waste consultant to advise and prepare WACS.*
  - USAID Resources –
    - [How to Conduct a Waste Analysis Characterization: Vietnam](#) (video)
  - Other Resources –
    - [Waste Analysis and Characterization Study: A Manual](#) (Philippines)
    - [Decentralized Composting for Cities of Low- and Middle-Income Countries](#) – see chapters two and three for residential waste characterization study methodology.
    - [Standard Test Method For Determination of the Composition of Unprocessed Municipal Solid Waste](#) – provides guidance for facility waste characterization studies
- [Marine Litter Audit Guidebook](#)
- [Street Litter Audit Guidebook](#)
- [Solid Waste Capacity Index for Local Governments \(SCIL\) Toolkit](#) - *provides a methodical and distilled, yet comprehensive approach for local governments to assess their capacity to create and sustain an economically and environmentally sound SWM system.*

## 3.2 Review of Regulatory and Industry Requirements, Best Practices, and Current Capacity

A comprehensive plan should reflect applicable laws and regulations, local markets (formal and informal), and industry best practices to understand compliance requirements and how often plans should be updated. During this step, planners should complete a Compliance Gap Analysis identifying the laws, regulations, or mandates that govern the area’s SWM system; describe the current solid waste and recycling system; and assess the existing recyclable market—including an analysis of potential market opportunities to understand whether enhanced collection or more recycling and/or disposal infrastructure is needed.

### *Review of Regulatory and Industry Requirements and Best Practices*

One of the first steps in developing the ISWMP is knowing the local, provincial, national, and regional SWM laws and regulations that require compliance and determining the planning area’s status of compliance with them. This usually involves environmental protection statutes but could also include marine litter and debris prevention, litter laws and bans, and restrictions on single-use plastics.



To assist in this effort, Clean Cities, Blue Ocean developed a legislative and regulatory **SWM Compliance Gap Analysis** template, which begins with identifying relevant laws and regulations and pinpointing the clauses within them that require compliance. Specific compliance clauses are recorded in a spreadsheet and linked with one of the nine categories, shown in Table 1. An analysis is then performed to determine if the area is in full, partial, or out of compliance for each (national, regional, or local) compliance clause so that action can be taken to bring the jurisdiction into compliance.

The ISWMP must address areas with partial or no compliance to ensure the area is brought into compliance and avoid penalties. The Compliance Gap Analysis can be completed as a separate activity, with results included in the ISWMP

Table 1. Compliance Gap Analysis framework

Category of the Law/Regulation	Identified Compliance Clauses in Law or Policy	Status of Compliance with Compliance Requirements
1. Planning	<ul style="list-style-type: none"> <li>• National</li> <li>• Regional</li> <li>• Provincial</li> <li>• Local</li> </ul>	<ul style="list-style-type: none"> <li>• Full Compliance</li> <li>• Partial Compliance</li> <li>• Out of Compliance</li> </ul>
2. Legal and Policy Framework		
3. Financial Management		
4. Service Delivery		
5. Human Resources		
6. Community Engagement & Social and Behavior Change		
7. Enforcement		
8. Gender Equality		
9. Marine Debris		

To further supplement the ISWMP’s regulatory framework, planners may review policies being implemented by similar or more progressive districts to meet similar SWM goals. To study their policies as best practices, planners should focus on districts with similar sizes and SWM systems.



Street sweeping, waste collection, and waste disposal across program focal countries.  
 Photos: Clean Cities, Blue Ocean

### Describe the Current Solid Waste and Recycling System

To develop an ISWMP, planners must fully understand the capacity and limitations of the current SWM system. Accordingly, every ISWMP should begin with a description of the current system that documents the baseline conditions of the SWM system to provide a picture of what is currently happening with respect to waste diversion programs and practices, waste collection (formal and informal), processing/aggregation (such as transfer stations, material recovery facilities, compost facilities), and disposal (recycling and disposal facilities). Planners should also be sure to include as many known informal recyclable aggregators and junk shops in the description, since these solid waste facilities are also vital to most SWM systems around the world. As part of the data collection and review process, planners should obtain as much information as possible on existing facilities': operational data, equipment and condition, processed materials, staffing, and environmental conditions. A list of recommended data to capture is included in Clean Cities, Blue Ocean's [Rapid Appraisal Facility Tool \(RAFT\)](#).

A written description should be supplied for all other aspects of the SWM system, including collection, to capture:

- Residential households
  - How many units/households are collected and by whom (municipal employees, contracted private company, etc.)?
  - What do they pay and how is the fee collected?
  - How frequently is waste collected?
  - What is collected (mixed waste, segregated waste (degradable and non-degradable), etc.)?
  - Are materials segregated and collected separately? How and by whom (formal/informal, municipal staff/under contract)?
  - How much of each material type is collected?



Members of Clean Cities, Blue Ocean's team collecting facility information using the RAFT in Indonesia. Photo: Clean Cities, Blue Ocean

- Where are the materials delivered and are they transferred to another facility?
- How much do the services cost (the local government)?
- Non-household generators (commercial retail, industrial and institutions)
  - Same questions as above
- If the municipality provides waste collection, this section should include a description of:
  - The number and type of staff
  - The number and types of equipment used
  - Location and type of collection and storage facilities

Findings from this research will be included in Sections 2 and 3 of the ISWMP, which will contain an inventory of all the system waste management facilities, with their locations plotted on a map. From this data, planners can then identify areas that may need enhanced collection, recycling, and/or disposal infrastructure.

### *Assess Existing Recycling Market (Formal and Informal)*

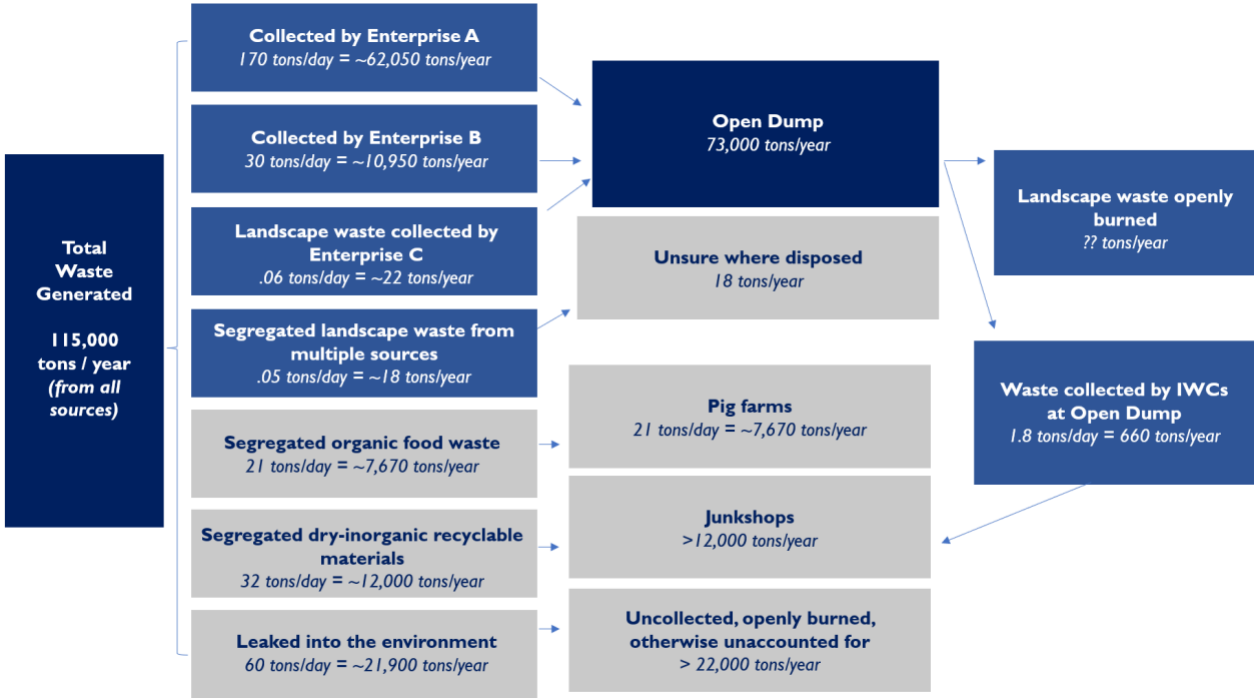
Before developing options for improving the SWM system, it is important to understand the current (formal or informal) markets for targeted materials that are planned to be recovered, treated, recycled, and/or diverted from disposal. This should include an assessment of existing recyclable markets and an analysis of potential market opportunities.

Recovered materials may include:

- Separated recyclables sold into known recycling markets, provided they meet industry standards;
- Plastics that are converted into industrial fuels or used in building materials;
- Organic materials that can be composted as soil amendment for agriculture, fed to animals, or digested to generate electricity or fuel; or
- Municipal solid waste (MSW) that is mechanically treated to create refuse-derived fuel. MSW can be thermally or chemically treated in a waste conversion facility to generate steam, electricity, renewable natural gas, or refuse-derived fuel.

Recycling requires a substantial amount of clean recyclable material to be economically sustainable. Therefore, it is important that planners understand how much material is already being separated and aggregated for recycling before they develop additional systems for diversion. Planners can establish how much recycling is currently happening in the planning area by consulting with the local informal sector, aggregators, buyers of recyclable materials, and by using USAID's RAFT tool for each recycling aggregator. This information will help inform the ISWMP as to what types and quantities of materials are being sold to larger recycling entities. Once information is gathered, planners should develop a waste flow diagram, as shown in *Figure 4*.

Figure 4. Example of waste flow diagram



**Related Resources**

- **SWM Compliance Gap Analysis** (coming soon) – a guide and template for local governments to identify relevant laws, regulations, and clauses within them that require compliance.
- **Rapid Appraisal Facility Tool (RAFT)** – A simple form that guides planners to gather critical solid waste facility data to equip them with the pertinent information needed to assess the solid waste system to determine what needs improvement. The form provides a series of questions to gather information such as facility location (geo coordinates), the name, operator, number of staff, type and volume of materials are processed, and available equipment.

**3.3 Establish Goals and Identify Options for Improvement**

Using all of the information gathered, planners must identify the strategic goals and priorities for the planning area that meet the specific needs of its community and develop potential options—programs, policies, and improved or new infrastructure—to meet those planning goals. These goals should address a variety of topics, including solid waste generation and disposal; planning for the projected closure date of the area’s open dumpsite; establishing waste diversion goals or other measurable targets; developing programs for waste reduction, reuse, and recycling (segregation); among others. Most plans have short-term (up to five years) and long-term (beyond five years) goals for a given time horizon with established periods for plan specific updates (usually every five years for long-term plans).

## Establish Future System Goals

Identifying the goals and priorities for the planning area will guide the development of the ISWMP to meet the area’s specific needs. Goals are the long-term aims to be achieved as an outcome of the plan. Goals for the ISWMP should be developed with the local government, key stakeholder groups, and Waste Management Advisory Committee. Goals included in an ISWMP should aim to establish sustainable solutions that promote circular economy principles, as well as gender equality and women’s empowerment.

Targets are a way of measuring progress toward ISWMP goals and should be tailored to suit the area’s priorities and how it plans to achieve its goals. Sample goals and targets (in italics) are shown below.

Table 2. Examples of ISWMP Goals

System Component	Example Goals and Targets
<b>Collection</b>	<ol style="list-style-type: none"> <li>1. Improve collection of residential and commercial (residual and recyclable) waste to provide service to <i>80-90% of all generators in all areas of the city within three years; and 100% within five years.</i></li> <li>2. Ensure that food waste is collected a minimum of <i>X times per week.</i></li> </ol>
<b>Disposal</b>	<ol style="list-style-type: none"> <li>1. Operationalize a sanitary landfill capable of handling all the district’s waste <i>for 20 years by 2030.</i></li> <li>2. Close all illegal waste dumps <i>by 2035.</i></li> </ol>
<b>Reduce</b>	<ol style="list-style-type: none"> <li>1. Reduce plastic shopping bag waste <i>by 30% by 2028.</i></li> <li>2. <i>Double</i> the number of appliance repair workshops <i>by 2026.</i></li> <li>3. Reduce paper waste <i>by 2024</i> providing citizens with an option to have their waste bills sent to them electronically rather than mailed.</li> </ol>
<b>Reuse</b>	<ol style="list-style-type: none"> <li>1. Increase sales by consignment (resale) shops <i>by 2% each year</i> of the planning period.</li> <li>2. <i>Double</i> the number of water bottle refilling stations in public areas <i>by 2030.</i></li> <li>3. Expand the number of local library books available <i>by 40% by 2027.</i></li> </ol>
<b>Recycle</b>	<ol style="list-style-type: none"> <li>1. Establish the capacity to process and market <i>50 MT per day</i> of recyclable waste collected by the district <i>by 2029.</i></li> <li>2. Reduce waste disposed from non-household units <i>by 30% by 2030.</i></li> <li>3. Purchase recycled paper <i>for 10%</i> of the district’s printing paper needs.</li> </ol>

## Identify Improvements Needed and Potential Solutions

The established ISWMP priorities, goals, and targets should be compared with the existing solid waste and recycling system and used to identify what improvements are needed to meet these criteria. Reviewing the current solid waste and recycling system provides an opportunity to look at what is or is not working well. If public complaints are being received about specific services or facilities, these need to be addressed.

At this stage, planners should consider:

- What programs or infrastructure are working well?
- What should be kept or improved? How?

- What is not working well?
- What new approaches can be developed?
- What are the national targets for recycling single-use plastics and is the system currently supporting those measures? How is the data being tracked for this target?

Using waste characterization, generation and projection information, calculations should be made to determine how these targets will be met. For example:

- A jurisdiction collects and disposes 50,000 metric tons of waste per year (60% is biodegradable) in their landfill.
- If a goal was set to reduce the waste to the landfill by 30% in five years, this community knows that 15,000 metric tons could be diverted if they could collect and compost 50% of its biodegradable waste (or about 40 metric tons per day).
- Now the local government knows that its plan needs to include building and operating a compost facility that can manage up to 40 metric tons per day of organics and state how it intends to collect these materials (Can they use existing vehicles? Do new ones need to be purchased? Do they need to hire additional staff?)  

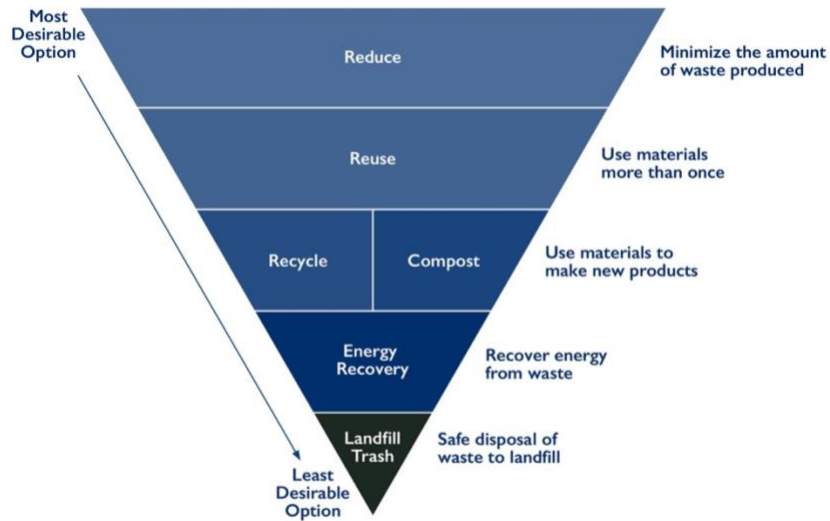
$$50,000 \text{ tons annually} \times 60\% \times 50\% = 15,000 \text{ tons per year } (\sim 40 \text{ tons per day})$$
- This community will need to figure out who generates this material (businesses, households, etc.), in what waste zones, and how many of these units they plan to target. Time will need to be allotted to develop a budget for and build the system before it can be implemented, too.

The ISWMP should also include a strategy (with options) for when the area's open dump or landfill disposal site(s) will reach capacity under varying scenarios for waste diversion. Achieving waste diversion goals will affect the longevity of the landfill or disposal site. Options for solid waste reduction, reuse, recycling, conversion, and disposal should be developed to meet waste diversion goals or other targets. Enhanced solid waste collection, processing/aggregation, conversion, and disposal solutions should also be developed to meet the plan's specific goals and targets.

Deciding what improvements are needed is an iterative process. At the core of the ISWMP are options that are developed to improve the integrated SWM system. Those options can include programs, policies, and improved or new infrastructure. Programs and policies should be based on the waste management hierarchy, focusing on the 3Rs at the top of the hierarchy (see *Figure 5*).



Figure 5. Preferred waste management hierarchy



Planners should assess each component in the waste value chain to identify the need for and solutions for improvements. For example, the following components should be assessed:

- Material processing facilities and transfer station capacity - to decide if expanded or new facilities are needed to meet future demand and to accommodate improved collection programs for source separated materials.
- Programs for diverting waste from landfills – to consider solutions such as improved collection services for segregated waste streams, with designated collection bins in public and high-traffic areas (with regular collection service and to prevent litter overflows and programs to enforce their use).
- Disposal facilities – to consider improved or new disposal facility options based on deficiencies found during the assessment of baseline conditions. If the existing system does not have enough landfill disposal capacity to meet the planning period’s future disposal needs, expanding existing or developing new facilities will need to be considered. This could include recommendations to optimize landfill capacity or implement other disposal site best management practices, such as proper soil coverage. Ensuring there is long-term disposal capacity is the “cornerstone” of the solid waste system.

Once distinct options for improving the SWM system are identified, planners should evaluate and compare the options against a set of criteria that has been developed with input from key stakeholders and the Waste Management Advisory Committee, such as:

- technical and regulatory feasibility;
- benefits for advancing local circular economy, including the creation of green jobs;
- environmental protection;
- waste diversion from landfills; and
- cost effectiveness.

To perform a comparative analysis, the goal for each criterion should be defined and each option scored on how it achieves the goal. Because not every criterion will be of equal importance, goals should be

weighted by importance and applied to the scoring. A Goal Achievement Decision Matrix (Figure 6) can be developed to quantitatively compare options and select the highest-ranking options as defensible recommendations for the ISWMP. This matrix can be applied on a system-wide basis or for individual components of the plan when several options are being considered. A decision matrix is not needed if all options being considered need to be implemented to meet system capacity needs (e.g., establishing a final disposal site).

Figure 6. Sample Goal Achievement Decision Matrix

Decision Criteria	Criteria Weight (1-5) <i>1 = lowest importance 5 = highest importance</i>	Option 1: Criteria Satisfaction Points <i>(Example: properly close existing open dump and site new landfill away from residents )</i>	Option 1: Weighted Score <i>(Example: properly close existing open dump and site new landfill away from residents )</i>	Option 2: Criteria Satisfaction Points <i>(Example: remediate existing open dump into managed disposal site and increase capacity)</i>	Option 2: Weighted Score <i>(Example: remediate existing open dump into managed disposal site and increase capacity)</i>	Option 3: Criteria Satisfaction Points <i>(Example: remediate existing open dump into managed disposal site and increase capacity)</i>	Option 3: Weighted Score <i>(Example: remediate existing open dump into managed disposal site and increase capacity)</i>
Community Acceptance	5	5	25	3	15	4	20
Environmental Impacts	4						
Cost	4						
Level of Control	3						
Remaining Landfill Capacity	3						
		Total		Total		Total	

*Goal Achievement Matrix Instructions:*

1. Determine decision criteria and goal options
2. Assign each decision criteria a weight based on its importance
3. Determine the extent to which each option satisfies each criteria. Assign points accordingly (using the criteria weight as the maximum amount of points possible).
4. Multiply the criteria weight by the criteria satisfaction points.
5. Assess totals for each goal option.

### 3.4 Conduct an Economic Analysis

A vital part of the planning process is conducting an economic (financial or cost-of-service) analysis that determines a solid waste system’s current cost, as well as the future cost of the planned system—and identifies options to fund these costs. Building an effective solid waste system requires that planners understand the cost of services currently being provided and once established, estimate the projected cost of the desired integrated SWM system, as it develops. Maintaining sufficient funds to cover the full cost of a sustainable SWM system is a common challenge across many countries as they develop or update SWM plans. Revenue structures vary from country to country, but the general funds that local governments typically rely upon to operate their waste systems are insufficient to manage the quantities of waste being generated by their growing populations. In this step, planners will identify funding options to cover any revenue gaps, lower general-fund subsidies, and cover the cost of the desired SWM system, to be presented to key stakeholders.

## Conduct a Financial (Cost-of-Service) Analysis

A projected Cost-of-Service Analysis (COSA) establishes the future cost impacts of the ISWMP as compared to the baseline costs of the current system. Even if ownership or operation of the waste management infrastructure is with a different entity or entities, it is still vital to establish the cost of the complete future system and planned infrastructure so that planners can exercise sound, data-driven decision making. Multiple scenarios should be considered based on the primary cost drivers, including but not limited to recovery rates, infrastructure and waste segregation costs, and service delivery among distinct types of waste generators (i.e., commercial, industrial, residential). Clean Cities, Blue Ocean's [Solid Waste Cost-of-Service Analysis: Guidelines for Local Governments](#) can be used to guide this process.

Clean Cities, Blue Ocean's COSA Guidelines recommend the following steps be taken to develop the cost of services:

- 1. Compile data** - Gather current SWM system data, including those for 3R programs. This includes annual plans, personnel, budgets, and history and scope of services. Inventory all assets within the SWM/3R program by owner such as buildings, land, equipment, and vehicles. Obtain other information including financial records, reports, accounts served, contracts, and qualitative and quantitative data that supplies information on the organization's finances. It is likely that all these expenditures are not in the same cost center (budget). Therefore, it is important to work with all agencies involved in the solid waste system to compile all the costs.

*Baseline costs should be based on actual financial data from the previous year, or from receipts, invoices, check registers, and/or other source documents.*

*Projected (future) costs can be developed by adjusting the baseline costs (e.g., from the previous year).*

Estimated changes to the baseline costs should be projected based on ISWMP recommendations and proposed changes to the SWM system, service offerings, number/mix of customers, and large capital outlays.

- 2. Estimate costs** - Cost estimating is used for existing system facilities and programs and for recommended ISWMP system improvements and programs. If records are limited, use a "bottom up" cost estimating technique, by which the costs of several lower-level components are summed to arrive at the total cost.

It is important to estimate costs for proposed program and facility improvements when evaluating options and impacts to system users and to find potential funding opportunities to help finance ISWMP recommendations. Estimates for equipment, buildings, or operations that are not yet in place can be made by contacting vendors and/or using budgets for similar activities that the jurisdiction is currently implementing.

## Identify Funding Options

Once estimates have been made for current and future system operational and maintenance costs, planners must determine how the costs of the system will be paid for (i.e., funded). Clean Cities, Blue Ocean's [Funding Options for Solid Waste Systems in Low- to Middle- Income Countries](#) provides

planners with information on how other local jurisdictions have addressed funding for their SWM systems, as well as examples of funding options that can be adapted to their own circumstances. The resource aims to enable local governments to take concrete steps toward establishing new funding that will support an economically sustainable SWM system.

Funding options may include adjusting/implementing:

- Disposal fees at the landfill
- Sale of landfill gas for energy/electricity
- Collection fees for industrial and commercial businesses which reflect the actual system costs
- Property or utility taxes to offset system costs
- Service fees from other beneficiaries (i.e., tourism)
- Sale of recovered materials from a material recovery facility
- Loans or grants from financing or donor agencies, including private sector investors and beneficiaries

### **Related Resources**

- [\*\*Solid Waste Cost-of-Service Analysis: Guidelines for Local Governments\*\*](#) – provides guidance to help local governments in low- and middle-income countries determine the costs of various local government SWM and 3R (reduce, reuse, recycle) programs that reflect local circumstances and opportunities. A Cost-of-Service Analysis is a detailed accounting and summary of all of the costs associated with a SWM/3R system. It is usually conducted as the initial financial step that can be used to form the foundation for future analyses that will inform and guide programmatic and logistical decisions in a financially strategic manner. During this process, financial data is obtained and organized so that a full picture of the costs of the current SWM/3R system can be seen as a single function that is implemented by the local government. Once a baseline level of these costs has been determined through this tool, local governments can use this information to support future actions such as SWM funding options, rate studies, or planning efforts.
- [\*\*Funding Options for Solid Waste Systems for Low- to Middle-Income Countries\*\*](#) – provides local government officials and staff with information on how other local jurisdictions have addressed funding for their SWM systems, as well as examples of funding options that can be adapted to their own circumstances. The resource aims to enable local governments to take concrete steps toward establishing new funding that will support an economically sustainable SWM system.
- [\*\*Virtual Training: Identifying Funding Options for Sustainable Solid Waste Systems\*\*](#)

## **3.5 Prepare the Plan**

To prepare the final plan, planners must develop an implementation schedule that includes recommended programs and facility improvements—including to site, design, and obtain regulatory approvals for these improvements; any recommended policy measures; as well as timelines to plan, budget, and track the progress of the plan's goals and targets. To monitor and measure the success of the plan, planners must establish key performance indicators such as the waste generation rate, material reduction targets, cost of service, rate of recycling/diversion. Once the plan is drafted, it should be presented to key stakeholders and decision makers to collect final feedback to finalize the plan and move toward submission for local government approval.

## Develop an Implementation Schedule

At this stage, an implementation schedule should be prepared that includes all recommended programs and facility improvements—including to site, design, and obtain regulatory approvals for these improvements; any recommended policy measures; as well as timelines to plan, budget, and track the progress of the plan’s goals and targets. Being as detailed as possible in specific implementation steps for every strategy supports successful implementation. Below is an implementation table template for a five-year program. If there are long-term goals that go beyond Year Five, develop a second table for years five to ten.

Table 3. Sample implementation schedule

GOAL I		Priority Ranking	Year 1	Year 2	Year 3	Year 4	Year 5
Strategy 1.1	Action 1.1.1						
	Action 1.1.2						
Strategy 1.2	Action 1.2.1						
	Action 1.2.2						

## Establish Key Performance Indicators

The final step in the planning process is to establish a system to measure the ISWMP’s success. Key Performance Indicators should be developed based on the plan’s goals and targets, such as:

- **Waste Generation Rate** for residential, commercial, institutional, industrial, and construction and demolition sectors (kgs/capita/day). Know the per capita generation rate for each sector. If the plan’s 3R goals are met, the per capita generation rate should be lower in future years.
- **Recycling/Diversion Rate** for material diverted from disposal compared to waste disposed and recycled (percentage). Know the diversion rate (how much material is diverted from disposal). Comparing future years will indicate if the programs are working or if the population may be growing and if any programs need to be modified.
- **Airspace Utilization Factor**. This is determined by calculating the tons of waste received divided by total volume of landfill airspace consumed (metric tons/cubic meter). This factor will indicate if the landfill is being operated according to best practices or if landfill operations need improvement (such as better compaction) so that the life of the landfill can be extended.
- **Targeted Waste Material Reduction** data based on waste characterization data and surveys. This will determine if recycling is increasing and what materials are being recycled.
- **Cost of Service** based on cost-of-service parameters. This will indicate if the cost of waste management is increasing or decreasing.

## 4. Ongoing Implementation and Monitoring

During the ISWMP implementation, planners must monitor its progress on an ongoing basis to assess and ensure it is meeting the implementation schedule and plan goals. These following questions should be answered:

- Is there a reduction in waste material being disposed of? What is the reduction?
- Is the per capita generation rate going up or down?
- Are targeted waste streams being reduced?
- Are landfill operations improving?
- How much does it cost to run the waste system?

To answer these questions, the following data will be needed:

- Weight and volume of waste collected, diverted, and disposed at the landfill
- Types of waste diverted: organic waste, aluminum cans, glass, ferrous metals, plastics, paper, cardboard, any other type important in your area
- System operating costs per ton
- Revenues from disposal fees, energy sales, use fees, and sales of recovered materials
- Measured reduction in beach litter and marine debris seen in adjacent rivers, streams, bays, and beaches

To ensure access to this data, planners must set up related data gathering systems/requirements and assign a team at the municipality or district-level to oversee data gathering, management, and reporting. There should be a central repository for all the information collected. Some of this data is also reported to the local and regional environmental monitoring and enforcement departments. Find out what the reporting requirements are for the district.

### 5.1 Review of the ISWMP

If there are local regulations that require periodic reviews of the ISWMP, planners should follow those guidelines. Otherwise, it is common to:

- Review annually for budgeting purposes;
- Make annual adjustments and recommendations to city officials based on progress toward meeting key performance indicators; and
- Update the ISWMP every five years.

### 5.2 Formulating Supporting Public Policy

Developing effective policy mechanisms is critical to the ongoing success, institutionalization, and sustained implementation of the ISWMP. Policies provide a legal and regulatory framework to guide the actions of both the city administration and residents. Well-crafted policies can address key aspects such as waste segregation, recycling initiatives, and proper disposal methods. By clearly outlining responsibilities, standards, and penalties for non-compliance, policies create a foundation for accountability and ensure that all stakeholders are aligned in their efforts to manage solid waste effectively. Additionally, policies can



promote sustainable practices that are aligned with a circular economy, encouraging the adoption of innovative technologies and environmentally friendly approaches to waste management.

Further, policy mechanisms play a vital role in securing necessary resources and funding for the implementation of solid waste management plans. Municipalities often require financial support to invest in infrastructure, such as recyclables processing facilities and waste collection systems. Through strategic policies, governments can establish funding mechanisms, such as taxes or fees, to generate revenue specifically designated for waste management initiatives. Moreover, policies can facilitate partnerships with private sector entities, encouraging businesses to participate in waste management efforts and contribute to the overall success of the plan. Robust policy mechanisms not only set the guidelines for effective waste management but also provide the means to fund and sustain these essential initiatives for the benefit of the community and the environment.

# Annex I. Integrated Solid Waste Management Planning Process

## Solid Waste Management Planning Process



## Annex II. Integrated Solid Waste Management Plan Outline

This outline can be used by planners to develop and assemble an Integrated Solid Waste Management Plan. Components may vary for countries with specific SWM planning requirements and regulations.

1. Goals or targets for the ISWMP
2. Background research and data
  - a. Description of current solid waste management system
  - b. Laws, regulations and industry best practices governing solid waste management
  - c. Waste projections and characteristics
3. Description of current solid waste and recycling system
  - a. Collection (residential and non-residential for both mixed and segregated wastes)
  - b. Transfer
  - c. Processing (e.g., material recovery facilities, composting)
  - d. Disposal (including closure of waste dumps)
  - e. Recycling markets (formal and informal)
4. Options for improving the solid waste management system
  - a. Collection
  - b. Transfer
  - c. Processing (e.g., material recovery facilities, organics processing)
  - d. Disposal
  - e. Recycling markets (formal and informal)
5. Financial (Cost-of-Service) Analysis
6. Funding Sources
7. Implementation Plan
  - a. Communication Strategy
  - b. Key Performance Indicators
  - c. Implementation Schedule