

PLASTIC  
SMARTCITIES



Working with cities worldwide to  
keep plastic out of nature by 2030



Resources & Waste  
Advisory Group™



# Towards Circular Systems: Lessons from Plastic Smart Cities

Translating local interventions  
into scalable solutions





# Introduction

Since 2018, Plastic Smart Cities has worked with over 50 cities/municipalities worldwide to implement plastic pollution reduction strategies.

With the ultimate objective of eliminating plastic leakage into the environment, diverse strategies have targeted key stages of the solid waste value chain while promoting circular economy approaches that prioritizes plastic reduction, reuse, recovery and recycling.

## Study overview

This report captures learnings from a range of PSC pilot interventions conducted between 2018 and 2024 from five countries in East and Southeast Asia where we have had some of the longest history of engagement: China, Indonesia, the Philippines, Thailand, and Viet Nam , highlighting lessons for future programme design.

As WWF’s PSC programme continues to expand globally, the study does not cover the full extent of PSC work. This report has been structured as a living resource - designed to be expanded over time to include case studies from additional countries and a broader range of solutions as the initiative grows.

Plastic Smart cities (PSC) is part of the world wide Fund for Nature’s (WWF) No Plastic in Nature initiative.



Tourist using refill station in Hue



Leaves turned into dishes



*Plastic Smart Cities support urban centres, coastal areas, and tourism hotspots to co-create solutions that prevent plastic from leaking into nature — delivering real change through circular systems and inclusive action.*



# PSC Focus Areas

This package of lessons learned from Plastic Smart cities are framed using the PSC Focus Areas along with an Enabling Framework to share examples of what worked along with areas for improvement.

## Goal: Reduction of Plastic Leakage into Nature



### Reduce | Reuse

- **Eliminate harmful and avoidable plastics**, e.g. phase out unnecessary or single-use plastics, promote bans or restrictions
- **Strengthen reuse systems and products** to reduce the usage of single-use plastics



### Separate | collect

- **Improve collection and segregation systems** to ensure plastics are captured and directed to appropriate recycling or disposal channels while reducing contamination e.g. strengthen access to formal collection systems, enhance segregation at the source, and optimize waste logistics



### Recycle | Recover

- **Boost recycling and recovery rates** to retain plastics within the value chain for a circular economy e.g. support the development of infrastructure and technologies at scale, and market incentives that promote the use of recycled materials

## Systemic Interventions

### Strategy Development

Support City or National Action Plan

### Policy Advocacy

Advocate city and/or national adoption of policies for effective implementation of the global plastics treaty (EPR, Bans, Regulation)

### Financing & Funding

Support city capacity to finance scalable solutions

### Knowledge Strengthening

Strengthen cities and national agencies on plastic circularity & reduction technical expertise

### Systems & Infrastructure

Support cities with the implementation and evaluation of scalable pilots for circular systems in cities

# Replication & Scaling

Replicating and scaling integrated solid waste management initiatives is challenging due to variations in context:

- stakeholder interests
- infrastructural capacities
- community awareness
- geographical considerations (e.g., urban vs. islands)

Drawing from the PSC case studies and lessons, some of the key factors for successful replication and scaling include:



Political buy-in and shared ownership



Existing policies or regulations



Pathway to unlocking finance or securing financial sustainability



Commitment of the local community/organisations/stakeholders



Training and advocacy for stakeholders' readiness and involvement for capacity building and knowledge transfer



Designing operational systems and procedures with baselines and monitoring for adaptive implementation



The [PSC Plastic Smart Guide](#) provides a step-by-step approach that supports replication and sustainable systemic changes – start with detailed waste flow baseline assessments, stakeholder alignment, tailored infrastructure investments for scaling at the design stage, targeted training, monitoring.

note

Projects that generate high costs but deliver limited value should be avoided due to the likelihood of them remaining financially unsustainable in the long-term.



minimising waste generation at source is key



- **Supporting regulatory actions** on bans or restriction on single-use plastic (SUPs) and other harmful plastic items
- **Redesign business operations** through innovation and eco-design for the phase out of SUPs
- **Fund and co-develop reuse and refill systems at scale** supporting with guidance for cohesive large-scale initiatives
- **Support behavioural change** programmes and public awareness campaigns to encourage reduction of plastics

Investing in circular waste & resource management systems requires an integrated approach that addresses the entire waste value chain and a long-term commitment prioritising upstream & midstream measures.

prioritising two-stream separation



- **Expand Collection Services** to areas of low collection (typically peri-urban, rural, and informal settlements)
- **Support community-based collection systems**
- **Collaborate with Businesses for Take-Back Scheme**, ensuring market linkages are strengthened



connecting aggregators and scaling infrastructure



- **Strengthen interfaces within value chains** ensuring connectivity between various operators
- **Finance equipment and systems** for large-scale recovery and recycling facilities
- **Build technical skills and knowledge** for low leakage operational standards

Underpinning these are the need for investments in:



policy reform, institutional capacity building, public-private partnerships, blended financing, inclusive governance, just transition, data systems, and market development to ensure financial sustainability, policy alignment and long term resilience of circular systems.

collection vehicle - Bogor, Indonesia





## 1

# Reduction

**Sitting at the top of the waste hierarchy, waste reduction is considered the most vital solid waste management option** - targeting interventions on preventing waste before it enters the system provides an upstream solution.

With global ambitions targeting corporate net-zero and over 150+ countries moving towards a legally-binding Global Plastics Pollution Treaty, trends are now shifting towards 'reduce and reuse', with less reliance on 'recycle'.

PSC has supported initiatives that promote waste reduction through:

- ☆ Education & Behavioural Change;
- ☆ Business Engagement;
- ☆ Reuse and Refill Models



## Lessons Learned



### Education and Behavioural change

- Embed waste + environmental education into curricula
- Advocate schools to ban single-use plastics (SUPs) + adopt a reuse & refill model for canteens
- Empower student leadership in waste monitoring + in engaging wider communities and families.



### Business Engagement and Reduction

- Align regulations with market incentives & opportunities, backed by proactive communication strategies.
- Enhance municipal and private sector collaboration.
- Redesign systems with cost-effective, eco-friendly alternatives to SUPs.



### Reuse and Refill

- Enhance financial viability and operational efficiency, e.g. improve logistics, better regulatory support
- Enforce regulations mandating clear reuse targets

(Make sure to include targeted incentives and public campaigns -- critical for ensuring lasting operational sustainability and consumer buy-in)

Read case studies on Reduction, from Indonesia's Zero Waste Schools to Viet Nam's sustainable tourism hotspots: [bit.ly/PSCReduction](https://bit.ly/PSCReduction)

## 2

## Collection



**Waste collection is a basic service that about two billion people globally still do not have access to.** Providing a reliable, robust and universal collection service will help protect public health by preventing open dumping, burning, and plastic leakage from uncollected waste.

PSC has worked at two levels to improve waste capture, particularly in underserved areas:

- ☆ **Formal collection systems** – expanding waste collection services, improving logistics, and integrating digital tools to enhance efficiency
- ☆ **Community-based waste management models** – empowering local groups (including waste banks and informal waste workers) to strengthen waste separation at source and linkages with offtakers for better waste recovery/recycling

## Lessons Learned



## collection &amp; Separation

- Implement source separation – separating wet and dry waste significantly improves recyclability of materials.
- Continuous education, regular monitoring, and empowering waste collectors to educate residents at the point of collection are essential for improving source separation compliance.



## community-based waste management

- Integrate waste banks into the wider waste management system – through partnerships with aggregators, junkshops, or larger material recovery facilities for financial sustainability.
- Strengthen relationships with communities to build trust and education.

Read case studies on Collection, from Thailand's waste banks to the Philippines' use of digital tech: [bit.ly/PSCCollection](https://bit.ly/PSCCollection)



## 3 Recovery & Recycling

Recovery and recycling initiatives are integral to PSC's approach, focusing on:

- ☆ **Enhancing the capacity and efficiency** of material recovery facilities (MRFs) and waste banks.
- ☆ **Supporting existing infrastructure** through the provision of equipment and infrastructure, while also facilitating the establishment of new facilities where necessary.
- ☆ **Addressing key enablers** such as waste collection prior to recycling, and subsequent market linkages for recyclable waste.

The recovery and recycling stage rarely involves only investing in equipment and facilities, but also in service and value chains.



### Lessons Learned



### Recovery & Recycling Services

- Integrate facilities within the existing solid waste management system with the appropriate operator model for long-term sustainability.
- Conduct accurate waste flow baselines, market assessments, feasibility studies, and risk assessments to ensure the availability of strong market linkages to guarantee offtake stability and sale of collected materials.
- Establish market stabilisation mechanisms such as Extended Producer Responsibility (EPR) frameworks for funding and the diversification of offtakers.



Read case studies on Recovery & Recycling, from Viet Nam's island-based waste management to large scale recovery facilities in Indonesia: [bit.ly/PSCRecoveryRecycling](https://bit.ly/PSCRecoveryRecycling)



## 4 Enabling Framework

It is crucial to look at the solid waste management (SWM) support system of an initiative when designing, approving, implementing, and supporting it to ensure long-term success. This support system is referred to as the enabling framework, shaping the overall context.

PSC emphasises the importance of a strong enabling framework for long-term impact, with focus on:

- ☆ Policy and regulation
- ☆ Sustainable financing mechanisms
- ☆ Robust monitoring and assessment



### Lessons Learned



#### Local Policy and Regulation

- Establish enforcement mechanisms e.g. fines, bans, and buy-back schemes.
- Strengthen public engagement to ensure community participation for long-term behavioural change.



#### Sustainable Financing

- Diversify revenue schemes to buffer to operational costs, e.g. waste collection service, selling and processing materials
- Employ EPR for market stabilisation



#### Monitoring and Assessment

- Ensure waste flow baselines are accurately conducted, up to date, and used to inform strategic action plans and adaptive management.
- Leverage digital applications to enhance efficiency of data management.

Read case studies on the Enabling Framework from City Action Plans in Viet Nam to Waste Flow Baselines in the Philippines: [bit.ly/PSCEnabling](https://bit.ly/PSCEnabling)



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The plastic pollution crisis is one of the greatest environmental challenges of our time, but it is also one we have the knowledge, tools and momentum to solve. A future with no plastics in nature is possible, but only if we act with urgency, unity and unwavering resolve. We call upon governments, businesses and civil society around the world to act boldly, urgently and together!

# OUR VISION

## a world with no plastic in nature

this vision is based on



A just and inclusive transition



a safe circular plastics economy



a recognition that the impacts of plastic pollution extend beyond biodiversity and include impacts on climate and human health